**CONTENT:**

Intraventricular hemorrhage (IVH) in very low birth weight infants (VLBW) happen in most of the patients within the first three days of life. The current concepts of the pathogenesis of both, IVH and periventricular leukomalacia (PVL) includes a period of cerebral ischemia. However, currently there is no established tool to recognize and eventually treat brain ischemia in a timely fashion to avert brain damage such as IVH/PVL. Cerebral tissue oxygenation (cStO2) as measured by near-infrared spectroscopy possibly indicates cerebral hypoperfusion. The objective of this study was to compare cStO2 during the first 72h of life in VLBW with and without IVH/PVL.

In a prospective cohort study cStO2 was measured in prospectively managed inborn VLBW along with arterial oxygenation (SpO2) and pulse rate from the first minutes of life during delivery room resuscitation and with extended monitoring during the subsequent 72h in the NICU. All parameters were recorded simultaneously every 2 seconds. cStO2 was recorded bitemporally by absolute oximetry (ForeSight®, Casmed). Cranial ultrasound was performed on day of life 4 and thereafter repeatedly until discharge. cStO2 was compared between infants with and without IVH/PVL first by calculating the mean cStO2 difference for every hour and second by computation of the area under a threshold, which was defined as the dynamic 10th percentile of all VLBW considered otherwise as “healthy”.

Between 10/2010 and 05/2014, 166 VLBW were studied, four of which had to be excluded because of death before 72h. IVH/PVL developed in 24/162. Infants in the IVH/PVL (no IVH/PVL) group were 67% (44%) male, had a mean gestational age of 25.9 (27.3) weeks +/- 15 (20) days and a mean birth weight of 721 (872) +/- 319 (308) grams. 71% (93%) were delivered by cesarian section, 38% (63%) had received a complete course of antenatal steroids.

Infants with IVH/PVL showed a lower cStO2. The hourly mean difference was 2.41% with a 95% confidence interval of 2.00 – 2.86. The largest difference was observed during the first 3 hours of life (Figure). Area under the threshold was not significantly different: Infants with IVH/PVL spent 6.8 (interquartile range 0.7-80.1) %hours under the threshold, infants without IVH/PVL did so for 4.4 (0.7-20.0) %hours.

VLBW with IVH or PVL had significantly lower values of cStO2 during the first 72h of life. The magnitude of this difference varies over the time and appears to be largest in first hours of life. We speculate that even short but severe episodes of impaired cerebral perfusion may be sufficient to cause IVH.

**IMAGE / TAB:**
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=ee7b4f3792ceb888fa9766bab70a0c87-MjAxOS0wNSM1Y2UyNjy2YmloDDc4

**IMAGE / TAB CAPTION:** Cerebral tissue oxygenation (cStO2) of VLBW with and without IVH/PVL during the first 72h of life

**COI:** None declared
ID: 14

**TITLE:** Performing Newborn Life Support in advance of Neonatal Advanced Life Support course – back to basics?

**AUTHORS:** Tim Hundscheid 1; Jos Bruinenberg 2; Jeroen Dudink 3; Rogier de Jonge 4; Marije Hogeveen 5

**AFFILIATIONS:** 1 Paediatric Dept., Amalia Children’s hospital, Radboudumc, Nijmegen, the Netherlands
2 Paediatric Dept., Elisabeth-Tweesteden hospital, Tilburg, the Netherlands
3 Neonatology Dept., Wilhelmina Children’s hospital, Utrecht, the Netherlands
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5 Neonatology Dept., Amalia Children’s hospital, Radboudumc, Nijmegen

**CONTENT:**

The Dutch Foundation for the Emergency Medical Care of Children (SHK) recently developed the Neonatal Advanced Life Support (NALS) course. This course offers additional theoretical education and skill training regarding airway management, more complex scenarios and crew resource management compared to the Newborn Life Support (NLS) course. Successful completion of a NLS test scenario is a prerequisite for the NALS course. The course directors had the impression that a substantial amount of participants failed.

We analysed if and why NALS course participants failed their test scenario. We wanted to gain insight which errors of omission (EoO; an error which occurs as a result of an action or assessment not taken) and errors of commission (EoC; an error which occurs as a result of not timely, or technically incorrect, performing an indicated action) were made. Scoring forms of the NLS scenario of participants on the first six NALS courses were analysed. Characteristics of participants and total amount of failures were collected. Failures were subdivided in EoO, EoC and unspecified if data on the scoring form were missing.

In total, 23/86 participants (27%) failed their NLS test scenario. SHK instructors (20/21) in general, and more specific NLS instructors (14/14), passed their scenario more often (p=0.008 and 0.013 respectively) compared to other participants (43/65). In total 110 fail items were made, of which the most frequent were the EoO not assessing heart rate (n=47) and the EoC inadequate performance of airway management (n=24).

- NLS performance in NALS course participants is suboptimal, both regarding EoO and EoC;
- NLS performance might be improved by checklists to reduce EoO
- NLS performance might be improved by local assurance of retention of skills to reduce EoC.

**COI:** Jos Bruinenberg, Rogier de Jonge, Jeroen Dudink and Marije Hogeveen are NLS and NALS instructors

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**Supported by:**

**Powered by:**
ID: 19

TITLE: CORRECTION OF APOPTOSIS OF LYMPHOCYTES INHALATION NITROGEN OXIDE IN NEWBORNS ON MECHANICAL VENTILATION.

AUTHORS: Pukhtinskaya Marina, Estrin Viadimir.

AFFILIATIONS: Department of Anesthesiology and Critical Care Medicine, State Medical University, Rostov-on-Don, Russia.

CONTENT:

Introduction. Activation of apoptosis of lymphocytes at the newborns with respiratory pathology, who are on mechanical ventilation of lungs, is followed by decrease in blood of concentration of endogenous nitrogen oxide (NO) and confirms high probability of development of bacterial complications.

Research objective. Decrease in frequency of development of sepsis by correction of apoptosis of lymphocytes by inhalation NO.

The randomized controlled blind clinical trial was performed on 97 full-term newborns with respiratory pathology on mechanical ventilation; no clinical signs of bacterial infection were diagnosed, with the content in blood of lymphocytes AnnexinV-FITC+PL≤10,6%, AnnexinV-FITC+PL+≤0,56%. Patients of group I (n=44) received inhalations by NO (10 ppm, 48 hours; «Pulmonox mini», Austria). Group of control - II (n=53).

On the 1th, 3th and 20th days after admission CD3+CD19-, CD3-CD19+, CD3+CD4+, CD3+CD8+, CD69+, CD71+, CD95+, HLA-DR+, CD34+, CD14+, CD3-CD56+, lymphocytes with expression AnnexinV-FITC+PI-, AnnexinV-FITC+PI+ were determined by method of a flowing phenotyping.

In I group (n=44) development of sepsis is confirmed at 4 newborns; in control group (n=53) - at 13 newborns (p1=0,04; p2=0,05, Fischer-Exvin,s test, bilateral alternative, 5% significance value). Lethal outcome in I group – 6 newborns; in II group - 10 (p1=0.37; p2=0,59; Fischer-Irvin,s test). Median of the transfer to independent breath in I group - 5 days, in II - 10 (p=0.00007); hospitalization duration in resuscitation in I group - 11 days, in II – 15 (p=0,02610); Kaplan-Major,s method, Gekhana-Vilokson,s criterion.

For 3th days in I group on comparison II group with relative contents increased CD3+CD19-, CD3+CD4+, CD14+ (p<0,05); decrease CD3+CD69+, CD3+ CD95+, lymphocytes with expression AnnexinV-FITC+PI-, AnnexinV-FITC+PI+ (p<0,05).

Correction of apoptosis of lymphocytes inhalation NO reduces the frequency of development of sepsis, duration of artificial ventilation of lungs and hospitalization in resuscitation, forms a tendency of decrease in frequency of a lethal outcome. Inhalation NO increases activity of monocytes and decrease activity of apoptosis of lymphocytes.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: "none declared"
ID: 27

**TITLE:** THE BIRTH TREND AND SHORT-TERM PROGNOSIS OF SMALL-FOR-GESTATIONAL-AGE INFANTS IN JAPAN

**AUTHORS:** Riki Nishimura; Naoto Takahashi; Akira Oka

**AFFILIATIONS:** Dept of Pediatrics, University of Tokyo, Tokyo, Japan

**CONTENT:**

Low birth weight is associated with hypertension, cardiovascular diseases and type II diabetes mellitus, of which mechanisms are called as “Developmental origins of health and disease, DOHaD”. Adaptation for unfavorable environment during fetal and early infancy periods is thought as a main cause of DOHaD. The number of low birth weight infants is increasing in Japan, which can lead to increased disease burden in future. According to this theory, preterm small-for-gestational-age (SGA) infants should be a strong risk factor for future morbidity. The aim of this study was to elucidate recent trend of preterm SGA birth in Japan and its associate factors.

We used the Neonatal Research Network of Japan (NRNJ) database for this analysis. This database contains clinical information of infants with gestational age (GA) less than 32 weeks or birth weight ≤ 1500 g admitted in 217 participating NICU, and a total of 56097 cases were registered between Jan 2003 and Dec 2015. The data of infants with less than 30 weeks gestation was analyzed in this study. SGA was defined as birth weight less than 10th percentile for GA. Infants with congenital anomalies, less than 22 weeks gestation and having missing data which was essential for analysis were excluded. The birth trend and the associate factors of SGA birth were explored.

In 32272 eligible infants, 31024 infants were analyzed in this study, and overall SGA rate was 23.6%. The rate of SGA increased from 8.1 to 29.2% as the gestational weeks advanced. The frequency of SGA birth has increased by approximately 7% during the 13-year study period, which was statistically significant upward trend (p < 0.001, Cochran-Armitage trend test). SGA was significantly associated with maternal age (odds ratio 1.03, 95% CI 1.02-1.03), hypertensive disease of pregnancy (HDP)/eclampsia (OR 7.66, 95% CI 7.14-8.23), and year of registration (OR 1.01, 95% CI 1.00-1.02) after adjusted for parity and the number of fetuses. SGA rate significantly increased in GA 23, 24, and 25 weeks infants, but not significant in > 25 weeks gestation. The survival to discharge rate was significantly improved during this period in SGA of < 26 weeks gestation (from 58.1 to 82.9%).

SGA birth rate was significantly increasing during the 13-year study period in Japan, which was strongly related with advanced maternal age and coexisting HDP. SGA rate significantly increased in GA 23-25 weeks, which would not be explained by older maternal age. Since short-term survival is improving, increasing indication of intensive care for more premature SGA may be one of reasons of this result.

**IMAGE / TAB:**

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**IMAGE / TAB CAPTION:** The frequency of SGA birth from 2003 to 2015.

**COI:** None declared
ID: 28
TITLE: FOLLOW UP OF NEUROPSYCHOLOGICAL DEVELOPMENT DURING THE FIRST YEAR OF LIFE IN INFANTS WITH A PROLONGED NEONATAL JAUNDICE
AUTHORS: Tatyana Itova 1, Victoria Atanasova 2, Vanya Nedkova 3
AFFILIATIONS: 1 Department of Neonatology, University Hospital Medika, Rousse, Bulgaria
2 Clinic of Neonatology, University Hospital "Dr. G. Stranski", Pleven, Bulgaria
3 Clinic of Pediatric Diseases, University Hospital "Dr. G. Stranski", Pleven, Bulgaria

CONTENT:

Neonatal jaundice is a part of the neonatal adaptation syndrome. It is believed that 98% of newborns have elevated bilirubin levels, but only about 60% have clinical manifestations. If the serum bilirubin levels are well controlled, unfavorable late neurological effects should not be observed. Is that the case? The aim of this study is to trace the nervous-mental development during the first year of life in children who have experienced neonatal jaundice.

Ninety-two babies born are followed up to the age of one year. The babies are divided into 4 groups: A – without neonatal jaundice, B – with jaundice treated with phototherapy in the 1st week of life, C – intensive jaundice during the first 14 days treated with phototherapy and urodeoxycholic acid, D – intensive prolonged jaundice requiring complex treatment (excluding exchange transfusion). Studied indicators: weight and gestational age at birth, sex, delivery way, Apgar score, maternal age & education, domicile. The serum bilirubin levels (total and direct) are traced during the hospital stay. Then a transcutaneous bilirubin level was monitored at day 14 and 28. In case of prolonged jaundice treatment with urodeoxycholic acid up to 3 months of age was performed.

Neuro-psychological development was monitored in the first 12 months of life, assessed by four indicators of development: motor functioning, sensor activity, emotional-social integrity and speech. The assessment was performed during prophylactic examinations by calculating a developmental rate according to the methodology of Manova-Tomova (1974, last update 2015). The analysis was performed by the studied indicators. We found that groups were comparable across all indicators except for residence, with the significant difference between groups B and D. Statistically significant development delay was proven in the group D compared to the other 3 groups for all studied age groups.

According to our data, prolonged intensive icterus has an unfavorable effect on the development of children for the first year of their life. Children with prolonged jaundice need to be followed up for a long period of time to assess possible deviations in their psycho-motor development.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 30

**TITLE:** ANTENATAL AND DEMOGRAPHIC FACTORS AND THE RISK OF BRONCHOPULMONARY DYSPLASIA (BPD) IN PRETERM INFANTS

**AUTHORS:** Yograj Deorukhkar 1; Jayesh Bhatt 2; Anjum Deorukhkar 3; Dushyant Batra 4

**AFFILIATIONS:**
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4. Department of Neonatology, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

**CONTENT:**

Bronchopulmonary dysplasia (BPD) remains an important cause for significant morbidity and mortality in preterm infants with a substantial burden on health services. The aetiology is multifactorial and yet to be fully understood. The aim of our study was to evaluate the association selected antenatal and demographic factors with BPD in preterm babies born in the two tertiary neonatal units in Nottingham, United Kingdom between January 2012 and March 2017.

This was a retrospective observational study looking at the preterm babies below 33 weeks’ gestation born and cared for in the two tertiary care neonatal units in Nottingham. The data was collected from the neonatal and maternity databases. BPD was defined as a need for additional oxygen at 36 weeks post conceptual age. The factors evaluated include maternal smoking status at the time of booking, social deprivation scores, small for gestational age, ethnicity and use of antenatal steroids. The data was analysed using Mann-Whitney test, Wilcoxon signed rank test, Fisher’s Exact test and Kruskal-Wallis test.

752 neonates born below the age of 33 weeks’ gestation were included in the study. Lower gestational age and birth weight were associated with BPD (p value 2.2e-16). Additionally, being small for gestational age was another significant factor shown to be associated with BPD (Odds ratio 2.5, 95%CI 1.17, 4.96). Other factors such as maternal smoking status at booking, social deprivation scores and ethnicity did not reach statistical significance in our study to show association with development of BPD. Antenatal steroids did not confer protection against BPD in our study group.

BPD is associated with lower gestation, lower birthweight and being small for gestational age. Maternal smoking status, ethnicity and social deprivation scores did not show association with BPD.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 32

TITLE: Use of web-based game in neonatal resuscitation - Is it effective?

AUTHORS: Cheo Lian Yeo 1,2,3; Imelda Lustestica Ereno 1; Selina Kah Ying Ho 1,2,3

AFFILIATIONS: 1 Department of Neonatal and Developmental Medicine, Singapore General Hospital, Singapore
2 Yong Loo Lin School of Medicine, National University of Singapore, Singapore
3 Duke-NUS Medical School, Singapore

CONTENT:

Didactic lectures and manikin-based simulation training used in neonatal resuscitation training are time and resource demanding, yet knowledge and skills acquired deteriorate months post-training. To empower learners to take control of their own learning on a continuous basis, innovative training strategies are needed. Given the proven effectiveness of the use of digital simulation in supporting procedural learning in healthcare education, we designed a single-player web-based, unguided Neonatal Resuscitation Game that supports on-demand learning and describes the evaluation of the effectiveness of the web-based game on the retention of knowledge and skills in resuscitation.

A non-randomised controlled study included healthcare professionals who attended simulation-based training in neonatal resuscitation from Oct 2016 to Jan 2018 at the SGH and KKH, Singapore. Following the initial training, participants assigned as controls received no additional retraining, while the experimental group received access to the web-based game. Baseline assessment of knowledge and skills in neonatal resuscitation is performed using a multiple-choice question test and a manikin-based skills test done upon completion of training and compared with an assessment at 6-month post-training.

Differences between groups were compared using Fisher’s exact test. Knowledge and skill performance scores between study groups were compared using a two-sample t-test or Wilcoxon rank-sum test.

A consistent decline in knowledge scores of 2.4-5.8 percentage points is seen in all study groups at the final assessment. The decline in knowledge scores was lowest in the intervention group, (p=0.357) while statistically significant declines were seen in the controls (p=0.048), and the experimental non-intervention group (p<0.001). Compared with the other study groups, the decline in total performance and sub-skills tests scores at the final assessment was greater in the intervention group (p=NS). Findings suggest that the use of the web-based game may be protective of knowledge retention but not technical skills in neonatal resuscitation. Modified intention-to-treat analysis showed that use of the web-based game resulted in no difference in mean knowledge test scores, total performance and sub-skills tests scores from baseline to final assessment in the control or experimental groups.

Findings suggest that the web-based game in its current format, may not be effective in facilitating retention of knowledge and technical skills in neonatal resuscitation. Results cannot be generalised given the limitations of the study design and small study population. Evidence on game quality, accessibility, usability and playability is needed for complete evaluation of game effectiveness.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 33

**TITLE:** EFFECT OF COMPREHENSIVE COUNSELLING ON PATTERN OF POST- DISCHARGE MORTALITY AND MORBIDITY AMONG VLBW BABIES IN INDIAN SETTING

**AUTHORS:** Poonam Dalal 1; Sachin Dangi 2; Geeta Gathwala 3

**AFFILIATIONS:**
1 Professor, Department of Pediatrics, Pt. B D Sharma PGIMS, University of Health Sciences, Rohtak, Haryana, India
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**CONTENT:**

With the advances in neonatal care, the number of preterms discharged from the neonatal intensive care units (NICU) continues to increase. NICU graduates are at increased risk of adverse outcomes more so in limited resource settings. In India, VLBW babies constitute 4-7% of the live births and nearly 30% of neonatal deaths. VLBW babies are more likely to die in the first year of life than infants of normal birth weight. The reported rate of readmission for NICU graduates ranges from 10-20%. This study was planned to ascertain post-discharge morbidity and mortality pattern and the effect of comprehensive counselling on short term outcomes in VLBW babies discharged from NICU in Indian Setting.

This quality improvement interventional study was conducted in the Neonatal Services Division of a tertiary care center of North India from November 2017 to July 2018. The VLBW babies discharged from NICU were followed up till chronological age of 3 months for final outcome (alive/death/lost to follow-up). Any event of emergency department visit or re-hospitalization was recorded as per a detailed proforma. A structured comprehensive counselling at the time of discharge in form of one-to-one counseling, video clips and brochures regarding hand hygiene, feeding, KMC, red flag signs and need for regular follow-up was introduced after a period of 3 months. The data was evaluated to assess the impact of comprehensive counselling on post-discharge mortality and morbidity pattern in VLBW babies.

A total of 132 VLBW babies were enrolled in the study; 64 in control group and 68 in the study group (after intervention). Two babies were lost to follow up, one each in study group and control group. The baseline characteristics likely to impact final outcome like birth weight, gestational age, co-morbidities, NICU stay and maternal details were comparable in the two groups. A total of 31 babies were re-hospitalized during the three months follow-up period; 21(32.8%) in the control group and 10(14.7%) in the study group which was statistically significant (p<0.05). Two babies expired in the study group as compared to 5 in the control group. The mean KMC duration, rate of observation of hand hygiene by caregivers and weight gain at 3 months of chronological age were significantly better in the study group as compared to control group; with p value <0.001, 0.01 and <0.001 respectively.

The introduction of a simple quality improvement intervention comprising of comprehensive counselling at the time of discharge led to a positive impact on weight gain, KMC duration and hand hygiene practices being observed by caregivers after discharge, decreased rate of emergency department visits and re-admissions and an improved survival rate in three months follow-up among VLBW babies discharged from NICU in a limited resource setting.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** "None declared"
ID: 34
TITLE: FEASIBILITY AND IMPACT ON GROWTH OF CONCENTRATED STANDARDISED PARENTERAL NUTRITION IN VERY PRETERM INFANTS IN A TERTIARY NEONATAL UNIT IN THE UNITED KINGDOM
AUTHORS: Tng Chang Kwok; Ramune Snuggs; Rowan Toyer; Emmanuel Oyewole; Kamil Effendi; Lucy Stachow; Deepa Panjwani
AFFILIATIONS: Neonatal Unit, Leicester Royal Infirmary, Leicester, United Kingdom

CONTENT:
Cumulative nutritional deficit in very preterm infants may lead to poor neurodevelopmental outcome. Optimisation of early nutrition, with emphasis of earlier commencement of parenteral nutrition (PN) with amino acids and addition of lipids within 24 hours old, prevents postnatal growth failure. Concentrated standardised PN may reduce the delay in commencing PN as compared to conventional individualised PN. However, the feasibility of concentrated standardised PN in a busy tertiary neonatal unit setting in the United Kingdom as well as its impact on growth in very preterm infants are unclear.

In December 2017, the PN provided in Leicester neonatal service was switched from individualised PN to standardised concentrated PN based on the ‘SCAMP’ regimen. Retrospective and prospective data collection were performed on infants receiving PN within 24 hours old born between September to November 2017 (individualised PN arm) and similar period in 2018 (concentrated standardised PN arm) respectively. Infants are excluded if they are transferred out or demise before completing PN in Leicester neonatal service. Growth parameters at birth, 28 days old and 36 weeks corrected gestation/discharge were obtained and converted to z scores using the LMS method. Mann Whitney test was used to compare continuous data.

21 and 20 infants with mean gestational age of 29.6 and 28 weeks respectively were included in the 2017 individualised PN and 2018 concentrated standardised groups respectively. There was no difference in the demographics of infants in both groups. Concentrated standardised PN was commenced earlier by median of 8 hours old (n=20) compared to 25 hours old (n=19) in the individualised PN group (U=42, p<0.0001). There was no statistical difference in the change in weight z score from birth at 28 days old (median -0.47 (n=20) in 2018 vs -0.66 (n=19) in 2017, U=178.5, p=0.75) and at 36 weeks corrected gestation/discharge (median -0.72 (n=20) in 2018 vs -0.86 (n=21) in 2017, U=106, p=0.7). 29% reduction in procurement cost was seen when concentrated standardised PN replaced individualised PN.

Standardised PN is feasible in a busy tertiary neonatal unit setting in the United Kingdom. It allows earlier commencement of PN and reduction in cost. The lack of difference in growth parameters seen may be due to the small sample size. However, further efforts should be made to improve the extrauterine growth restriction seen in these preterm infants.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Weight z score for infants receiving individualised parenteral nutrition (PN) in 2017 and standardised PN in 2018

COI: None declared
ID: 38

**TITLE:** Evaluating the neonatal ward round: should parents only be allowed in the neonatal ward whilst their child is being reviewed?

**AUTHORS:** Thomas Hixson 1, Jason Palman 2, Chinnappa Sanath Reddy 3.

**AFFILIATIONS:** 1 Neonatal Unit, Princess Alexandra Hospital, Harlow, Essex, United Kingdom.

**CONTENT:**

The ward round (WR) is a fundamental part of caring for newborn patients on a Neonatal Unit (NNU); recommendations to help support parents of patient include participation and collaboration between parents and healthcare professionals through attendance at WRs. This aims to establish parental views on the current WR process within the NNU at Princess Alexandra Hospital, Harlow focussing on the concept of confidentiality and satisfaction of parents with the WRs process. This project also uniquely aims to identify demographic or social factors that impact on the parents’ opinions of the WR process.

Our study recruited 36 parents with babies admitted to the NNU for more than two days between July 2017 and October 2017. Formal consent was given by each parent. Questionnaires were distributed to parents collecting demographic data and parent opinions on the WR process. Multiple choice questions and visual analogue scales were used within the questionnaire. Data was analysed using R (R Development Core Team 2010).

The majority of patients preferred communal ward rounds (CWR) (66%) rather than private ward rounds (PWR). Over 30% of parents felt the ward round was “too long” whilst none found it “too short”. Parents with babies born at a lower gestational age preferred a PWR (p=0.043). A logistic regression model accounting for the gestational age, length of stay and feeding modality, found the most influential factors distinguishing parents preferring CWR over PWR include higher frustration of leaving the ward whilst other babies are being reviewed, lower understanding of reason behind parents being asked to leave during the WR, and lower concern of CWR breaching confidentiality. Combining these three variables significantly contributed to the WR preference of parents with an area under the curve (AUC) of 0.914 (p=0.0002, figure 1).

By taking into account the demographics and significant factors we have identified, the WR process can be adapted to maintain confidentiality but improve parental satisfaction, doctor-patient relationships, and parental and baby bonding. A larger multi-centred version of our study, would be our next step to ensure generalisability.

**IMAGE / TAB:**
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=d5e47c37f6bd786837b0e0bf336b2cf9-MjAxOS0wNSM1Y2UyNjy2YmujNTi2

**IMAGE / TAB CAPTION:** Figure 1. Receiver operator curve of the 3 factors that independently contribute to the difference of the groups of parents.

**COI:** None declared
ID: 42  
TITLE: APPROACH TO THE DESIGN AND DEVELOPMENT OF COMPUTER-SIMULATED NEONATAL RESUSCITATION GAME FOR HEALTHCARE TRAINING  
AUTHORS: Imelda Ereno, Ho Kah Ying Selina, Vina Tagamolila, Yeo Cheo Lian  
AFFILIATIONS: Singapore General Hospital, Outram Road, Singapore

CONTENT:

The Singapore Neonatal Resuscitation Course (SNRC) curriculum is comprised of online e-learning modules, and 1-day instructor facilitated performance and integrated skills training, simulation and debriefing. Current institutional policies require local healthcare professionals to undergo training once every 2 years. However, evidence suggests that knowledge and skills in neonatal resuscitation decay with time as early as 6 months post-training. SNRC in collaboration with Serious Games Association, Singapore (SGA) designed and developed a computer-simulated neonatal resuscitation assessment game.

Objectives: To develop and implement an unguided-web-based simulation game for re-training and assessment of knowledge and technical skills in neonatal resuscitation

A single-player, unguided, time-constrained web-based simulation game was built. The player portrays the role of the team leader, with 1-3 non-player characters (NPC) in a scenario-based neonatal resuscitation. To promote situated learning, the 2015 newborn resuscitation algorithm was formalized. Learning content is embodied within the game design by recreating accurate simulation environment, including gameplay features and teaching strategies.

Resuscitation scenarios under 3 main categories (Term, Preterm, Extreme Preterm) with graduated levels of difficulties (Easy, Moderate, Challenging) were developed. At the end of every game session, a detailed feedback is available to the user for self-assessment and monitor user’s progress.

Neonatal resuscitation game is a model of learning that facilitates learning on a continuous basis with a focus on competency rather than compliance to institutional policy. It empower learners to take control of their own education and has the potential to impact re-training and competency maintenance in other resuscitation programmes.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 44

**TITLE:** EFFECTS OF NASOJEJUNAL TUBE (NJT) FEEDING WHEN COMPARED TO NASOGASTRIC TUBE (NGT) FEEDING ON GROWTH AND ADVERSE CONSEQUENCES (ASPIRATION PNEUMONIA, SEPSIS, NECROTISING ENTEROCOLITIS AND DEATH) IN PREMATURELY BORN INFANTS LESS THAN 34 WEEKS GESTATION.

**AUTHORS:** Alice Scott 1; Jodie Nguyen 2; Ramon Fernandez 1,2; Cathy Garland 2; Phil Amess 2; Rob Bomont 2; Heike Rabe 1,2; and Prashanth Bhat 1,2

**AFFILIATIONS:** 1 Brighton and Sussex Medical School, Brighton, UK
2 Trevor Mann Baby Unit, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK

**CONTENT:**
Gastro-oesophageal reflux (GOR) is common in premature infants. Whilst this usually resolves with time physiologically or with minimal use of anti-reflux medications, some infants will continue to experience symptoms such as frequent vomiting and failure to thrive in the neonatal period. The greatest risk of continued GOR is aspiration pneumonia. It is therefore necessary, in some cases, to feed by nasojejunal tube (NJT). Whilst evidence exists to suggest that NJT feeding improves outcomes for those with severe GOR, there is concern over the risks associated with NJT feeding. Most notably, there is a potential correlation between NJT feeding and the development of necrotising enterocolitis (NEC). The aim of the study was to determine the effects of NJT feeding compared to nasogastric tube (NGT) feeding, and to identify the risk profile of those who develop NEC, including any co-existent factors.

A retrospective matched pair-cohort analysis of patient data over a five-year period was undertaken. Prematurely born infants less than 34 weeks’ gestation admitted to a tertiary neonatal unit who needed nasojejunal feeding were identified and matched for gestational age with an equal number of infants who received nasogastric feeds only. In addition, data from premature infants less than 34 weeks who developed NEC during the same time period were also collected. Infants with major congenital abnormalities and infants who developed NEC before NJ tube was inserted were excluded from the study. SPSS Statistics version 25 was used to analyse the data. Mann Whitney U test was used to compare the outcomes between the two groups. A $p$-value < 0.05 was considered statistically significant.

Twenty NJT fed infants less than 34 weeks gestation were matched for gestational age with twenty infants who received NGT feeds. There were no significant differences between the two groups with regards to the baseline characteristics. None of the infants developed an intestinal perforation secondary to NJT placement. There were no differences between the two groups with regards to rate of growth ($p=0.409$), aspiration pneumonia ($p=0.79$), NEC ($p=0.602$), sepsis ($p=0.221$), time to discharge ($p=0.429$) or death ($p=0.429$). In addition, 29 infants less than 34 weeks’ gestation who developed NEC during the same time period were identified. 2 out of these 29 infants had been fed via NJT and the remainder via NGT. 21 out of 29 infants required surgery for their NEC, 2 of which died subsequently. No common factors which could be considered potentially causative of NEC were found within the group.

Our results suggest that NJT feeding is possibly a safe method to deliver enteral nutrition to premature infants < 34 weeks with severe GOR who respond poorly to more conservative treatments. Equal growth rates between the groups indicate that NJT fed infants may not suffer from notable malabsorption or failure to thrive. Further large randomised controlled studies would be needed to corroborate these findings and confirm the safety of NJT feeding.

**IMAGE / TAB:**
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=000e649ce12258405a655c89ec908859-MjAxOS0wNSM1Y2UyNjY2YmJiNzRl

**IMAGE / TAB CAPTION:** Results

**COI:** None declared
ID: 48

TITLE: CORRELATION ANALYSIS BETWEEN MOLECULAR MARKERS AND SCORAD SCALE

AUTHORS: Nurangiz Hajiyeva 1; Afag Akhundova 2; Nargiz Mammadova 3; Pusta Orujova 4

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CONTENT:

Damage of the barrier function of the intestinal mucous membrane has important role in pathogenesis of atopic dermatitis. Mucous membrane markers MUC-2 (Mucin 2) and ITF (Intestinal Trefoil Factor) implement protective function of the intestinal mucous membrane.

The aim of the current study is prediction development of atopic dermatitis (AtD) from the first days of postnatal period by assessing the status of mucosal intestinal secretion based on correlation analysis. Process of becoming allergic phenotype starts even before birth due to certain physiology changes happened with pregnant woman. Besides, in resent years there is an observation of a tendency of growth a number of pregnant woman, who possesses high risk in development of perinatal complication, and brings to disorder of neurohumoral adaptive mechanisms, non-adequate immune response of fetus and newborn. It is defined that intestinal mucous membrane is the most delicate for adverse impacts of antenatal period. There is observed boosting penetrability of mucous membrane of children with AtD that allows allergen permeate into organism. Our research defines induction impact of allergic processes on expression MUC-2 and ITF of the intestinal mucous membrane. Though available data about role of mucous membrane and other factors impact on early development of AtD are rare and quite controversial.

We divided 56 term newborns into 3 subgroups based on severity of AtD: 13 children with mild severity, 25 children with moderate severity, 18 children with heavy severity. Definition of the AtD severity of the children at the first year of life was conducted based on semi-quantity scale of SCORAD.

While examining correlation analysis between level of structural and functional components of mucosal barrier and degree of the clinical appearance of AtD, we found the true positive dependency between concentration of Muc-2 and estimation by scale SCORAD (p=0,414; p < 0,001). Similar dependency between ITF level and SCORAD scale is relatively moderate (p=0,265; p = 0,039). Hypersecretion of goblet cells exerted in high concentration of Muc-2 since first days of life allows us imply infringement of intestinal mucous barrier under impact of perinatal risk factors follow by formation AtD on the next stages of ontogenesis. Obvious change in the level of Muc-2 in compare with ITF indicators in AtD evidently prove higher sensibility of Muc-2 as intestinal barrier against harm conditions in antenal age.

Because appearance of high concentration of Muc-2 indicates hyper secretion of goblet cells, we can conclude that perinatal risk factors defeat mucosal barrier of intestine and formulate AtD at the following stages of ontogenesis. Difference between significant changes in the levels of MUC-2 and ITF during AtD reveal higher sensibility of this component of the intestinal barrier for damaging influences in antenal period.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=71911ec16604b0d7d4d08580591ce0dd-MjAxOS0wNSM1Y2UyNjY2YmJIMzI

IMAGE / TAB CAPTION:

COI: None declared
ID: 59

TITLE: Does Lumbar puncture performed for raised CRP help the management of early onset neonatal sepsis? A 20-month experience in transitional care.

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Katharine McDevitt  2

AFFILIATIONS: Paediatric Department, Peterborough City Hospital, Peterborough, U.K

CONTENT:

Early-onset neonatal sepsis (EOS) is a potentially life-threatening disease. C reactive protein (CRP) is the most used biomarker for the detection and management of EOS. In our neonatal unit lumbar puncture (LP) is routinely performed if CRP is above 20mg/L, as per East of England (EoE) guidelines, to detect meningitis and determine the length of treatment. EoE guidelines recommend 5 days of antibiotics for babies with significant rise in CRP. It is therefore unclear whether LP performed only on basis of raised CRP adds to the management of EOS

We conducted a single-centre retrospective study to assess the impact of LP, performed on the basis of raised CRP only (in the absence of clinical signs), on detection of meningitis and management of EOS in terms of the length of antibiotic treatment. 49 newborn infants who did not require admission to the neonatal unit but who had been screened and treated for EOS on the basis of risk factors or soft clinical signs, and who had an LP for raised CRP were identified over a 20-month period from May 2016 until December 2017. Newborn infants with traumatic LPs were excluded due to controversy in interpreting microscopy in presence of red blood cells in cerebrospinal fluid. Patient records were reviewed along with CRP levels, CSF microscopy and culture results.

21 infants were treated in view of risk factors for sepsis but had no clinical signs of infection. The remaining 28 infants were treated for showing soft signs of infection eg mild respiratory distress or feeding difficulties. All infants remained well throughout their stay in the hospital.

No infant had raised white cells in their CSF and were negative for gram staining or bacterial growth. The mean length of antibiotic treatment for the babies having an LP was 5.3 days, versus the 5 days that would have been given as per recommendations in the guideline for raised CRP (p = 0.062).

In our study, LP in infants with raised CRP who were not significantly unwell did not result in a diagnosis of meningitis and did not alter the length of antibiotic treatment significantly. This study highlights the importance of reviewing the practice of LP being routinely performed as part of work up for EOS when CRP is raised without clinical signs or strong suspicion of meningitis.

COI: The authors declare that they have no conflict of interest
ID: 60

TITLE: Early Fortification of Enteral Feedings for Infants <1250 Grams Birth Weight Receiving a Human Milk Diet Including Human Milk Based Fortifier

AUTHORS: Robert Huston 1; Martin Lee 2; Evelyn Rider 3; Melissa Stawarz, 4; Dawn Hedstrom 5; Melissa Pence, RD 6; Vera Chan 2; Jessica Chambers 3; Stefanie Rogers 4; Nadine Seger 5; Howard Cohen 6

AFFILIATIONS: 1 Northwest Newborn Specialists, PC and Pediatrix Medical Group, Portland, OR; 2 Prolacta Bioscience, Duarte, CA; 3 Providence Alaska Medical Center, Anchorage, AK; 4 Providence St. Vincent Medical Center, Portland, OR; 5 Billings Clinic, Billings, MT; 6 Salem Health Hospitals and Clinics, Salem, OR.

CONTENT:

An exclusive human milk diet (EHM) of mother’s own breast milk (MOM) supplemented with banked donor breast milk and fortified with a human milk-based fortifier has been shown to decrease the occurrence of necrotizing enterocolitis (NEC) compared to a bovine diet of MOM supplemented with preterm formula and fortified with a bovine-based fortifier in infants <1250 g birthweight. Growth velocity may be less for infants receiving EHM compared to a bovine diet. Studies of fortification of human milk feedings at lower feeding volumes than 80-100 mL/kg/day have found mixed results with regard to improving growth. The objective of this study was to determine if growth is improved by earlier fortification of breast milk for preterm infants supported with a human milk based fortifier.

A multi-center retrospective study of the outcomes of infants of 500-1250 g birth weight whose breast milk feedings were fortified at >60 mL/kg/day (LATE) versus < 60 mL/kg/day (EARLY) of enteral feeding volume. Primary outcomes were growth velocities and changes in z-scores for weight and head circumference (HC) from birth to discharge. Clinical outcomes were also evaluated. Weight gain velocity was calculated using the exponential method. Continuous outcomes were analyzed using a multiple linear regression model and binary outcomes were analyzed using multiple logistic regression. The adjustment variables considered were birth weight/head circumference, gestational age, gender, SGA status, chronic lung disease, PN days, and study site.

Median+IQR range for gestational age (27.6+3.4 vs 27.0+2.9 wks, p=0.03) and chronic lung disease (CLD: 42.6 vs 27.6%, p=0.008) were higher, and weight gain (12.9+2.6 vs 13.3+2.6 g/kg/day, p=0.03) was lower in the LATE vs the EARLY group. Adjusted multiple linear regression analysis found that early fortification was associated with improved growth velocity for weight (coefficient, standard error, p-value: 1.636, 0.508, p=0.007) and HC (0.030, 0.013, p=0.021) and less negative changes in z-scores for weight (0.238, 0.103, p=0.022) and HC (0.273, 0.137, p=0.046). Adjusted multiple logistic regression found that early fortification was associated with decreased occurrence of CLD (-0.965, 0.331, p=0.004). No other outcomes, including NEC, were associated with early versus late fortification.

Early fortification appears to positively affect growth for infants whose human milk feedings are fortified with a human milk based fortifier without adverse effects. The incidence of CLD was also reduced in the early fortification group.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: Evelyn Ryder is a consultant for and Martin Lee and Vera Chan are employees of Prolacta Bioscience (Industrial City, CA).
ID: 65

TITLE: WHERE ARE WE NOW WITH NEONATAL RESUSCITATION

AUTHORS: Jocelyne Bukeyeneza MD1
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2B.Sc, M.Sc, MD candidate 2020, McGill University
3Thérèse Perreault, MD, FRCPC, FAAP, Associate Professor, Division Director of Neonatology, Montreal Children’s Hospital, McGill University

CONTENT:

Background: Neonatal Resuscitation Program (NRP) is a practical tool to improve newborn survival and reduce death from perinatal asphyxia. In 2010, NR training was introduced in Rwanda. However, it is unknown how NR training is integrated in the clinical practice.

Objectives: As a Quality Improvement project, knowledge and application of Rwanda Neonatal Treatment and NRP guidelines were assessed among Health Care Providers (HCP): Post-graduates (PG), Neonatal nurse (NN) and Midwives.

Methodology: Surveys were distributed to HCPs in July 2017 at the Centre Hospitalier Universitaire de Kigali (CHUK).

Results: Eighty-seven HCPs answered: 32/46 PGs, 11/14 NNs and 44/65 Midwives. The main reason to attend birth is fetal distress (83%). Pediatrician or PGs are called the most (50%) to attend birth. Umbilical pulse (60%) is used more than stethoscope (46%) to assess heart rate (HR) and if HR<60 bpm, chest compression is done first (57%). Resuscitation is initiated with FiO2≥0.5 for terms (68%) and preterms (62%). Ventilation effectiveness is thought to be seen by chest rise 84%. Ambubag (75%) is reported as the tool to deliver Continuous Positive Airway Pressure (CPAP). More than 50% of respondents have received NR training in the past year.

Conclusion: Bridging know-do gap is a worldwide challenge and only good understanding of NRP principles and regular simulated practices can ensure competencies acquisition and maintenance.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 66

**TITLE:** LUNG DEPOSITION EFFICIENCY OF NEBULIZED PORACTANT ALFA IN SPONTANEOUSLY-BREATHING NEWBORN PIGLETS: COMPARISON OF CPAP vs PRESSURE SUPPORT VENTILATION VIA NASAL PRONGS

**AUTHORS:** Nord A 1; Linner R 1, Salomone F 2; Bianco F 2; Ricci F 2; Murgia X 3; Schlun M 4; Cunha-Goncalves D 1; Perez-de-Sa V 1

**AFFILIATIONS:** 1 Department of Clinical Sciences, Lund University, Skåne University Hospital, Lund, Sweden; 2 Department of Preclinical Pharmacology, R&D, Chiesi Farmaceutici S.p.A., Parma, Italy; 3 Department of Drug Delivery, Helmholtz Institute for Pharmaceutical Research Saarland, Saarbrücken, Germany; 4 PARI Pharma GmbH, Starnberg, Germany

**CONTENT:**

Aerosolized surfactant delivery to preterm neonates on non-invasive ventilation has been associated with poor lung deposition rates, precluding the clinical implementation of nebulized surfactant therapy. In this study, we compared the lung deposition of nebulized surfactant (poractant alfa) delivered with a customized eFlow Neos investigational vibrating-membrane nebulizer system to healthy newborn piglets managed either with nasal continuous positive airway pressure (nCPAP) or with nasal pressure support ventilation (nPSV).

Twenty-five newborn piglets (1.16–2.2 kg) were sedated and supported with either nCPAP (3 cmH2O, n=12) or nPSV (3 cmH2O + 3 cmH2O PEEP, n=13) via custom-made nasal prongs (FiO2 0.5, Servo-I ventilator). All piglets received 200 mg/kg of technetium-99m-labeled surfactant by continuous nebulization. Blood gases were taken before and after surfactant nebulization. The surfactant deposited in the lungs was measured by gamma scintigraphy. Statistical analysis was performed with the t-test.

Mean surfactant deposition was 15.9 ± 11.9 % in the nCPAP group and 21.6 ± 10 % in the nPSV group (p=0.20). Respiratory rates were similar in both groups. Minute volume (MV) was 535 ± 197 mL in the nCPAP group and 796 ± 251 mL in the nPSV group (p=0.009). Blood gases were similar in both groups (table 1).

Irrespective of the non-invasive ventilation mode used, relatively high surfactant deposition rates were achieved with nebulization. The deposited surfactant amounts are promising for their potential to elicit a sustained pulmonary function improvement in the context of respiratory distress syndrome of the neonate.

**IMAGE / TAB:**
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=fd468502eab7b6cb264e1ac749f00c75-MjJxOS0wNzM1Y2VjYmMzNGYy

**IMAGE / TAB CAPTION:** Table 1 - Arterial blood gases in healthy newborn piglets before and after nebulization. Data presented as mean ± SD.

**COI:** The study was funded by a grant from Chiesi Farmaceutici S.p.A. Federico Bianco, Fabrizio Salomone and Francesca Ricci are employed by Chiesi. Martin Schlum is employed by Pari Pharma. Xabi Murgia is a Consultant for Chiesi. Valeria Perez de Sa, Anders Nord,
ID: 72

TITLE: GENETIC PREDICTORS OF EARLY-ONSET NEONATAL SEPSIS AND PNEUMONIA IN PRETERM NEONATES WHO REQUIRE RESPIRATORY SUPPORT

AUTHORS: Nikitina I.V. 1,2, Donnikov A.E. 1, Krogh-Jensen O.A. 1,2, Lenushkina A.A. 1, Ionov O.V. 1,2, Kryuchko D.S.1,3, Zubkov V.V., 1,2 Degtyarev D.N. 1,2

AFFILIATIONS: 1 Federal State Institution “National Medical Research Center for Obstetrics, Gynecology and Perinatology named after Academician V.I. Kulakov” of the Ministry of Health of the Russian Federation, Moscow, Russia. 2 Federal state autonomous educational institution of higher education. I.M. Sechenov First Moscow state medical university of the Ministry of Health of the Russian Federation (Sechenov university), Moscow, Russia. 3 The Federal state autonomous institution «National Medical Research Center for Children's Health» of the Russian Federation Ministry of Health, Moscow, Russia.

CONTENT:

The aim of this study was to evaluate gene polymorphisms in preterm neonates, who required respiratory support, in order to find genes potentially involved in the response to invasion of infectious agents and inflammation process.

The study included 313 preterm newborns (24-36 weeks of gestation) admitted to the neonatal intensive care unit (NICU) of the National Medical Research Center for Obstetrics, Gynecology and Perinatology, Moscow, Russia, between January 2013 and December 2015. All neonates had signs of respiratory distress and required ventilatory support. Peripheral blood samples for genotyping DNA were taken in all patients at the same time of sepsis-workup. Depending on the reason of respiratory distress (infectious or non-infectious), all patients were divided into two main groups: the first group included 121 neonates with respiratory distress syndrome (RDS) or transient tachypnea of neonate (TTN), the second - 192 newborns with early-onset neonatal sepsis (EOS) or pneumonia.

Based on the gestational age, the neonates of the two main groups were divided into 3 subgroups: 24-28 weeks, 29-32 weeks and 33-36 weeks. We identified statistically significant differences in gene polymorphisms in preterm neonates of various gestational ages having infectious and non-infectious cause of respiratory distress. According to our data the distribution of the following genotypes and alleles was statistically different: in subgroup 29-32w - NOS3-786, NOS3-894, IL1b; in subgroup 33-36w - AGTR2, IL4R1902, IL8, GNB825, HTR2A. Almost all patients (33 of 34) in subgroup 24-28 weeks of gestation had EOS or pneumonia, thus comparative analysis was impossible.

Our findings show that several genetic predictors seem to play an important role in realization of early-onset neonatal sepsis and pneumonia in preterm neonates. Different genetic polymorphisms associated with early-onset sepsis and pneumonia were detected at different gestational ages.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
TITLE: A retrospective study (2001-2017) of both acute and chronic morbidity and mortality associated with Staphylococcus aureus bacteraemia in a tertiary neonatal intensive care unit.

AUTHORS: Daniel O’Reilly MB.BCh.BAO1, Ciara O’Connor MD2, Naomi McCallion MD1,6, Richard J Drew MD 3,4,5

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6 Department of Paediatrics, Royal College of Surgeons in Ireland, Dublin 2, Ireland.

CONTENT:

Staphylococcus aureus bacteraemia in NICU patients can cause significant morbidity and mortality. This study set out to evaluate the outcomes of early and late neonatal S. aureus bacteraemia with regard to risk factors, treatment, acute complications and long term outcomes.

A retrospective study of laboratory records, performed with local ethical approval of confirmed S. aureus bacteraemia occurring over a 16-year period (November 2001 to January 2017) in a large tertiary neonatal unit in Ireland with local ethical approval.

74 neonates (MSSA n=72, MRSA n=2) were identified for inclusion in the study of whom 8.1% (n=6) met the definition criteria for early sepsis and 91.89% (n=68) met definition criteria for late sepsis. Low birth weight neonates (born weighing less than 2500g) accounted for 79.72% (n=59) of all neonates. The median age to bacteraemia was 11 days post-delivery (range=0-100); median onset early sepsis 1.5 days versus late sepsis 12 days. Complications of SAB; cellulitis n=17, pneumonia n=12, necrotising enterocolitis n=7, thromobophlebitis n=5, skin abscess formation n=4, osteomyelitis n=3, endocarditis n=1. The mortality rate in infants with late S.aureus bacteraemia was 6.4% (n=3).

Preterm and low birth weight infants were at highest risk of S.aureus bacteraemia. Only a small proportion of affected children had long term clinical sequelae on follow-up. While early empiric antibiotic treatment was universally implemented, the high rate of recurrence and breakthrough bacteraemia suggests that early implementation of a rationalized antimicrobial regimen may be of particular benefit in this cohort.

COI: None Declared
ID: 78  
TITLE: TIME TRENDS OF AWARENESS AND KNOWLEDGE ABOUT MOTHER-TO-CHILD INFECTION IN JAPANESE PREGNANT WOMEN  
AUTHORS: Sachiyo Fukushima 1; Kazumichi Fujioka 1; Sadayuki Nagai1; Ruka Nakasone1; Shutarou Suga1; Shinya Abe1; Mariko Ashina1; Shohei Ohyama1; Toshihiko Ikuta1; Kousuke Nishida1; Kenji Tanimura2; Hitode Yamada2; Kazumoto Iijima1  
AFFILIATIONS: 1 Department of Pediatrics, Kobe University Graduate School of Medicine, Kobe, Japan  
2 Departments of Obstetrics and Gynecology, Kobe University Graduate School of Medicine, Kobe, Japan  

CONTENT:  
Transmission of infections from the pregnant mother to her developing fetus can lead to spontaneous abortions, fetal deaths, intrauterine growth restriction, and severe congenital anomalies. To reduce the incidence of these infections, it is essential to educate women regarding the types of pathogens commonly involved in maternal-fetal transmission, such as cytomegalovirus (CMV) and parvovirus B19 (PVB19). Previously, we conducted a survey on pregnancy-related infections and reported that the vast majority of Japanese women are not aware of methods to prevent the transmission of CMV and PVB19 infections. In this study, we compared the results of a newly-conducted questionnaire (October 2012 to January 2018) with a previously reported survey (June 2011 to September 2012) to assess the effect of maternal education. The survey contained questions to assess a woman’s knowledge of transmission routes, time of susceptibility to infection, the maximum frequency of fetal infection in cases of maternal infection. The followings were the known knowledge to be assessed. For transmission routes, CMV is transmitted by “contact with children’s urine and saliva, or semen,” Rubella virus is transmitted by “droplet,” Toxoplasma gondii is transmitted by “cat feces or eating undercooked meat,” and parvovirus B19 is transmitted by “droplet.” For all four pathogens, the most susceptible time of infection that may cause severe fetal disease is the first trimester. The maximum frequency of fetal infection when being maternal infection is ≥80% for Rubella, 50–80% for Toxo, and 10–50% for CMV and PVB19.

Participants’ characteristics, such as age, history of childbirth and spontaneous abortions, and gestational age at the time of survey completion, were also collected. Results were divided into two time epochs of 32 months: Phase I (October 2012 to May 2015, n=914) and Phase II (June 2015 to January 2018, n=519), and then compared with historical controls (n=343). Data are expressed as number (percent) or median (range). Statistical analyses were performed using chi-square test, and a p <0.01 was considered statistically significant.

There were no significant differences in patient demographics between the three groups. Compared with controls, women had significantly greater knowledge of Rubella and Toxo at the Phase I time epoch, and of CMV at both Phases. Awareness of transmission routes for both Rubella and CMV was significantly higher at Phases I and II than that for controls. For time of susceptibility, awareness was significantly higher for both Rubella and CMV at Phase I than in the control group. The knowledge about maximum frequencies of the maternal-fetal infections were significantly higher for Rubella at both Phases, and for CMV at Phase I than controls. The knowledge of PVB 19 infections were not different between both Phases.

In summary, maternal knowledge regarding Rubella, Toxo, and CMV maternal-fetal infections have improved compared with the previous report. However; the awareness of PVB 19 infections is insufficient. Thus, we conclude that the dissemination of information regarding PVB 19 infections is inadequate and needs improvement in Japan.

IMAGE / TAB:  
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=826854edd570a7f7f7011b29c04cb5e4-MjAxOS0wNSM1Y2UyNjY2YmM1Mjkw

IMAGE / TAB CAPTION: Data are displayed as median (range), number (percent), or percent. * p<0.01 vs Historical Control

COI: None declared
ID: 83
TITLE: MOTHERS OF VERY PRETERM BORN INFANTS, EXPERIENCES IN HOSPITAL AND DURING POST-DISCHARGE INTERVENTION
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CONTENT:

Motherhood begins unexpectedly when delivering a very preterm born (VPT) infant. Hospitalization and the discharge to-home are stressful experiences for mothers and make this transition into parenthood complicated. In the Netherlands, the ToP program, a strength-based responsive parenting intervention, is available for all VPT infants after hospital discharge. In 12 home-visits in the first year, parents are assisted in understanding their infants behavior and needs and how they can respond accordingly. The aim of this qualitative study is to gain deeper insight into how mothers of VPT infants experience the transition to motherhood as well as the support received during the ToP program.

Interpretative phenomenological analysis was applied to semi-structured interviews with two mothers of VPT infants who completed the ToP program. This idiographic approach was chosen because it delves deeply into lived experience, producing nuanced insights into complex, subjective phenomena that may be experienced in widely varying ways. Mothers were purposively selected with different socio-economic backgrounds but with good abilities to reflect on their experiences. Mother 1 (M1) has a master’s degree and is employed and mother 2 (M2) is low educated, unemployed and chronically ill. Interview topics covered maternal experiences during hospitalization and the ToP program. The interviews were audiotaped, transcribed and analyzed for superordinate and subordinate themes.

Four thematic domains were identified: 1) Balancing and precarity, including transitions in identity and regaining agency, 2) Social and discursive shaping of experiences, including socio-economic differences and the experiences of technology, 3) Attuned support and 4) Misattuned support. In the high-tech hospital environment and at home in the first year, both mothers struggle to develop a maternal self amidst invasive experiences. Help can be felt as deeply attuned or horribly misattuned. Support that helps mothers to regain agency and works within her own tolerance for input, is experienced as helpful. M1 feels educationally equal to professionals and gains agency by being informed but does not appreciate directive advice. M2 experiences developmental science as “pushing”, believing her infant will develop at his own pace but she values advice after seeing improvements herself.

Both mothers were overwhelmed by the unexpected birth and alienated environment, controlled by professionals and technology. In their long journey to achieve a secure maternal footing, they needed support attuned to their individual needs, beliefs and background. These interviews gave insights at both practical and more overarching levels about how to provide a more sensitive and attuned care during and after hospital discharge.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared
ID: 88

TITLE: DO HEMODYNAMIC PARAMETERS CHANGE AFTER SEPARATION OF OMPHALOPAGUS CONJOINED TWINS? – A PROSPECTIVE OBSERVATIONAL STUDY USING ELECTRICAL VELOCIMETRY (ICON)

AUTHORS: Aravanan Anbu Chakkarapani 1; Helmut Hummler 2; Kiran More 3; Naharmal Soni 4; Samir Gupta 5

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CONTENT:
ICON™ is a non-invasive (NI) method of monitoring hemodynamic (HD) parameters continuously at the bedside to guide clinical management.

The three components of HD assessment that affect cardiac output are preload, pump, and afterload. Using ICON,

a) Thoracic fluid content (TFC) and Stroke volume variation (SVV) reflect preload
b) Index of contractility (ICON) & Systolic time ratio (STR) measure cardiac contractility
c) Systemic vascular resistance (SVR) reflects afterload

Stroke volume (SV) & Cardiac output (CO) are flow values that are continuously measured.

Omphalopagus twins are joined at the abdomen and often share liver, digestive system or other organs which may impair HD and thus organ perfusion.

Objectives: To prospectively record HD parameters in conjoined twins before and after successful separation through continuous NI bedside monitoring using ICON.

Methodology: Omphalopagus conjoined twins born at 33 week gestation were separated surgically at 4 months of postnatal age at Sidra Medicine, Qatar. We measured hemodynamic parameters using ICON.

The data recorded every minute prospectively was downloaded and grouped into Pre-operative 24 hours, Post-operative day 1, Post-operative day 2 and Post-operative day 3.

Before surgery, SV and CO were higher in twin 1 compared to twin 2 and TFC, ICON and STR were higher in twin 2. These findings did not fit to the clinically observed hemodynamic conditions.

Post operatively, most of the parameters were comparable except the SVV which was higher in twin 2 suggesting decreased preload. Over the first 3 days after surgery, the preload and CO decreased in twin 1 suggesting distributive shock. This was later clinically confirmed as blood culture positive sepsis. On the contrary, in the twin 2, there was increased extracellular fluid that led to low urine output and this was reflected as increased TFC and decreased cardiac index as measured by the ICON. This was later confirmed clinically as progressive abdominal compartment syndrome requiring surgical intervention.

It is feasible to monitor the HD parameters continuously non-invasively in conjoined twins during pre- and post-operative periods. The trend of observed parameters postoperatively was useful to guide the management of HD disturbances early. However preoperatively, it is difficult to quantify electrical interferences and thus HD differences between the twins.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=dddff3de10398ee79e8fda9453b5b23b-MjAxOS0wNSM1Y2UyNjY2YmM4Njg1

IMAGE / TAB CAPTION: Table 1: Hemodynamic parameters in Twin 1 & Twin 2 Post op day 1 to 3

COI: None declared
ID: 99

TITLE: "YOUR BABY HAS TRISOMY 21": WHAT IS THE PREFERABLE WAY TO INFORM THE FAMILY?

AUTHORS: Michael S Schimmel 1,2 , Francis B. Mimouni 1,3, Tali Mor Yosef 4, Netanel Wasserteil1

AFFILIATIONS: 1 Dept. Neonatology, Shaare Zedek Medical Center, Jerusalem, Israel
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4 Social work department, Shaare Zedek Medical Center

CONTENT:

Informing parents that a neonate has trisomy 21 (T21) can have major impact on his/her future care, including the possibility of child abandonment. There are two theoretical different approaches about providing this information: the 1-step approach consists of informing parents as soon as the mother is physically fit to hear the news; the 2-step approach consists of first conveying that there are findings that "may suggest the possibility of T21", then at a follow up meeting to explicitly confirm the clinical diagnosis.

We hypothesized that the 2-step approach would be preferred by the mothers included in a retrospective cohort of infants with T21.

Mothers of T21 children filled a questionnaire, where they reported whether they had been informed using the one or the 2-step approach and whether they would have preferred the other approach. The questionnaires were filled with the help of interviewers who explained the parents its terms (if necessary) in person (at a routine encounter in a day care center for children with T21) or on the phone. The study was approved by our local Institutional Review Board, and a written informed consent was obtained from all the mothers involved in the study.

Maternal preferences were analyzed using Chi square tests and stepwise backward logistic regression analysis. The Minitab Statistical Package, version 16 (Minitab, State College, PA) was used for analyses.

Fifty six mothers agreed to participate into the study. Only 45 completed the questionnaire part dealing with which approach was taken with them and what was their preference. 40% reported that they were informed in the 1 step approach and 60% in the 2-step approach. 72.2% of women in the 1-step group stated that the 1-step approach was their preference, while 70.4% in the two-step group stated that the 2-step approach was their preference. The majority of women (75.6%) stated their preference to be informed in the maternity suite rather than the delivery room. In logistic backward stepwise regression analyses, only maternal age was significantly correlated with the approach chosen by the team (P=0.001) (women informed in a 1-step method ended up being older), while the type of approach preferred was only influenced by the actual type of approach that the team used (P=0.001).

Mothers were in general satisfied with the method used. Only 30% in each group would have preferred the other method. Empathy and the benevolence may be more important than the "technique" used to deliver the news. The team chose a different approach with different mothers. We suspect that choice of the method used was dictated by assessment of maternal readiness, and "adaptation" of the team to parental readiness may have made the difference.
ID: 105
TITLE: SURFACTANT REPLACEMENT THERAPY IN LATE PRETERM NEONATES WITH SEVERE RESPIRATORY DISORDERS. A RETROSPECTIVE COHORT COMPARATIVE STUDY
AUTHORS: O Ionov 1,2; E Kim 1; T Kosinova 1; Bezlepkina M.B 1; A Kirtbaya 1,2; E Balashova 1; A Ryndin 1,2; V Zubkov 1; D Degtyarev 1,2
AFFILIATIONS: 1 National Medical Research Center of Obstetrics, Gynecology and Perinatology named by V.I. Kulakov, Moscow, Russia
2 Federal State Autonomous Educational Institution of Higher Education I.M. Sechenov First Moscow State Medical University of the Ministry of Healthcare of the Russian Federation (Sechenovskiy University)

CONTENT:

Surfactant replacement therapy in early preterm infants significantly improves outcomes and reduces mortality. However, the advisability of surfactant therapy for late premature newborns (gestational age 34-36 weeks) is not clearly defined. There is lack of available data about the effect of surfactant replacement on the outcomes, total duration of respiratory therapy, the use of mechanical ventilation, length of stay in neonatal intensive care unit (NICU) for this population.

71 newborns with gest. age of 34 - 35 weeks, admitted to NICU of National Medical Research Center of Obstetrics, Gynecology and Perinatology named by V.I. Kulakov from 2013 to 2015, who needed respiratory support from the first day of life and were stabilized on non-invasive resp support and then had a progression of respiratory disorders in the first day of life and met the criteria of failure: FiO2 > 0.4 and/or Silverman score ≥ 4 were included. Patients were divided into 2 groups. Group 1 (n=32) received INSURE with poractant alfa with initial dose of 200mg/kg when criteria of failure were met. Group 2 (n=39) were treated without surfactant. The length of stay in NICU, the duration of respiratory therapy, need for conventional mechanical ventilation and HFOV, outcomes were assessed.

Requirement for conventional mechanical ventilation in group 1 and group 2 did not differ significantly: 47% vs 59%, OR 0.652 [0.238; 1.692]. In the meantime, newborns from the second group (treatment without surfactant) significantly more often were in need of "hard" parameters (Mean airway pressure ≥ 12 cm H2O and FiO2 > 0.5) of conventional ventilation (6% vs 28%, p=0.0286) and therefore significantly more often required HFOV OR 0.17 [0.034; 0.85] without significant increasing the duration of respiratory therapy (Me: 88 vs 114 hours) and the length of stay in NICU (Me: 6 days in both groups). There was an absence of IVH, NEC, ROP, PDA and BPD in both groups. In group 2 the requirement of inotropes and/or vasopressors therapy was higher than in group 1 (31% vs 13%), although there were no statistically significant differences: OR0,322 [0.091; 1.137].

In our study surfactant therapy did not affect the need for conventional mechanical ventilation, the length of stay of newborns in NICU and main outcomes. Therefore the internal guide-line NICU of NMRCOGP n. by V.I. Kulakov does not provide the surfactant replacement in late preterm infants for routine use. Well-timed and correct HFOV in late preterm infants is a qualitative and cheaper alternative to surfactant therapy.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 106

TITLE: Neo-Sense - a novel sensor to detect neonatal heart rate: Qualitative study on healthcare professionals

AUTHORS: Oana Anton 1; Ramon Fernandez 2; Elizabeth Rendon-Morales 3; Rodrigo Aviles-Espinosa 3; Christina J Jones 4; Heike Rabe 5

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CONTENT:

Heart rate (HR) is the most important indicator when evaluating the clinical status of a newborn. Well established methods are either rapid but inaccurate, or have unacceptable delay to signal acquisition. A novel heart rate monitoring device based on Electric Potential Sensing (EPS) technology is being developed in collaboration with the Robotics and Mechatronics Systems Research Center, University of Sussex. The aim of our study was to inform the prototype design by exploring healthcare professionals’ views and perceptions on current methods used to detect HR and gain valuable insight into the desirable features of the novel sensor.

This was a qualitative study where we conducted semi-structured interviews to elicit healthcare professionals’ views and perceptions on current and prospective methods to detect and monitor HR on babies. We focused on two key areas: views on established heart rate monitoring devices and the essential features of the novel Neo-Sense sensor. The inclusion criteria were healthcare professionals involved in the immediate care of babies: paediatricians, midwives and neonatal nurses. Each interview was audio-recorded and transcribed verbatim. Thematic content analysis using the Burnard’s framework was used to interpret the data. To reduce researcher bias, transcripts were read independently by another researcher and discussed to achieve consensus.

We recruited 21 participants, 7 from each professional group. The initial heart rate assessment preferred was by stethoscope. Difficulties with auscultation reported were due to environment, equipment, interfering with resuscitation and staff anxiety. Other limitations mentioned were: delay in display for pulse oximetry and difficulties with the attachment of ECG leads.

Regarding our novel sensor, all three professional groups agreed that it looked non-invasive, “less scary for parents”, comfortable and had fewer wires. The overall consensus was that it should be incorporated in a pad, mattress or strap, and be placed under the baby. The ideal features included: accuracy, ease of use, quickness of reading, wireless connection, smooth surface, easy to maintain and to attach. Suggestions for prototype improvement included a skin friendly material, targeted training and the use of diagrams.

For a novel sensor to be accepted it has to overcome the practical barriers for use and prove its accuracy, reliability and speed. The development of a technological solution requires a multidisciplinary team effort and has immense implications for clinical practice.

COI: None declared
ID: 107

TITLE: HEART RATE MONITORING IN NEWBORN BABIES: A SYSTEMATIC REVIEW

AUTHORS: Oana Anton 1; Ramon Fernandez, 1; Elizabeth Rendon-Morales 2; Rodrigo Aviles- Espinosa 2, Harriet Jordan 3; Heike Rabe 3

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CONTENT:

The majority of newborn infants make the transition from the intrauterine to extra uterine environment successfully; however, approximately 10% of newborn infants require assistance during this transition. Heart rate (HR) is the most important clinical indicator to evaluate the clinical status of a newborn.

Aims
Our study aimed to determine and review all established and novel methods developed to date used to detect heart rate on babies giving special consideration to non-invasive techniques and their potential to minimise noxious stimuli and infection.

We performed a systematic literature search on the following data bases: MEDLINE, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), CINAHL. The inclusion criteria were studies on methods to detect heart rate in both term and preterm infants in comparison to one of the current gold standards: pulse oximetry (PO) or ECG published in the last 15 years. Two independent reviewers screened titles and abstracts for eligibility. Data extracted in an Excel table was analyzed to produce a narrative review structured around type of monitoring, obstacles in the use of the technology, as well as methods to overcome these limitations.

The search identified 649 studies after duplicates were removed. Titles and abstracts were screened for eligibility and full article analysis was performed on 26 studies of which 25 met the inclusion criteria. The methods to detect heart rate can be categorised into well-established methods and novel methods. We have also divided them into continuous contact, intermittent contact and non-contact methods.

Well established methods such as auscultation and palpation, although rapid and easily available, have been shown to be inaccurate. ECG and PO were both more precise but the delay in obtaining a reliable heart rate signal from birth often exceeded one to two minutes. Novel sensors offered the advantages of minimally obtrusive technologies but have limitations mainly due to movement artefacts, inefficient sensor coupling with the skin, intermittent measurements and poor-quality recordings.

Limitations of existing methods have potential impact on short and long term morbidity and mortality outcomes. The development of a technological solution to determine HR accurately and quickly in babies at birth has immense implication for further research and can guide interventions, such as placental transfusion and resuscitation.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 110
TITLE: Organising Institutions
AUTHORS: Kazumichi Fujioka 1; Mariko Ashina 1; Sadayuki Nagai 1; Ruka Nakasone 1; Shutaro Suga 1; Shinya Abe 1; Sachiyu Fukushima 1; Shohei Ohyama 1; Toshihiko Ikuta 1; Kousuke Nishida 1; Kazumoto Iijima 1
AFFILIATIONS: 1. Department of Pediatrics, Kobe University Graduate School of Medicine, Kobe, Japan

CONTENT:

Meconium peritonitis is caused by leakage of meconium into the fetal peritoneal cavity due to intestinal perforation. Since meconium is sterile, it is regarded as a unique non-infectious inflammatory disease. However, its pathophysiology is not well understood due to lack of animal models that accurately mimic the condition. Recently, a technique using “cecal slurry (CS)” has been established to non-surgically induce neonatal sepsis, and involves the intraperitoneal (IP) administration of adult cecal contents suspended in dextrose to newborn pups. To generate a neonatal mouse model of meconium peritonitis via IP administration of human meconium suspension or “slurry” (MS) by applying the CS methodology.

Under the approval of our Institutional Animal Care and Use Committee (P170103) and obtaining parental consent, fresh meconium from healthy term newborns was taken via the rectal stimulation and then suspended in PBS to 500 mg/mL and stored at -80°C. 200 μL of MS (meconium) or PBS (control), or of CS at the LD40 dose (1.5 mg/g, suspension of cecal contents from adult mice in 15% glycerol-PBS to 100 mg/ml) was administered IP to 4d-old wild-type FVB mice pups. Blood gas/electrolyte levels at 3h, weight at 24h post-administration were measured and survival up to 5 days was monitored.

Administration of MS resulted in significant decreases in weight gain and survival (0.8±7.5% (n=26), and 58.8% (n=34), respectively) compared with PBS controls (18.6±4.8% (n=10) and 100% (n=10), respectively, p<0.05 for both). These findings were comparable to those found in age-matched CS-treated pups (-3.1±5.2% (n=11) and 58.3% (n=12), respectively, Fig. 1, 2). At 3h post-sepsis induction, significant changes in Na+, K+, anion gap, lactate, base excess, and HCO3− were found in both MS and CS groups compared with controls. In contrast, pCO2, pO2, and osmolarity levels were different in in MS-treated pups only. Interestingly, blood glucose levels were significantly increased in CS-treated pups (Table).

IP administration of MS from human infants resulted in significant mortality and weight loss to 4d-old newborn pups, and affects blood gases and electrolytes. Therefore, we conclude that this MS model can be used to study the pathophysiology and treatment of meconium peritonitis.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=bb9b5b60b5461c6605f80cf1b783bea4-MjAxOS0wNSM1Y2UyNjY2YmQwNGNh

IMAGE / TAB CAPTION: Figure 1. Kaplan-Meier survival plots of 4d-old pups given MS (n=34), CS (n=12), or Veh (n=10). The survival rate was significantly lower in the MS group (58.8%) and CS group (58.3) than in the Veh groups (100%). Figure 2. Body weight change 24h post-adm

COI: None declared
ID: 113
TITLE: A DECADE IN THE PERINATAL MANAGEMENT OF TRANSPOSITION OF GREAT ARTERIES IN A TERTIARY NEONATAL CENTER
AUTHORS: Heba Hassan (1); Md Aamir (2); Alok Sharma (3)
AFFILIATIONS: Neonatal Dept., Princess Anne Hospital Southampton UK

CONTENT:

Despite advances in prenatal ultrasound screening the detection rate of major congenital heart defects (CHD) as reported in the literature varies from 10% to 70%. D-TGA is the most common prenatally diagnosed congenital heart disease. The incidence is 3/10000 live births. Management of neonates with D-TGA varies in different parts of the world. Prenatal diagnosis and centralisation of care is key in ensuring these babies get appropriately stabilised prior to surgery. We have performed an observational study of the perinatal management of neonates with D-TGA over the last 12 years and give an overview of how management has evolved in a tertiary care NICU serving the south east of England.

This was a single center retrospective study of D-TGA performed from 2006 to 2018. It was performed as a service evaluation. Ethical approval was waived. Data was collected from the medical records regarding demographics and epidemiology and entered onto an anonymised database. Prenatal diagnosis, postnatal diagnosis, place of delivery, management, septostomy and perinatal outcome prior to transfer for cardiac care were analysed. Prostin use, septostomy procedure and outcome at discharge from the NICU were recorded annually to evaluate whether there were any themes to diagnosis and practice. New guidance regarding stabilisation and Prostin was introduced in 2015. Septostomy rates and mortality were analysed in 2 epochs 2006-2015 and 2015-2018 before and after this change (Table 1)

91 cases of D-TGA admitted over the 13-year period. 83 cases were diagnosed prenatally. 8 cases were diagnosed in the postnatal period. The median weight and gestation were 3345 gm (887-4845) and 39 weeks (25-41) respectively. The M:F ratio was 1.6:1. 85 cases were inborn and 6 were transferred from other units. 5/85 inborn babies were postnatal diagnosis as were 3/6 cases transferred in. 9/91 (10%) were preterm. Off the 91 cases managed 72 (79%) had Prostin and 48 (52%) ended having a septostomy for management. 43 cases (47%) did not get a septostomy prior to surgery. The overall mortality prior to transfer for cardiac care was 3/91 (4.4%). All these babies were preterm. Septostomy rates (43% vs 73%) and Prostin use (96.6% vs 74.5%) in inborn neonates have increased from Epoch 1 to Epoch 2. Mortality amongst inborn in epoch 1 was 1/55 (1.8%). There have not been any deaths in epoch 2.

Prenatal diagnosis of D-TGA has increased over time with a median of 8 cases treated per year. The overall mortality remains low in term neonates whether diagnosed prenatally or postnatally. Mortality in preterm neonates with a diagnosis of D-TGA remains high. Using a standardised management approach has resulted in an increase in Prostin use and Septostomies on the NICU. This allows for better stabilisation prior to surgery.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1

COI: None declared
ID: 115

TITLE: GUT STEPS- STRATEGIES AND TOOLS TO ENHANCE PATIENT SAFETY IN NECROTIZING ENTEROCOLITIS (NEC) - A QUALITY IMPROVEMENT (QI) INITIATIVE

AUTHORS: Nazakat Merchant 1; Clare Dawson 2; Sankara Narayanan 3

AFFILIATIONS: Department of Neonatology, West Hertfordshire NHS Trust, London, United Kingdom

CONTENT:

NEC is a neonatal emergency mainly seen in preterm infants. It can have devastating consequences including delayed feeding, surgery, short gut, poor growth, increased hospital stay, delayed neurodevelopment and death. In the UK, one in 20 preterm infants < 32 weeks gestation are at risk of NEC with high mortality rates of >20%

In 2017, our neonatal unit stood out as a negative outlier for NEC in preterm infants < 32 weeks (17.2 % vs national average of 5.6 %) in the National Neonatal Audit Programme benchmarks.

Study aim was to understand the risk factors linked to NEC and decrease the incidence of NEC at our unit by 50% over 1 year using structured quality improvement (QI) methodology.

Retrospective baseline data was collected for all preterms < 32 weeks gestation born in 2017. Infants with major congenital anomalies (n=3) and those diagnosed with NEC prior to admission to our unit (n=2) were excluded. Extrinsic risk factors such as enteral feeding practices, compliance with network NEC bundle, relevant medication exposure, blood transfusion, sepsis were investigated. Modifiable contributing/causative factors and themes were identified. Appropriate QI tools were used to drive changes to decrease NEC rate. Process changes were monitored by iterative PDSA cycles and NEC occurrences tracked using statistical process control (SPC) charts - ‘days between NEC’ and ‘eligible infants between events’ g charts for the next 12 months.

Of the 58 babies < 32 weeks born in 2017, 10 had NEC (17.2%). Pareto chart identified key risk factors for NEC i.e. early initiation of formula feeds when mother’s own milk was not available, antireflux medication and blood transfusion. Awareness was raised about NEC related complications: antibiotic duration, prolonged parenteral nutrition, surgery, delayed discharge and poorer developmental outcome. All key stakeholders were engaged including parents in these discussions. Following QI initiatives in 2018, 3/52 babies (5.7%) had NEC. There was no significant difference in the 2017 and 2018 groups on demographics such as gestation at birth, birthweight, gender. The average number of NEC free days increased from 29 to 143. The average number of patients between NEC events increased from 5.8 to 20.

Intelligent reinvention and careful adaptation of evidence-based practices to local ecosystem resulted in significant reduction in NEC rates. Use of statistical process control tools enabled real time monitoring of adverse events that guided timely actions. It is now important to scale-up, sustain and spread findings to the wider neonatal community.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Illustration demonstrating our QI methodology

COI: none declared
ID: 116

TITLE: Serum neurofilament light chain levels are an independent predictor of neurodevelopmental outcome in preterm infants

AUTHORS: Katharina Goeral 1*, Annalisa Hauck 2*, Andrew Atkinson 3, Michael Wagner 1, Birgit Pimpel 1, Renate Fuiko 1, Katrin Klebermass-Schrehof 1, Zuzanna Michalak 4, Jens Kuhle 4, Angelika Berger 1, Monika Olischar 1, Sven Wellmann 2,5

AFFILIATIONS: 1) Division of Neonatology, Department of Pediatrics and Adolescent Medicine, Pediatric Intensive Care and Neuropaediatrics, Medical University Vienna, Vienna, Austria
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4) Neurologic Clinic and Policlinic, Departments of Medicine, Biomedicine and Clinical Research, University Hospital Basel, University of Basel, Basel, Switzerland
5) Division of Neonatology, University Children's Hospital Regensburg (KUNO), University of Regensburg, Regensburg, Germany

CONTENT:

Serum neurofilament light chain (sNfL) has recently emerged as a promising biomarker reflecting structural neuro-axonal damage in different neurological diseases. Our study aimed at assessing whether sNfL can predict the functional outcome in preterm infants who suffered from neonatal hemorrhagic brain injury.

In this prospective observational study, we used an ultrasensitive single-molecule array assay to measure serum and cerebrospinal fluid (CSF) concentrations of NfL in preterm infants diagnosed with periventricular/intraventricular hemorrhage (PIVH). We determined the temporal profile of serum and CSF NfL levels from first diagnosis of PIVH until term equivalent age, their association with cerebral imaging markers, and with clinical and functional outcome until 2 years of age assessed by Bayley Scales of Infant Development. We fitted univariable and multivariable logistic regression models to determine risk factors for low motor and cognitive development. Longitudinal mixed effects models modelled NfL levels using cubic spline smoothers to track the trajectory over time.

The study included 48 infants born with less than 32 weeks of gestation. At the time point of PIVH diagnosis, sNfL median levels were 271.9 pg/mL (IQR 155.1–396.1), and strongly decreased until term equivalent age to 15.7 pg/mL (IQR 11.1–32.3). CSF values of NfL were 113-fold higher (IQR 40–211) than corresponding serum values. Additional cerebral infarction (n=23) but not post-haemorrhagic hydrocephalus with permanent external ventricular drainage (n=29) or other diseases independently determined sNfL levels. In multivariate logistic regression models, the only significant predictor of poor motor outcome at 1 and 2 years or death was sNfL level.

This study shows that early sNfL is an independent prognostic biomarker for motor functional outcome in preterm infants after PIVH.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 119  
TITLE: ASSOCIATION BETWEEN SOCIOECONOMIC FACTORS AND NEURODEVELOPMENT OUTCOMES AT 1 AND 2 YEARS OF CORRECTED AGE IN VERY LOW BIRTH WEIGHT AT A MOTHER-INFANT HOSPITAL IN BUENOS AIRES, ARGENTINA.  
AUTHORS: Héctor Raúl Cimbaro Canella 1; Norma Aspres 2, María Lucrecia Cuneo Libarona 3; Alejandra Fiorentino 4; Iris Shapira 5; Mónica Brundi 6  
AFFILIATIONS: 1, 2, 3, 4, 5, 6 Neonatology Dept.; Ramón Sardá Mother-infant Hospital of Buenos Aires City, Argentina.  

CONTENT:  
Recently, the number of preterm and small for gestational age survivors has increased at Ramón Sardá Mother-infant Hospital. Factors such as growth, low birth weight and health outcomes are affected by adverse socioeconomic status in early childhood. The objective of this retrospective study was to analyze the association between socioeconomic factors and neurodevelopment outcomes at 1 and 2 years of corrected age (CA) in preterm babies with a birth weight less than 1500 grams, born between 2003 and 2013 at this hospital.  

We conducted a retrospective study of infants included in the preterm follow up program between 2003 and 2013. Infants with congenital diseases and other morbidities were excluded. Socioeconomic factors: years of maternal education, unmet basic needs, monoparental family, unstable occupational status, adolescence and social insurance. The neurodevelopment score at 1 and 2 years of CA was binary encoded as adequate and inadequate. Other factors: sex, small for gestational age, hospital readmissions and breastfeeding. To evaluate the association between socioeconomic factors and the binary score of neurodevelopment Chi-square test and logistic regression were performed. Odds ratios were estimated.  

A total of 405 infants were included for the first year analysis and 317 for the second one. Less than 7 years of maternal education, unmet basic needs, monoparental family, unstable occupational status, lack of breastfeeding at 6 months and small for gestational age were associated with lower neurodevelopment scores both at 1 and 2 years of CA (bivariate analysis, Mann Whitney U test, p<0.05). Furthermore, small for gestational age (OR=2.72; 1.37-5.40; p=0.004), lack of breastfeeding at 6 months (OR=2.33; 1.39-4.00, p=0.001) and less than 7 years of maternal education (OR= 3.35; 1.33-8.43; p=0.010) were found to be risks factors for an inadequate neurodevelopment outcome at 1 year of CA. However, only the unmet basic needs was found to be a risk factor for an inadequate neurodevelopment outcome at 2 years of CA (multivariate analysis, OR=1.84; 1.09-3.09; p=0.02).  

Small for gestational age, lack of breastfeeding at 6 months and less than 7 year of maternal education were found to be risks factors for an inadequate neurodevelopment outcome at 1 year of CA. Only unmet basic needs was found to be a risk factor for an inadequate neurodevelopment outcome at 2 years of CA.  
It is paramount to deepen the study of socioeconomic factors and life inequalities in order to understand vulnerability and its dimensions.

IMAGE / TAB:  
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IMAGE / TAB CAPTION:  
COI: None declared
ID: 121

TITLE: ASSOCIATION BETWEEN SOCIOECONOMIC FACTORS AND GROWTH OUTCOMES AT 1 AND 2 YEARS OF CORRECTED AGE IN VERY LOW BIRTH WEIGHT BABIES AT A MOTHER-INFANT HOSPITAL IN BUENOS AIRES, ARGENTINA.

AUTHORS: Héctor Raúl Címbaro Canella 1; Norma Aspres 2; María Lucrecia Cuneo Libarona 3; Marina Tuduri 4; Laura Kasten 5; Mónica Brundi 6

AFFILIATIONS: 1, 2, 3, 4, 5, 6, Neonatology Dept., Ramón Sardá Mother-infant Hospital of Buenos Aires City, Argentine.

CONTENT:

Recently, the number of preterm and small for gestational age survivors has increased at Ramón Sardá Mother-infant Hospital. Factors such as growth, low birth weight and health outcomes are affected by adverse socioeconomic status in early childhood. The objective of this retrospective study was to analyze the association between socioeconomic factors and growth outcomes at 1 and 2 years of corrected age (CA) in preterm babies with a birth weight less than 1500 grams, born between 2003 and 2013 at this hospital.

We conducted a retrospective cohort study of the infants included in the preterm follow up program between 2003 and 2013. Infants with congenital diseases and other morbidities were excluded. Socioeconomic factors: years of maternal education, unmet basic needs, monoparental family, unstable occupational status, adolescence and social insurance. The outcomes: Z scores of growth and underweight, short stature and microcephaly at 1 and 2 years of CA. Other factors: sex, small for gestational age, hospital readmissions and breastfeeding. Chi-square test and logistic regression were run for underweight, short stature, microcephaly and socioeconomic factors. Odds ratios were calculated.

A total of 405 infants were included for the first year analysis and 317 for the second one. Factors like small for gestational age, hospital readmissions, less than 7 years of maternal education and monoparental family were associated with lower growth Z scores outcomes both at 1 and 2 years of CA (bivariate analysis). Small for gestational age, less than 7 years of maternal education, female gender, hospital readmissions and monoparental family were associated with underweight, short stature and microcephaly (Chi-square test p<0.05). Less than 7 years of maternal education was the strongest factor associated with underweight (OR 10.40; 3.22-33.58; p<0.001), short stature (OR 4.46; 1.50-13.30; p=0.007) and microcephaly (OR 23.48; 2.67-206.42; p=0.004) at 2 years of CA (multivariate analysis).

Small for gestational age, years of maternal education, female gender, hospital readmissions and monoparental family were associated with underweight, short stature and microcephaly.

It is paramount to deepen the study of how socioeconomic factors and life inequalities influence childhood growth in order to understand vulnerability and its dimensions.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 122

TITLE: AMBULANCE EQUIVALENT VIBRATION INDUCED BRAIN INJURY IN THE DEVELOPING BRAIN: A TWO HIT MECHANISM?

AUTHORS: Wan Teng Lee 1; Lara Shipley 1; Ian Bloor 1; Don Sharkey 1

AFFILIATIONS: 1 Academic Child Health, School of Medicine, University of Nottingham, Nottingham, UK

CONTENT:

Inter-hospital transfer of preterm infants is associated with worse neurological outcomes. Chronic whole-body vibration (WBV) causes neurovascular injury, but it is unknown what impact a single, acute WBV exposure has on the developing brain as a potential mechanism of neuronal injury. Using our new rodent model of a single acute WBV exposure, as experienced during neonatal ambulance transfer, we have previously demonstrated outer cortical neuronal injury. We now hypothesise that the preterm phase of neuronal development is more susceptible to WBV induced traumatic brain injury (TBI) and aimed to explore neuronal injury in the whole developing brain.

Female Sprague-Dawley rats, at neurodevelopmental stages equivalent to the 32w preterm (postnatal day 7) or post-term (postnatal day 21) infant, were randomised into control (C) and WBV (V) groups. V groups were vibrated at 2m/s² for 90 minutes. 24 hours post-exposure, whole brain tissues were sectioned and TUNEL stained for apoptotic cells. Blinded histological quantification of apoptotic cells was performed within 4 cortical and 4 subcortical regions of interest and analysed using Mann-Whitney U test with significance set at P<0.05. This study was conducted in accordance to the Animal Act 1986.

Day 7 V pups had significantly more apoptotic cells in the outer cortex, mid-outter cortex, and corpus callosum/hippocampus regions compared to the C group (Table 1). Amongst day 21 pups, only the outer cortex of the V group showed significantly more apoptosis. In both V groups, apoptosis was maximised at the outer cortex and decreases toward deeper regions. Overall, more brain regions were significantly affected and at greater extent in day 7 V group than in day 21.

Ambulance equivalent WBV induces microscopic TBI within the developing brain, appearing particularly susceptible in the outer cortical layers. Deeper regional injuries in the corpus callosum and hippocampus could be related to poor stress response and subsequent poor cerebral autoregulation. These microscopic injuries could impact the long-term neurodevelopment of transported neonates even in the absence of intraventricular haemorrhage.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=61335e52c518cd7ed6209f172c0af93a-MjAxOS0wNSM1Y2UyNjY2YmQ1OWIy

IMAGE / TAB CAPTION: Table 1: Percentage TUNEL +ve cells in day 7 and day 21 C and V groups.
Data expressed as median (IQR). Statistical significance: ***p<0.001 C vs V, **p<0.01 C vs V, *p<0.05 C vs V

COI: None declared
ID: 125
TITLE: LESSONS LEARNED FROM THE PERINATAL AUDIT ON SEVERE HYPERBILIRUBINEMIA; THE DUTCH EXPERIENCE
AUTHORS: A.N. Rosman 1, B.J. Smit 2, K.A. Bergman 3, P.H. Dijk 3, C.V. Hulzebos 3
AFFILIATIONS: 1 Perined, Utrecht, the Netherlands
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CONTENT:

Newborns with severe hyperbilirubinemia (SH), i.e. total serum bilirubin (TSB) higher than exchange threshold, are at risk of neurological damage. Each year many jaundiced term infants present at emergency departments who need immediate treatment. Apparently, and despite a national guideline on hyperbilirubinemia, early recognition to prevent SH is difficult. We aimed to identify substandard factors (SSF) in health care processes of newborn infants with severe hyperbilirubinemia.

Since 2017, SH is one of the main themes of the perinatal audit in the Netherlands. In the SH audit, newborn infants with a gestational age > 35 weeks with an unconjugated TSB higher than the threshold of an exchange transfusion are included. Perinatal care is discussed with all stakeholders: obstetricians, midwives, pediatricians, maternity nurses and care assistants, and parents. A substandard factor is defined as care that deviates from recommendations of the guideline and has the potential to lead, directly or indirectly, to an adverse outcome. SSFs were divided in three categories: a) observation and communication, b) knowledge, and c) organization of care.

In total, 72 infants were reported (Table; estimated incidence of SH: 10-34/ 100.000 live births per year). Notification of jaundice occurred at a mean age of 45 hours. Midwives (42%) and maternity care assistants (32%) were the first to signal jaundice, in contrast to parents (4%). Mean interval between visible estimation of jaundice severity and phototherapy was 30 hours. Median (range) maximal TSB was 427 (271-658) µmol/L. Most frequent underlying causes were blood group incompatibility (n=30 (42%)) or lactation failure (n=14 (19%)). All newborns received phototherapy, 18 (25%) underwent an exchange transfusion. SSF were present in 40 (56%) infants: 83 in 2017 and 40 in 2018, respectively (see Table). Sometimes, a long delay existed between the first notification of jaundice and treatments. Risk assessment was not documented in many infants (83%).

Severe hyperbilirubinemia remains a serious health problem in the Netherlands. The perinatal audit is a tool to identify substandard factors in severely jaundiced infants. The lack of risk assessment and the long delay between the first notification of jaundice and treatment need attention. Improvement of substandard factors will hopefully occur after implementation of more strict recommendations in the revised Dutch hyperbilirubinemia guideline.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=1c73eeae8d22b4a725c23170b6cf29eb-MjAxOS0wNSM1Y2UyNjY2YmQ2ODk5

IMAGE / TAB CAPTION: Table. Demographic and clinical characteristic of infants with severe hyperbilirubinemia

COI: None declared
ID: 133

TITLE: PREVENTION OF UNNECESSARY ANTIBIOTIC EXPOSURE IN TERM BABIES TREATED FOR SUSPECTED EARLY ONSET SEPSIS

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CONTENT:

Many babies treated for suspected early onset sepsis are well, but at risk of infection. A previous review of practice demonstrated that it took an average of 52 hours for blood culture reports to be available, but true positive blood cultures all signalled positive within 36 hrs of collection. Following this local guidance was introduced which aimed to prevent unnecessary exposure of antibiotics to babies treated for early onset sepsis. This recommended discontinuing antibiotics at 36 hours (prior to 2nd gentamicin dose) if the culture has not yet signalled positive (in the absence of the report) if babies were clinically well and had a static or falling CRP at 24 hours i.e. both ≤ 10.

We performed a retrospective audit of babies treated for suspected early onset sepsis from January 1st 2017 to December 31st 2017 from electronic records. Babies included were those with clinical indicators and/or risk factors for sepsis, two CRPS ≤10, clinically well by 24 hours and blood cultures not signalling positive at 36 hours. Babies who were preterm or unwell at presentation or 24 hours were excluded. Of these, the number of babies who received a 2nd dose of gentamicin was documented. Positive blood cultures from all babies treated for suspected early onset sepsis were documented, and the time the culture was taken, first signalled positive and reported to the neonatal team, was recorded.

536 babies were treated for early onset sepsis; 277 (51.7%) fulfilled the inclusion criteria. Of the 277 babies, 33% received a 2nd dose of gentamicin. After excluding babies with any clinical indicators for sepsis, 24% received a 2nd dose of gentamicin. 14 (2.6%) had a positive blood culture, 6 (1.1%) of which were considered true positives. The average time from collection the culture first signalled positive was 16 hours 28 minutes (range 8 hours 7 mins – 30 hours 54 minutes) and the time taken by the microbiology team to communicate the results to the neonatal team was 21 hours 12 minutes (range 10 hrs 31 mins – 35 hours 22 minutes). All babies with a true positive culture had an elevated 2nd CRP (31 – 203).

The audit demonstrated that all positive blood cultures signalled positive within 36 hours, no babies had antibiotics unsafely discontinued and in 24-33%, the 2nd dose of gentamicin could have been safely avoided. This could facilitate early discharges, improve parent satisfaction, create capacity, reduce drug toxicity, nursing time and cost. A neonatal sepsis sticker has since been introduced, which prompts review of antibiotics at 36 hours.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 139
TITLE: OUTCOME AND MORBIDITY IN MULTIPLE PREGNANCY – A COMPARISON BETWEEN SPONTANEOUS AND IN VITRO FERTILIZATION PREGNANCIES
AUTHORS: Luminita Paduraru 1,2
Ionela Musteata 2
Maria Stamatin 2
Gabriela Ildiko Zonda 1,2
Mihaela Moscalu 3
AFFILIATIONS: 1 Division of Neonatology, Department of Mother and Child Care, “Grigore T. Popa” University of Medicine and Pharmacy, Iași, Romania
2 Regional Centre of Neonatal Intensive Care Unit, “Cuza-Vodă” Hospital of Obstetrics and Gynecology, Iași, Romania
3 Division of Informatics and Medical Statistics, Department of Preventive Medicine and Interdisciplinarity, “Grigore T. Popa” University of Medicine and Pharmacy Iași

CONTENT:

Over the last decades, population studies in developing countries noted an increase in multiple pregnancies (MP) due to the increasing availability and affordability of in vitro fertilization (IVF). In the mean time, MP are responsible for a disproportionate amount of morbidity and mortality, largely attributable to complications of prematurity. Women with MP are six times more likely to deliver preterm and 13 times more likely to deliver before 32 weeks than those with a singleton pregnancy. The aim of this study was to determine the recent prevalence of multiple pregnancies in a level III center, to analyze the adverse neonatal outcome and the impact of IVF on morbidity.

We performed a retrospective study involving all multiple pregnancies delivered at Cuza-Voda Obstetrics and Gynecology Hospital in Iași, which is a level III perinatal center, between January 1st 2015 - December 31st 2018. The study included 791 newborns from 387 multiple pregnancies out of 26193 deliveries. Due to in utero death, 18 cases were excluded, resulting in a study group of 773 cases.

The rate of MP was 1.48%, out of which 95.87% were twins, 3.88% triplets and 0.26% quadruplets. 16.28% resulted from IVF. There was no significant association between MP and IVF, but IVF was significantly associated with c-section delivery (p=0.002). The prematurity rate was 79.8% (mean gestational age=34.3 weeks). 52.65% presented no morbidity, 43.33% had single morbidity and 4.01% developed complications. Twin-twin transfusion syndrome was present in 1.55% of cases. IVF was not associated with either single or complex morbidity. Of 366 cases with significant morbidity, 18 died (4.91%). There were no statistically significant differences regarding the need for bag and mask ventilation, CPAP use in the delivery room and NICU or surfactant administration, between spontaneous and IVF MP, but IVF newborns needed significantly more intubation and mechanical ventilation in the NICU.

Multiple pregnancies conceived in vitro are more likely to be delivered by c-section, may need more intubation and mechanical ventilation after birth, but are not more predisposed to develop severe morbidity.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 140
TITLE: C-REACTIVE PROTEIN FOR THE DIAGNOSIS OF LATE-ONSET INFECTION IN NEWBORN INFANTS: SYSTEMATIC REVIEW OF DIAGNOSTIC TEST ACCURACY
AUTHORS: Jennifer Brown 1
Nick Meader 1
Jemma Cleminson 1
Kath Wright 1
William McGuire 1
AFFILIATIONS: 1 Centre for Reviews and Dissemination, University of York, York, UK

CONTENT:

Late-onset infection is the most common serious complication associated with hospital care for newborn infants. Confirming the diagnosis by microbiological culture typically takes 24 to 48 hours. The serum level of the inflammatory marker C-reactive protein (CRP) measured as part of the initial investigation is used as an adjunctive rapid test to guide management in infants with suspected late-onset infection. Fast and accurate diagnosis of late-onset infection in newborns could inform treatment decisions and avoid unnecessary administration of antibiotics. We compared the accuracy of serum CRP with microbiological culture for diagnosing late-onset infection in newborns.

We searched MEDLINE (1946-2019), Embase (1946-2019), and Science Citation Index (1900-2019) for references published in any language. We included cohort and cross-sectional studies comparing the accuracy of serum CRP level with microbiological culture to diagnose late-onset (> 72 hours after birth) infection in newborn infants. Two reviewers assessed study eligibility against pre-defined criteria and extracted data on methodological quality and diagnostic performance, contacting authors for unpublished data where necessary. We generated hierarchical summary receiver operating characteristic curves to estimate sensitivity and specificity and applied diagnostic test accuracy measures to a hypothetical cohort of 1000 babies. The protocol was registered in PROSPERO (CRD42016045585).

We included 22 studies with data for 2255 infants. Most were prospective cohort studies conducted in neonatal units in high- or middle-income countries since the 1990s. Most studies used a pre-specified CRP cut-off for a positive index test (typically 5-10 mg/L) and the culture of a pathogenic micro-organism from blood as the reference standard. Risk of bias was low with independent assessment of index and reference tests in all studies. At median specificity (0.74), pooled sensitivity was 0.62 (95% confidence interval 0.50 to 0.73, Figure). Adding serum CRP level to the assessment of an infant with a 40% pre-test probability of late-onset infection (the median for included studies) generates a post-test probability of 26% for a negative test and a post-test probability of 61% for a positive test. Out of 1000 babies, 152 cases of infection would be missed, 256 would be wrongly diagnosed.

Serum CRP level at initial evaluation of an infant with suspected late-onset infection is unlikely to be considered sufficiently accurate to aid early diagnosis or select infants to undergo further investigation or treatment with antimicrobial therapy or other interventions. Future research efforts might focus on other serum biomarkers, such as procalcitonin, that are elevated more quickly in response to infection or inflammation.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Summary receiver operating characteristic (SROC) plot of C-reactive protein for neonatal infection. Study estimates of sensitivity and specificity are shown with the SROC curve.

COI: None declared.
ID: 142  
**TITLE:** Neonatal X-rays: Improvement of the quality and diagnostic efficacy  
**AUTHORS:** Cleaver, Caroline 1; English, Linzi 2; Garg, Shalabh 3  
**AFFILIATIONS:**  
1- Advanced Neonatal Nurse Practitioner, James Cook University Hospital, Middlesbrough, Cleveland, UK.  
2- Radiology Practitioner, James Cook University Hospital, Middlesbrough, Cleveland, UK.  
3- Consultant Neonatologist, James Cook University Hospital, Middlesbrough, Cleveland, UK.  

**CONTENT:**  
Plain film X-rays are frequently used in neonatal intensive care units (NICU) to diagnose potentially life-threatening conditions and to guide management. As neonates are often attached to complex equipment, portable X-rays are required that pose specific challenges affecting the diagnostic efficacy. An optimal x-ray taken in the first instance facilitates timely diagnosis, avoid repeat imaging and undue increased radiation exposure. The concerns were raised by NICU and Radiology staff regarding the quality of neonatal x-rays. We planned to undertake this project to try to standardise the procedure for neonatal x-rays for both the departments and improve quality.  
The objectives of this project were:  
To identify the range of issues with neonatal X-rays  
To ensure compliance with local guidelines  
To identify best practice and any specific suboptimal aspects  

In our tertiary neonatal unit, we retrospectively evaluated the chest and abdominal x-rays (sample size 101) over a 3 month period using a search query on the Picture Archiving Computer Systems (PACS) database. Pre-defined assessment criteria were identified after discussion with the radiologist and included positioning, collimation, lead protection, artefact, exposure, rotation, lordosis. These are all linked and determined by the exposure factors used to obtain the images (Table 1).  

The results of the image quality and diagnostic acceptability are shown in Table 2. It is appreciated that neonatal imaging is very challenging and possibly striving for 70% of X-rays to have no errors at all may be unrealistic. The vast majority of imaging was deemed diagnostically acceptable, however, for 14% of chest and abdominal X-rays to be unacceptable was poor.  
We further assessed the radiographs particularly for two main categories, image quality and positioning. The various aspects to achieve these two standards were further evaluated (Table 3).  

We included regular x-ray teaching as part of the nurses’ education programme. We implemented to have two nurses helping for NICU x-rays. We did not assess the need for repeat radiographs due to poor quality or diagnostic inability which is something to study in future. This project highlighted the need to identify basic practice points to improve the quality of NICU x-rays as well as diagnostic ability and reduce the need for repeat x-rays.  

**IMAGE / TAB:**  
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=47d1b7102b249195a237fca3f32d8fdd-MjAxOS0wNSM1Y2UyNjY2YmRjZWFWj  
**IMAGE / TAB CAPTION:** Table 1- Assessment criteria for Neonatal X-rays  
Table 2: Image Quality and Diagnostic Acceptability  
Table 3- Common practical themes related to image quality and position in Neonatal Radiographs  

**COI:** None declared
ID: 145

TITLE: EARLY INTERVENTION PROGRAM FOR VERY PRETERM INFANTS THAT ALLOWS FAMILIES TO APPLY IT CONTINUOUSLY AT HOME IMPROVES NEURODEVELOPMENT OUTCOME IN THE FIRST YEAR OF LIFE

AUTHORS: Rita C Silveira 1; Nadia C Valentini 2; Lilian Refosco 3; Eliane Mendez 4; Lenir Cauduro 3; Renato S Procianoy 1

AFFILIATIONS: 1 - Pediatric Department., Federal University of Rio Grande do Sul and Neonatal Section Hospital de Clinicas de Porto Alegre, RS, Brazil
2 - Programa de Pos graduação em Ciencias do Movimento Federal University of Rio Grande do Sul. Porto Alegre, RS, Brazil
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CONTENT:

Early intervention programs for preterm infants that focus on development while the babies are still in the hospital and post discharge, and into the community setting may have an important impact on long-term morbidity. Aim is to develop an early intervention program for very preterm infants that allows families to apply it continuously at home, as well as to quantify the results of early parental stimulation on improvement of cognition and motor skills.

Randomized Clinical Trial (NCT02835612) inborn preterm infants GA < 32 weeks or BW <1500 grams. Exclusion; death before 48 hours after birth, major congenital malformations. Intervention Group (IG): standard care plus tactile-kinesthetic stimulation during NICU stay. After discharge they receive systematics orientations for simulation at home and usual follow-up. Conventional Group (CG): standard care (kangaroo and breast-feeding policy) and they are referred to follow-up clinic which takes care of the demands according to their necessity. Home visits to to be sure that the intervention had been done by families (IG). Neurodevelopment outcome was measured by AIMS and Bayley III scales at 8 months CA.

A total of 66 preterm infants, birth weight and gestational age was 1083 ±313 grams and 29 ±2 wk IG; 1102 ±295 grams and 28.6 ± 1 wk CG. Late-onset sepsis and antibiotics use were more prevalent in CG (p=0.024). Pre-discharge PBI had similar means of maternal care and overprotection, means of paternal care and overprotection IG had Head Circumference smaller than CG at discharge (IG 33±1.9 cm and CG 34.1±1.9 cm, p=0.041). However, CG had poorer language compositum and motor function than IG at 8 months CA (MDI language 90±12 and 98± 14;p=0.038; PDI 84 ± 17 and 95± 15; p=0.025, respectively). In IG 24% and CG 54% of children had atypical development by AIMS (p= 0.041). After binomial regression stratified analyses including variables at p<0.10, the effect of intervention for obtain normal neurodevelopment was 1.62 (IC95% 1.10-2.61; p 0.04).

Parents can learn how to support their child’s development of motor and cognitive processes by receiving specialized and multidisciplinary skills training improving the neurodevelopment outcome of premiers at 8 months CA.

This study was supported by grants from CNPQ, Brazil Health Ministry and Bill and Melinda Gates Foundation.

IMAGE / TAB:
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IMAGE / TAB CAPTION:
None declared

COI: None declared
ID: 156

TITLE: INTRAVENOUS PARACETAMOL FOR PATENT DUCTUS ARTERIOSUS IN INDOMETHACIN-RESISTANT OR CONTRAINDICATED PRETERM INFANTS: A DOSE ESCALATION STUDY

AUTHORS: Eri Nishimura 1; Ayumi Oshima 1; Shun Matsumura 1; Sumie Fujinuma 1; Yukiko Motojima 1; Kosuke Tanaka 1; Junichi Ozawa 1; Satoshi Masutani 1; Kazuhiko Kabe 1; Keiko Ueda 2; Fumihiko Namba 1

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2 Clinical Research Support Center, The University of Tokyo Hospital, Bunkyo, Tokyo, JAPAN

CONTENT:

Patent ductus arteriosus (PDA) is a significant cause of morbidity and mortality in preterm infants. Indomethacin is the standard treatment for hemodynamically significant patent ductus arteriosus (hsPDA) in Japan. However, this drug can be associated with potentially significant adverse effects, such as renal impairment and gastrointestinal complications. Paracetamol may be a promising alternative to indomethacin for the closure of PDA with possibly fewer adverse effects. Nonetheless, up to this point, there have been no reports of its use for hsPDA in Japan.

In this dose-escalation study, we assessed the safety and feasibility of intravenous paracetamol treatment in preterm infants with hsPDA, who were resistant to or contraindicated the use of indomethacin. The first 3 patients were given a low dose (7.5 mg/kg every 6 h for 3 days), and the next 15 patients were given a high dose (15 mg/kg every 6 h for 3 days).

A low dose intravenous paracetamol treatment was performed for 3 preterm infants, with a mean gestational age of 25.4 weeks and a mean birth weight of 880 g. Paracetamol was administered because of acute renal failure in 2 cases and because of the ineffectiveness of indomethacin in 1 case. Although PDAs were temporarily closed in 2 of 3 cases, surgical closure was eventually needed in all 3 cases. A high dose intravenous paracetamol treatment was performed for 15 preterm infants, with a mean gestational age of 27.1 weeks and a mean birth weight of 905 g. Paracetamol was administered because of acute renal failure in 9 cases and because of the ineffectiveness of indomethacin in 7 cases. PDAs were closed or narrowed in 14 cases, although surgical closure was eventually needed in 6 cases. The treatments were well tolerated without serious adverse effects.

This is the first study in Japan demonstrating that intravenous paracetamol treatment in preterm infants with hsPDA who are resistant to or contraindicated the use of indomethacin is both safe and feasible, and a larger and controlled clinical trial is warranted for this approach.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 160

TITLE: RANDOMISED TRIAL OF ESTIMATING ORAL ENDOTRACHEAL TUBE INSERTION DEPTH IN NEWBORNS USING SUPRASTERNAL PALPATION OF THE TIP OR WEIGHT

AUTHORS: Madeleine C Murphy 1; Veronica Donoghue 2; Colm PF O’Donnell 3

AFFILIATIONS: 1. National Maternity Hospital, Dublin, Ireland; National Children’s Research Centre, Dublin, Ireland; School of Medicine, University College Dublin, Ireland
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CONTENT:

Endotracheal tube (ETT) tip position is determined on chest X-ray (CXR) and should lie between the upper border of the first thoracic vertebra (T1) and the lower border of second thoracic vertebra (T2). Infant weight is commonly used to estimate how far the ETT should be inserted, but frequently results in malpositioned ETT tips. Palpation of the ETT tip at the suprasternal notch has been recommended as an alternative. We wished to determine whether estimating ETT insertion depth using suprasternal palpation of the ETT tip rather than weight results in more correctly positioned ETT tips.

We performed this single-centre randomised controlled trial at a level III neonatal intensive care unit (NICU) at a university maternity hospital from December 2016 - December 2018. Infants were eligible for inclusion if they were intubated in the NICU. We excluded infants with airway or lung anomalies that could distort the upper airway anatomy. Participants were randomised to have ETT insertion depth estimated using palpation of the ETT tip at the suprasternal notch or weight [insertion depth (cm) = 6 + weight (kg)]. The primary outcome was correct ETT position, i.e. between the upper border of T1 and lower border of T2 on CXR, determined by one consultant paediatric radiologist masked to group assignment. The trial was registered before the first patient was enrolled (ISRCTN13570106).

Of the 118 included infants, 58 were assigned to suprasternal palpation of the ETT tip and 60 to the weight-based formula. The groups were well-matched for demographics at study entry. There was no difference in the proportion of correctly placed ETT tips between the groups [suprasternal palpation 27/58 (47%) vs weight 23/60 (38%), p=0.456]. Most incorrectly positioned ETTs were too low [56/68 (82%)].

Estimating ETT insertion depth using suprasternal palpation did not result in more correctly positioned ETTs.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=75b632fe555f57a9710f9df9a194803c-MjAxOS0wNSM1Y2UyNyY2YmUzZGMw

IMAGE / TAB CAPTION: Outcome measures

COI: none declared
ID: 161
TITLE: DETERMINATION OF HEART RATE IN PRETERM INFANTS AT BIRTH AND THE CORRELATION OF CLINICAL ASSESSMENT WITH SUBSEQUENT PULSE OXIMETRY: AN OBSERVATIONAL STUDY
AUTHORS: Madeleine C. Murphy,1-3 Lisa K. McCarthy,1 Colm P.F. O’Donnell1-3
AFFILIATIONS: 1. National Maternity Hospital, Dublin, Ireland
2. National Children’s Research Centre, Dublin, Ireland
3. School of Medicine, University College Dublin, Ireland

CONTENT:

Neonatal resuscitation guidelines recommend assessment of heart rate (HR) within one minute of birth. If an infant has a HR <100bpm, apnoea or gasping the algorithm recommends positive pressure ventilation, pulse oximetry (PO), and consideration of an electrocardiogram (ECG). Accuracy of clinical assessment during bradycardia has not been determined outside of animal or mannequin models. We wished to describe how HR is first determined after birth in preterm infants; and when it is first determined clinically, to compare how this correlates with subsequent pulse oximetry (PO) HR.

We performed an observational study of HR assessment in newly-born preterm infants at a university maternity hospital with a tertiary neonatal unit. High-risk deliveries were video recorded for research when a member of the research team was available with ethical approval and parental consent. We recommend clamping the umbilical cord at 60 seconds. We defined the time for clinical assessment of HR as being from when the stethoscope touched the chest until a HR was communicated to caregivers. The time for PO to determine HR was from the start of applying the monitor (Nellcor PO) to when a HR was displayed. HR determined clinically was compared with the subsequent PO HR for clinical relevance; >/<100bpm was chosen as this HR determines how clinicians progress down the algorithm.

We recorded 70 infants [mean (SD) gestational age 29 (3) weeks, birth weight 1290 (430) g]. The median (IQR) time from arrival to the resuscitaire to determine HR was 44 (32, 58) seconds; a continuous HR was obtained at 75 (48, 96) seconds, 20 (0, 48) seconds later. HR was determined more quickly with clinical assessment than with PO [8 (5, 14) vs 40 (29, 75) seconds]. Within 60 seconds of arrival to the resuscitaire, 56 (80%) infants had their HR determined. HR was first determined clinically for 46 (66%) infants and agreed with the HR subsequently measured by PO with respect to a value of >/<100bpm on 41/46 (89%) occasions (table 1). For the 16 infants whose initial HR was assessed clinically as <100bpm, the subsequent PO HR was <100bpm on 14 (88%) occasions. HR was first determined using PO for 24 (34%) infants.

HR was first assessed clinically in most infants. HR that was determined clinically accurately predicted the HR subsequently determined by PO in the majority of infants, including those who were determined to have HR <100bpm.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1. Distribution of heart rate (HR) by clinical assessment compared with the subsequent pulse oximetry HR (n=46)

COI: None declared
ID: 162
TITLE: PRIME (PRETERM INFANTS NEED MILK EARLY), A QUALITY IMPROVEMENT INITIATIVE IN A TERTIARY NEONATAL UNIT
AUTHORS: Murphy M1, Dunne E1, McCarthy R1, O’Hagan L1, Batson H1, Curley A1
AFFILIATION: 1. National Maternity Hospital, Holles Street, Dublin

CONTENT:

Maternal milk (MM) protects against necrotizing enterocolitis, sepsis and bronchopulmonary dysplasia. PRIME is a multi-disciplinary initiative to improve the early provision of MM for preterm infants and enhance outcomes. Our aim was to increase the number of high-risk infants receiving MM in the first day life in our tertiary neonatal unit.

We retrospectively reviewed time to first MM for infants born <32 weeks gestational age (GA) or with a birth weight (BW) <1500g in 2016. We conducted a cross-sectional survey to evaluate the knowledge and attitudes of staff towards breast milk for preterm infants. Deficits in background knowledge and training informed a teaching programme. Education involved training sessions, development of guidelines, designing breastfeeding diaries, distribution of posters, and presentation at meetings. The first 5 infants per month born <32 weeks GA or BW <1500g were included in the post-intervention analysis. The effect of the interventions were evaluated using a before and after study design. Time to first MM was our key performance indicator.

We reviewed 123 infants born in 2016 [Median (IQR) GA 29 (26, 31) weeks, BW 1140 (820, 1410) g]. Many infants didn’t start feeds in 1st 24 hours as MM was not available; median (IQR) time to 1st MM 35 (17, 55) hours, 34% of infants received MM in the 1st 24 hours of life. Prospective data was collected from 55 infants, born May 2018 – April 2019, following interventions [Median (IQR) GA 29 (27, 31) weeks, BW 1110 (850, 1600) g]. The median (IQR) time to 1st MM was 13 (7, 25) hours and 75% of infants received MM in the 1st 24 hours.

The initial results of this hospital-wide QI initiative are promising. The time to first MM has halved in the year since this initiative commenced. Further PDSA cycles are indicated to ensure ongoing improvement.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=e1c419ebc784ac985ad9744842c86087-MjAxOS0wNSM1Y2UyNjY2YmU0YTg0

IMAGE / TAB CAPTION: PRIME education poster

COI: None declared
ID: 163  
TITLE: SUDDEN UNEXPECTED POSTNATAL COLLAPSE IN THE NETHERLANDS. UPDATE OF A RECENT SURVEILLANCE STUDY  
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CONTENT:  
Sudden and unexpected collapse (SUPC) of apparently healthy newborn infants is a life threatening event. Underlying diseases are reported in approximately 50% of SUPC cases, and include congenital (cardiac) anomalies, infections, intracranial hemorrhages, metabolic and endocrine disorders. When no underlying disease is determined, SUPC may be caused by postural asphyxia: accidental suffocation due to an obstructed airway. Postural asphyxia is associated with prone position on mother’s chest, breast-feeding, and poor recognition of airway compromise. As skin-to-skin contact has many advantages, awareness of risk factors of postural asphyxia is of utmost importance. We aim to determine the prevalence of SUPC and associated factors in the Netherlands.  

The Dutch Surveillance Center of Pediatrics (the so-called NSCK) registry on SUPC was set up in April 2019 and will run for three years. The NSCK is part of the International Network of Pediatric Surveillance Units (www.inopsu.com). All pediatricians nationwide are asked to voluntarily report on cases of SUPC. The case definition of SUPC is: a newborn ≥ 35 weeks of gestational age with an Apgar score ≥ 8 after 5' who presents with cardiorespiratory collapse necessitating resuscitation within 24 h of birth. Resuscitation also includes insufflation breaths (before CPAP).  

In the first month of the registry 5 cases have been registered. We have noticed that not all pediatricians are aware of this SUPC registry, and some hesitate to report cases. This may be due to unclear inclusion criteria, or unclear definitions of resuscitation. Alternatively, the word “unexpected” may falsely be interpreted and not result in a SUPC report when health care professionals “already feel uncomfortable with the infant’s condition” and deterioration was not unexpected.  

SUPC occurs in the Netherlands. Exact numbers and prevalence of postural asphyxia and associated risk factors will be available after completion of the SUPC registry. Analysis of SUPC risk factors will contribute to optimal safety of skin-to-skin practices. Pediatricians are encouraged to report any possible SUPC case when in doubt. Meanwhile, awareness and early recognition of possible airway compromise during skin-to-skin contact is essential.  

IMAGE / TAB:  
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=1728ee5178a718e0cf59f920d3fb9fb2-MjAxOS0wNSM1Y2UyNyY2YmU1MGQ4  

IMAGE / TAB CAPTION: Table. Would you report these infants to the NSCK registry on Sudden Unexpected Postnatal Collapse?  

COI: None Declared
ID: 164
TITLE: THE PEDI-CAP CAUSES LEAK IN THE VENTILATORY CIRCUIT
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CONTENT:

Intubation of preterm infants is a challenging procedure and therefore the Pedi-CapTM, an exhaled carbon dioxide detector, is often used to verify successful endotracheal intubation. The Pedi-CapTM is also used for evaluating mask ventilation and the change of color indicates adequate lung aeration and pulmonary blood flow. In two cases at the Leiden University Medical Center, we suspected the Pedi-CapTM to have contributed to extensive leak within the ventilatory circuit. Following removal of the Pedi-CapTM, the leak disappeared and the clinical conditions of the infants improved. The aim of this study was to assess the frequency and degree of leakage caused by the Pedi-CapTM.

This study consists of a bench test and retrospective observational study. In bench test I, the Pedi-CapsTM were connected between the NeopuffTM and an artificial test lung. The Pedi-CapTM was placed underwater to detect leakage of air. For bench test II, the disposable Avea VarFlex Flow transducerTM was connected inline the ventilatory circuit to measure leak. Also, recordings of intubations in the delivery room were analyzed retrospectively. The median leak of all Pedi-CapsTM was calculated, as well as leak before and after removing the Pedi-CapTM.

Bench I test (n=44) showed the origin of leak: the (rippled) male end of the Pedi-CapTM. When the Pedi-CapsTM were connected directly to the NeopuffTM 32% of the Pedi-CapsTM caused inevitable extensive leak and 34% caused leak that diminished after sealing the end. In bench test II (n=44) the Avea flow transducer measured median (IQR) leak of 22% (18-60). In the retrospective analysis (n=17), the median (IQR) leak during neonatal stabilization was 39% (8-82). In cases the Pedi-CapTM was removed from the ventilatory circuit, the leak decreased significantly after removal (before vs after; 17% (7-75) vs 4% (2-10), p=0.004) (Figure 1).

The (rippled) male end of the Pedi-CapTM causes leakage varying from 8-82%. Large leaks can unnoticedly compromise respiratory support. We therefore recommend to remove the Pedi-CapTM after successful intubation and to be cautious when using the Pedi-CapTM for evaluation during mask ventilation.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=85690ff8d37970c53d305ff183445fa8-MjAxOS0wNSM1Y2UyNjy2YmU1OGI2

IMAGE / TAB CAPTION: Leak before vs after removing the Pedi-CapTM

COI: None declared
ID: 167
TITLE: INTRAPATIENT VARIABILITY OF REPEATED RESPIRATORY MECHANICS MEASUREMENTS IN VENTILATED NEONATES
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CONTENT:

Electronic Poster

The measurement of respiratory mechanics in newborn has been used to understand the pathophysiology of respiratory failure and describe the effects of medications such as the exogenous surfactant. Sleep state and position influence the measurements of lung function and contribute to their variability. Information about the intrapatient variability of pulmonary function measurements is of clinical importance because a large variability in the test results would preclude their use in the management of individual patients.

The aim of this study was to describe the intrapatient variability of repeated respiratory mechanics measurements in ventilated neonates.

Flows were measured through a pneumotachometer placed between the endotracheal tube and the ventilator circuit. We studied 100 healthy term neonates with 10 pulmonary mechanics measurements to determine the intrasubject variability of repeated measurements.

The coefficient of variation for these 100 subjects ranged from 4% to 29% for tidal volume; 2% to 15% for dynamic compliance, and 2% to 14% for pulmonary resistance. The intrapatient variability in respiratory mechanics parameters was lower in the controlled ventilation mode than in the assisted mode (2% vs. 8.5%). The choice of controlled cycles by suppressing spontaneous cycles reduce this variability, in our study, it was 0.8% for compliance and resistance.

The high variability of the measurement of respiratory mechanics in spontaneously breathing newborns infants may reduce the clinical usefulness of this for individual patients’ measurements during mechanical ventilation.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared

AUTHORS: Wievineke M.J. Apers 1; Linda S. de Vries 2; Floris Groenendaal 3; Mona C. Toet 4; Lauren C. Weeke 5.

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CONTENT:

Neonatal seizures are common and can be caused by a variety of underlying disorders. There is increasing evidence that neonatal seizures may result in further brain damage. The aim of this retrospective study was to describe the time interval between diagnosis of amplitude-integrated electroencephalography (aEEG) confirmed seizures and administration of antiepileptic drugs (AEDs).

In this single-center retrospective cohort study, full-term infants (n=106) admitted to a level III neonatal intensive care unit between 2012-2017 with seizures confirmed on two-channel aEEG and corresponding raw electroencephalography (EEG) trace, and treated with AEDs, were studied. The time-interval between the first seizure on the aEEG registration, confirmed by the researcher, and AED administration was calculated. Factors associated with early treatment and recognition of seizures by the clinician were analyzed.

The median time interval of initiating treatment of aEEG confirmed seizures was 01:50h (range 00:15h – 84:33h). Treatment of aEEG confirmed seizures was initiated <1h in 34/106 infants (32%), 1-2h in 21/106 infants (19.8%), 2-4h in 23/106 infants (21.7%), 4-8h in 14/106 infants (13%) and ≥ 8 hours in 14/106 infants (13%). The first aEEG confirmed seizure was detected by the BrainZ seizure detection algorithm (SDA) in 51%. Seizures treated 1h (67% versus 42%, p=0.02). 70.8% Of the first seizures were recorded in the patient files. Seizure detection by the SDA (OR 4.1, CI 95% 1.3-12.4) together with the presence of clinical signs (OR 16.8, CI 95% 4.7-59.7) were associated with recording of the first seizure on aEEG by the clinician.

Even though 32% of the seizures were treated <1h, there is room for improvement. Timely treatment occurred more often when seizures were detected by the SDA. Development of the SDA and training of staff for electrographic seizure recognition could improve time to treatment.
Recommendations regarding preterm resuscitation (NLS,NRP,European Consensus 2019) focus mainly on clinical management of airway and breathing at birth. Standard recommendations with regards to preventing hypothermia and hyperthermia focus on measures to keep a warm environment and use of a source of warmth i.e. infant warmer and plastic bag or thermal mattress. The Neonatal Life Support guidelines recommend measuring temperature only if resuscitation is prolonged. The impact of measuring temperature and introducing changes to the heating source as well as adding or removing thermal warming devices in response to measured temperatures has not been investigated. A prospective study of measuring the temperature of neonates less than 32 weeks after birth and during neonatal resuscitation, till stabilisation on the neonatal unit was performed in tertiary neonatal unit.

A prospective study was performed in 2017 measuring axillary temperature in babies < 32 weeks gestation. 4 temperature points were measured. T0 (temperature at birth), T1 (temperature after the baby was resuscitated in a plastic bag under the warmer with or without a trans-warmer and just prior to transfer into the transport incubator), T2 (temperature on arrival in NICU) and T3 (temperature when placed in a humidified incubator). T0 was measured using a servo control probe on the resuscitaire. T1-T3 were measured using a digital axillary thermometer. In July 2017 the servo controlled temperature was capped at 37°C to avoid hyperthermia. Transwarmer use was also limited to babies who were cold at 10 minutes. Temperature on admission for babies under 32 weeks in 2017 was compared with 2016.

63% (64/102) babies had temperature measurement during resuscitation. 52 (24-32 weeks gestation; median 27) had all 4 values measured. T0 temperatures varied from 34.8-35.9°C and increased till a steady state was achieved, so an absolute value was difficult to determine when measuring temperature with the servo-controlled probe. Mean temperature values T1 (36.8 Range 35.4-38.5), T2 (37.0 Range 36.5-39) and T3 (37.1 Range 36.6-39) increased over time during resuscitation, stabilisation and transfer. The incidence of hypothermia and hyperthermia decreased after implementation of measurement of temperature during preterm resuscitation (figure 1) from February to December. Comparison of temperature on admission showed that the percentage of babies that were normothermic increased from 72 to 87% from 2016 to 2017. Standardizing servo-controlled temperature to 37°C resulted in less hyperthermia.

This is the first study demonstrating that standardised measurement of temperature throughout resuscitation in extremely and moderately preterm neonates is feasible. Measuring temperature during preterm resuscitation has resulted in better thermal outcomes in our setting. It allows monitoring of trends in temperature allowing interventions that can treat both hypo and hyperthermia. The methodology is reproducible and can be used in all settings.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Figure 1 Measuring Temperature in Preterm Resuscitation

**COI:** None declared
ID: 194

TITLE: GUIDELINES FOR THE RESPIRATORY MANAGEMENT AT BIRTH OF SPONTANEOUSLY BREATHING BABIES LESS THAN 28 WEEKS GESTATION.

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CONTENT:

Extremely premature infants (< 28 weeks of gestation) have a special cardiopulmonary physiology at birth exposing them to a wide range of complications varying from death to short- and long-term morbidities. Alveolar atelectasis, hypoventilation and ventilation-perfusion mismatch are common in this group secondary to the combination of immature airways and surfactant deficiency which prevents preterm lungs from maintaining adequate FRC. This contribute to the development of RDS and subsequent BPD. The first few hours after birth are the critical time for the preterm infant at which some of the major complications (such as death, RDS and IVH) directly occur as well as major physiological changes that contributes to long-term complications (such as BPD and ROP). The first hour after birth is often referred to as the golden hour and interventions in this hour had been a subject for a large spectrum of research studies.

A range of measures has been clinically applied and/or studied for the initial management of extremely premature babies. These can be widely divided into non-pharmacological (Non-invasive respiratory support, sustained lung inflation and supplemental oxygen) and pharmacological (surfactant, caffeine, intratracheal Budosenide, Intratracheal Clara cell secretory protein, Antithrombin, Inositol, Postnatal thyroid hormones, Digoxin and Diuretics)

The aim of this paper is to review the respiratory management of the spontaneously breathing extremely preterm infants at birth exploited from the most recent systematic reviews, meta-analyses, trials and respected expert committees’ opinions and guidelines.

Search strategy and inclusion process:
The research question is developed according to the PIO model and is formulated as: “In extremely preterm infants (P) which respiratory management measures at birth (I) are associated with decreased incidence of mortality and respiratory related morbidities (O).

A structured search process was done in a range of databases including Medline, Embase, Pubmed, NICE, TRIP, Cochrane and Geneva foundation databases. The detailed search strategy and inclusion and exclusion process are shown in Appendices include in the original paper.

Grading of evidence:
The evidence for these recommendations is classified according to the classification scheme adapted from (Shekelle et al., 1999).

This paper was intended to exploit the most recent recommendations about the respiratory management of extremely premature infants and showed the following results:

- CPAP with a PEEP of 5-8 cm H2O is a feasible and effective measure for respiratory support at birth for the prevention of RDS and BPD in spontaneously breathing extremely premature infants, Grade of Recommendation (GoR) A, Level of evidence (LoE) Ia.
- Sustained Lung Inflations of 2-3 seconds duration but not >5 seconds are recommended, GoR D, LoE IV.
- Rescue surfactant administration either by InSurE or LISA/MIST is recommended for the prevention of RDS and subsequent BPD, GoR A, LoE Ia.
- Other measures including HNFC, NAVA, Supplemental oxygen administration and other pharmacological measures are not recommended measures to prevent RDS and subsequent BPD, GoR A-D, LoE Ia-IV.
The author concluded that the most effective measures in the area are: early CPAP with rescue surfactant administration via InSurE or alternatively LISA or MIST. Summary of recommendations is found in the flowchart designed by the author (see Figure).

Further trials are needed for establishing a safer and more effective care of the extremely premature infants.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Flowchart for respiratory support at birth for spontaneously breathing extremely premature infants

**COI:** None declared
ID: 195  
TITLE: Neonatal prolonged jaundice, the old problem in pediatric pathology  
AUTHORS: Sonia Tanasescu1, Tamasan Ionela1 Radmila Costachescu 1Simona Muntean2, Pop Liviu1 
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CONTENT:  
Neonatal jaundice is one of the most common conditions in the neonatal period that worries about indirect bilirubin through its neurotoxic property. Jaundice as cardinal symptom occurs in a wide variety of diseases in the neonatal period, translating to clinically by yellowing of the skin, mucous membranes and sclera due to bilirubin impregnation. Hyperbilirubinemia is an important and frequent long-term problem for the baby. It occurs when there is an imbalance between the production and elimination of bilirubin. Although bilirubin metabolism is well explained the mechanism involved in hyperbilirubinemia is not fully understood.  

We studied a total of 76 infants aged 10 days and four months hospitalized in Pediatrics II Timisoara during April 1, 2018 - 1 Aprilie 2019 after they were discharged from the maternity ward. All infants included in the study were aged ≥ 37 weeks of gestation and a total bilirubin ≥12mg / dl. We studied the following variables: gender, origin, age at admission, bilirubin value, type of food, type of birth, birth weight, maternal and neonatal risk factors for jaundice and treatment needs.  

Our study revealed a serum bilirubin concentration over 15 mg / dl in 62 (82%) of 76 infants. Reported by gender, higher incidence was observed in males 62% vs. 38% females. We found significant correlations between increased bilirubin levels and natural nutrition, blood type incompatibility, type of birth, and perinatal complications. Breastfeeding has been associated with a total serum bilirubin concentration of over 15mg / dl and the need for phototherapy. Hyperbilirubinemia has also been associated with natural birth and the application of a vacuum extraction.  

In conclusion, our study showed that breastfeeding is associated with prolonged severe jaundice and the need of phototherapy. There was no complication related to high bilirubin value and treatment with phototherapy.
Neonatal resuscitation is a common procedure with positive pressure ventilation (PPV) required in about 5% of newborn infants at birth. T-piece resuscitators (TPR) are recommended for newborn resuscitation. Data on their performance in term newborns are sparse. We have previously shown that PPV by a TPR in a compliant lung model generated significant inadvertent positive end-expiratory pressure (PEEP). We hypothesised that this phenomenon is related to the inflation rate and gas flow rate. Our objective was to study ventilation parameters in a neonatal manikin with normal term lung compliance ventilated with a TPR with different inflation and flow rates.

Staff members working at a tertiary neonatal unit in Sydney, Australia were recruited to ventilate a neonatal manikin with a TPR (Neopuff Infant Resuscitator, Fisher and Paykel Health Care, New Zealand) and mask with pressures of 25/5 cm H2O. The compliance of the lung model was similar to a term newborn with healthy lungs. Gas flow rates were 5, 10 and 15 litres per minute (LPM) and inflation rates were 30, 40 and 60 inflations per minute. These were sequenced randomly. Each participant performed a total of nine mask ventilation sessions using all flow/inflation rate combinations. A pneumotach was placed between the mask and the TPR. Data regarding ventilation parameters were collected using Spectra software (Grove Medical, UK) and analysed with repeated measures analysis of variance.

Twenty staff members participated in the study. A total of 8185 inflations were analysed. The number of inflations analysed at flows of 5, 10 and 15 LPM was 2689, 2737 and 2759 respectively. There were 1960 inflations with a rate of 30/min, 2508 inflations with a rate of 40/min and 3717 inflations with a rate of 60/min. At all the gas flow rates, the PEEP increased significantly with increase in inflation rate. The magnitude of this increase was more pronounced the lower the flow rate was (Fig 1). At a given inflation rate, PEEP was maximum at a flow of 5 LPM and minimum at a flow of 15 LPM. The measured PEEP was 8.7 cm H2O at the inflation rate of 60/min with flow of 5 LPM. Mask leak was of a very low magnitude. The expired tidal volume decreased as the inflation rate increased across all the flow rates and this was in keeping with the decreasing inspiratory time.

In a neonatal manikin with a compliant lung model, significant levels of inadvertent PEEP are generated with lower gas flow and higher inflation rates with a TPR. While providing PPV with a TPR during newborn resuscitation, practitioners should choose an inflation rate which is appropriate for the expected lung compliance with lower rates preferred for normal lung compliance. Gas flow rates of 10-15 LPM are more appropriate as compared to 5 LPM.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Fig 1: Rise in PEEP with increasing inflation rate and decreasing flow (with a reference line at a PEEP of 5 cm H2O). Individual box plot presenting median, interquartile range, range and outliers.

**COI:** None declared.
ID: 201
AUTHORS: Junko Nagasawa 1; Yuka Wada 1; Tetsuya Isayama 1; Aiko Sasaki 2; Kenichiro Motomura 2,3; Reiko Ito 4; Haruhiko Sago 5; Yushi Ito 1
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CONTENT:

Neonatal hemochromatosis (NH) is a disease with poor prognosis causing severe liver failure in both fetal and neonatal periods and is assumed to be an allogeneic immunological fetal liver injury. Up till date, no survey has outlined management of NH in Japan, due to the disease’s difficulty in diagnoses and treatment. Here we report the first nationwide survey for management of cases diagnosed clinically with NH in a 5 years period from 2010 to 2014.

Questionnaire surveys were sent to the National Perinatal Maternal and Child Medical Centers and the Organ Transplant Centers of a total of 275 hospitals, regarding their experiences for management of NH cases during 2010-2014. A further detailed questionnaire regarding diagnosis and management was sent to hospitals with positive respond of experiencing cases.

From 275 hospitals included in the survey a total of 197 hospitals responded. The responds included managements of 19 cases. Only 2 cases completely fulfilled the diagnostic criteria of NH stated by the Japanese Society of Pediatric Gastroenterology, Hepatology and Nutrition (JSPGHN). In 16 out of 19 cases abdominal imaging including MRI, CT, and/ or ultrasound was performed where iron deposition in 8 cases was observed. Therapeutic prophylaxis via maternal antenatal IVIG administration was done in 2 cases out of the 19. Both cases survived without requiring postnatal therapy. The remaining 17 cases received postnatal medical treatments and Liver transplantation was performed in 9 of them. Later on 2 cases were finally diagnosed as Niemann-pick disease. Fourteen out of the 17 cases survived and non-surviving cases (n=5) expired during first 6 month of age.

From this survey, fulfilling the requirements for diagnosing NH using the criteria stated by the JSPGHN is difficult to reach, as many cases could not receive required diagnostic investigations due to their poor general condition. Therefore, in order to improve NH prognosis a revision of the JSPGHN diagnostic criteria and a standardized management for NH including antenatal therapeutic prophylaxis is warranted.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 203
TITLE: Thermal injury in newborns and within the first 6 months of life
AUTHORS: Ashraf Mohammad zadeh1, Ahmad shah Farhat 2, Reza Saeidi 3
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CONTENT:
The skin is very thin and sensitive to burns in newborns. In this age group mortality rate is very high. Burns account for approximately 2 million injuries annually in the United States alone, of which 500,000 seek medical treatment and 100,000 require hospitalization. Approximately 50%, of burns occur in the pediatric population, with children younger than 5 years representing 17% of reported burn cases. Infants and children are a unique patient population that demonstrates increase susceptibility to death. Not only the young children have limited physiologic reserves, but their patterns of injury are very different from adults. Although thermal burns secondary to scale or flame are by far the most common etiologies in children and adults, injuries from chemical and electrical burns may be devastating and require early recognition and treatment.

The document of all infant burns admitted to Imam Reza hospital Mashhad Iran was retrospectively analyzed in one decade since 2001-2011.

Four hundred forty seven burns admitted to this ward for 10 years. Twenty five (6%) were in first 6 months of life. Three (12%) were newborn (first 28 days of life). Fifteen (60%) were female. Mean age in admission was 5.3±1.2 month (min 3 days, max 6 months). Mean percentile of burn was 23±15 percentile. Stay in hospital was 14±18 days. Mortality rate was 12%. Source of burns was hot water (tea,…) 80% and fire 16%, and one case (4%) was a newborn that got burn in lower extremities due to malfunction of incubator.

Result of this study was the same as world. Hot water and fire were the most sources of burns. Female were injured more than male. Mortality rate was 12%.
ID: 208

TITLE: EARLY MOTOR PROBLEMS AND THE EFFECTS OF PHYSIOTHERAPY ON LATER CHILD OUTCOMES

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CONTENT:

Early motor coordination problems have previously been associated with detrimental outcomes across various developmental domains in childhood. Despite increasing evidence suggesting that physiotherapy may not be effective to improve motor performance, children with early motor deficits are often referred to physiotherapy. However, previous studies have not yet investigated whether and how treatment via physiotherapy may influence the association between early motor problems and later developmental outcomes.

A prospective whole-population longitudinal study in Southern Germany assessed 1374 children from birth to 8 years. Early motor functioning was assessed at birth and at 5 months through standardised neurological assessments. Information on referral to physiotherapy was taken from parent interviews at 5, 20 and 56 months. Developmental outcomes included motor skills, mental health, cognitive function, attention regulation, academic achievement, and peer and parent relationships, and were measured at age 6 and 8 years via various standardised assessments and observations. Structural Equation Modelling (SEM) was applied to test direct and indirect associations between early motor problems and physiotherapy to later child outcomes.

Both, infant motor problems and physiotherapy were negatively associated with motor skills (β=-0.22, p<.001 and β=-0.14, p=.004), cognitive function (β=-0.10, p<.001 and β=-0.18, p<.001), attention regulation (β=-0.09, p<.001 and β=-0.16, p<.001) and academic achievement (β=-0.10, p<.001 and β=-0.13, p<.001) at school age. Detrimental effects of early motor problems on developmental outcomes, such as motor skills (β=-0.04, p=.006), cognitive function (β=-0.06, p=.001), attention regulation (β=-0.05, p=.001), and academic achievement (β=-0.04, p=.001), were partly mediated by physiotherapy. Early motor problems and physiotherapy had no direct effect on mental health. Physiotherapy however, had a direct negative effect on peer relationships (β=-0.11, p=.011) and a positive direct effect on parent-child relationships (β=0.09, p=.032).

Findings show that infant motor problems are associated with later developmental problems across various psychological domains. Infant motor problems may represent a starting point of a trajectory of difficulties that may lead to problems in multiple developmental domains. No evidence for a beneficial effect of early physiotherapy on later developmental abilities was found in at-risk children.
ID: 213

TITLE: A Systematic Review of Biomarkers in Neonatal Encephalopathy to Predict Long Term Outcome

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8. University of Aarhus, Denmark
9. University of York, UK

CONTENT:

Neonatal Encephalopathy (NE) describes central nervous system dysfunction from all causes and has a multifactorial aetiology. NE is difficult to diagnose, to treat and to predict outcome. In recent years there has been extensive research in diverse fields including blood, urine, CSF and neuroimaging to identify biomarkers in NE to predict outcome. Despite this there is no gold standard biomarker known at present and predicting outcomes in NE remains a significant challenge. Identifying prognostic biomarkers has implications for counselling parents on expected neurodevelopmental outcomes, future adjunctive therapies and guiding research.

The systematic review protocol was registered with Prospero. EmBase, PubMed, Cochrane and Web of Science were searched with relevant search terms. Biomarkers examined included serum, CSF and neuro-imaging to predict a composite outcome of death or abnormal neurodevelopmental assessment from six months of age to school age.

Two independent reviewers used Covidence software for study screening. A modified Cochrane data extraction form was used for data extraction and study quality was assessed using the QUIPS risk of bias (ROB) tool. Analysis of data and ROB was completed using Revman software (v5.3). When appropriate, studies were included in a meta-analysis (MA), using weighted mean difference and standard deviation for continuous data, and odds ratio for discrete data.

1613 papers were identified after duplicates were excluded. Following title and abstract screening there were 314 studies for full text screening, after which 71 papers were included to examine biomarkers to predict long term outcome. These 71 papers reported outcomes for over 20 different biomarkers. There was sufficient data to complete MA for 6 serum biomarkers and MRI as an individual biomarker.

MRI brain was the best biomarker to predict outcome. The meta-analysis included 938 patients from 23 studies. Abnormal MRI brain was predictive of adverse outcome with an odds ratio of 18.78 (95% CI 12.53 to 28.14). Raised serum Interleukin-6 (p value <0.01, effect estimate 141, 95% CI 32 to 252) and neuron specific enolase (p value <0.01, effect estimate 43.7, 95% CI 5 to 83) are associated with adverse long term outcome in NE, however there were small patient numbers in both studies.

MRI brain provides early prognostic information on long-term developmental outcome in NE. Early prognostic information is important to initiate early intervention of therapies, to counsel parents and for resource planning. Conclusive results could not be reached for many biomarkers due to reporting methods, small patient numbers and significant heterogeneity in reporting. Studies in future will benefit from establishment of core outcomes.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1: Meta-analysis of MRI brain to predict long term neurodevelopmental outcome and death

COI: nil
ID: 222
TITLE: MULTIPLEXED POINT-OF-CARE TESTING AND SCREENING TO DETERMINE THE FREQUENCY OF RESPIRATORY VIRAL INFECTIONS IN A NEONATAL INTENSIVE CARE UNIT
AUTHORS: Anna Neurohr1, André Kidszun1, Susanne Tippmann1, Daniel Schreiner1, Julia Winter1, Britta Gröndahl2, Stephan Gehring2 and Eva Mildenberger1
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2Department of Pediatric Infectious Diseases, University Medical Center, Mainz, Germany

CONTENT:

Respiratory viruses have been described to cause severe respiratory and sepsis-like symptoms in infants hospitalized in the neonatal intensive care unit (NICU). But despite a growing body of literature, the magnitude of the problem is not sufficiently known. In particular, the frequency of asymptomatic or minimally symptomatic infections is an open question. Aim of this study was to evaluate the overall frequency of respiratory viral infections in our NICU.

This was a prospective, observational study from 01.02.2018 to 31.01.2019. Infants hospitalized ≥72 hours were eligible for the study. To determine the frequency of respiratory viral infections, multiplexed point-of-care testing (POCT) of symptomatic infants was combined with a weekly screening of all infants. Virus samples were collected via nasal swabs and analyzed with the BIOFIRE® Respiratory Panel (POCT) and an in-house multiplex PCR (weekly screening / POCT crosscheck). Our 10-bed NICU is 24/7 open to families and visitors. The number of simultaneous visitors is restricted to two per patient. Parents and visitors are instructed in hand hygiene and advised to avoid visits in cases of respiratory illness. Siblings (irrespective of age) may visit the NICU following a physical check-up.

70 of 366 infants admitted to the NICU were eligible for the study. 67/70 infants (96%) were finally enrolled and analyzed. Multiplexed point-of-care testing (75 symptomatic episodes) combined with the weekly screening (272 episodes) yielded in 17 positive samples from 2 infants. Rhino-/enterovirus were detected in all cases. Both infants were first detected during symptomatic episodes. Thus, no infant was first diagnosed by means of the screening.

Respiratory viruses were detected during symptomatic and asymptomatic episodes but affected < 1% of infants admitted to our NICU and < 3 % of infants enrolled in the study. A low frequency of respiratory viral infections may be attained despite adherence to family integrated care including liberal visiting policies for younger siblings.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 226

TITLE: EFFECTS OF FAMILY CLINIC SUPPORTIVE OF BREASTFEEDING ON BREASTFEEDING DURATION OF PRIMAPAROUS WOMEN

AUTHORS: Eglė Markūnienė 1, Dalia Stonienė 2, Rasa Tamelienė 3, Natalija Skorobogatova 4, Gintarė Zibolienė 5.

AFFILIATIONS: 1 Neonatal department, Lithuanian University of Health Sciences, Kaunas, Lithuania, 2 Neonatal department, Lithuanian University of Health Sciences, Kaunas, Lithuania, 3 Neonatal department, Lithuanian University of Health Sciences, Kaunas, Lithuania, 4 Family Clinic, Lithuanian University of Health Sciences, Kaunas, Lithuania,

CONTENT:

WHO/UNICEF recommends, as the gold standard for children’s health and nutrient consumption, exclusive breastfeeding for infants until 6 months and to continue until 2 years with supplementary feeding. We found that breastfeeding (at least once per day) until 6 months in some European countries as Norway is 71 % (2013), Italy 46% (2013), Denmark 13% (2013) and Lithuania 45% (2015).

Anonymous questionnaire. Primaparous mothers raising 12–24 month-old infants 31 from private and 78 from state clinic were surveyed in 2017. Statistical analysis was performed with Statistical Package for Social Sciences SPSS (20.0 v.).

Breastfeeding duration in a private clinic ranged from 100 percent until 6 months to 90.22 percent until 12 months. Breastfeeding in state clinic ranged from 73.08 percent until 6 months to 35.9 percent until 12 months. (p<0,001). Breastfeeding duration in a private clinic ranged from 11 months (9.7 percent) to 23 months (6.5 percent), averaging 15.45 (± 3.65) months, whereas a state clinic ranged from 1 month (10.26 percent) to 24 months (2.56 percent), averaging 9.45 (± 5.797) months (p<0,001).

The most common reason for discontinuing breastfeeding was the child's refusal to breastfeed (19.05 percent), followed by lack of milk (14.29 percent); all of them were respondents of state clinic. Another 7.94 percent of respondents indicated that they stopped breastfeeding because of the child's age or illness. Not one mother in private, breastfeeding–supportive clinic reported problems with lack of milk or problems of breasts. Private clinic respondents more often received recommendations supportive of breastfeeding (chi2=24,034, df=6, p=0,001) (Table 1) and less often recommendations that would interfere with breastfeeding (chi2=31,983, df=8, p0,05), but breastfeeding--obstructive advice shortened breastfeeding duration significantly (r=-0,327, p=0,001).

1. Private clinic respondents more often received recommendations supportive of breastfeeding and less frequently recommendations interfering with breastfeeding as compared to state clinic respondents and breastfeed longer 2. Advice obstructive of breastfeeding shortened breastfeeding duration significantly.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1. Recommendations supporting breastfeeding

COI: None declared
ID: 229

TITLE: RELATION BETWEEN ESOPHAGEAL PRESSURE, VOLUME AND THE ACTIVITY OF THE DIAPHRAGM IN A PRETERM INFANT, A PHYSIOLOGICAL STUDY

AUTHORS: Ruud van Leuteren 1; Cornelia de Waal 1; Frans de Jongh 1,3; Gerard Hutten 1; Anton van Kaam 1,2

AFFILIATIONS: 1 Department of Neonatology, Emma Children’s Hospital, Amsterdam UMC, University of Amsterdam, Amsterdam, the Netherlands
2 Department of Neonatology, Emma Children’s Hospital, Amsterdam UMC, Vrije Universiteit, Amsterdam, the Netherlands
3 Faculty of Science and Technology, University of Twente, Enschede, The Netherlands

CONTENT:

Respiratory support is used in preterm infants to restore lung function and reduce the work of breathing (WOB). Measuring WOB requires invasive measurement of transpulmonary pressures combined with (spontaneous) tidal volumes. Therefore, clinicians use parameters like respiratory rate and distress, to assess WOB. A non-invasive method to measure WOB is lacking. Transcutaneous electromyography of the diaphragm (dEMG) has shown to be able to detect changes in diaphragm activity when changing respiratory support, which could reflect changes in WOB. In a search for a new WOB method this study describes the relation between esophageal pressure, tidal breathing and diaphragm activity in a preterm infant.

Esophageal pressure (Pes), volume and dEMG were recorded simultaneously in a preterm infant (gestational age 29.9 weeks, measured at day five, with a weight of 1115 grams) while supported by nasal continuous positive airway pressure of 4 cmH2O, without supplemental oxygen. Pes was measured with a fluid-filled feeding tube, retracted into the esophagus and connected to a pressure transducer. Volume was measured with respiratory inductance plethysmography (RIP), calibrated to tidal breathing measured at the airway opening using a flow transducer. dEMG was recorded by three skin electrodes placed on the infant’s chest. Breath-by-breath analysis of a segment resulted in an average respiration loop (based on 57 breaths) of the relation between dEMG activity changes and volume and Pes changes.

With the current measurement set-up it was feasible to retrieve, Pes, volume and dEMG tracings simultaneously in a preterm infant. RIP-calibration could be done with moderate accuracy (R2 multiple regression fit of volume vs. RIP 0.83). The EMG-pressure loop showed a pressure drop swiftly at the start of the diaphragm’s contraction and an increase in pressure during expiration, when the diaphragm relaxes again (Figure 1A). The dEMG-volume loop showed a physiological ramp inspiratory activity of the diaphragm before actual inspiratory volume was measured (Figure 1B). The median ramp inspiratory activity time of the diaphragm was 194 (246-152) ms. Post-inspiratory activity of the diaphragm was seen as well indicating an active process to maintain end-expiratory lung volume.

This study describes the expected physiological relation between the electrical activity of the diaphragm and the esophageal pressure and volume respectively. Based on these results dEMG seems a promising candidate for non-invasive WOB monitoring in preterm infants.

IMAGE / TAB:
https://www.eiseverywhere.com/eeselectv3/v3/events/351149/submission/files/download?fileID=50e7b2f6e910f550eda5061751f3971a-MjAxOS0wNSM1Y2UyNjY2YzA1Njlh

IMAGE / TAB CAPTION: Figure 1: dEMG – pressure (A) and dEMG – volume (B) loops showing the relation between these parameters. Inspiration and expiration were analyzed separately. dEMGRIA: ramp inspiratory activity of the diaphragm, dEMGPIA: post-inspiratory activity, TV: tida

COI: None declared
ID: 231

TITLE: CHANGES IN PRACTICE SUCCESSFULLY REDUCE ANTIBIOTICS USE IN A NEONATAL INTENSIVE CARE UNIT

AUTHORS: Greice Suellen Batista 1
Maressa Raquel de Mendonça Moura 2
Anelise Steglich Souto 3

AFFILIATIONS: 1, 2, 3 University Hospital Profesor Polydoro Ernani de São Thiago, Federal University of Santa Catarina, Florianópolis, Brazil
3 Paediatric Dept., Federal University of Santa Catarina

CONTENT:

Antibiotic therapy is a life-saving intervention in Neonatal Intensive Care Unit (NICU). Its use, however, needs to be rational and evidence-based. Worldwide, it has been encouraged to reduce unnecessary exposure of newborn to antibiotics, so we can avoid antibiotic-resistant infections, ototoxic and nephrotoxic effects, augmented risk of enterocolitis. Early antibiotic administration causes deleterious changes in microbiome, leading to long-term effects, like increased incidence of asthma, celiac disease and higher body mass index (BMI). However, translate evidence into practice is not always easy and requires a carefully designed program that targets changes in professional behavior and clinical practice. We aimed to improve antibiotic use in our unit by implementing a protocol that considers solely clinical symptoms to start antibiotics and positive cultures to determine its continuation. The purpose of this study is to compare the outcomes of newborns in the period before and after the implementation of this new protocol.

Study approved by local ethics committee. Design: prospective historical cohort. Participants: newborns admitted in the NICU in years 2011 (before the protocol) and 2016 (after the protocol). Newborns discharged with < 48h, birth weight < 500g, deceased due to malformations with < 48h and transferred to another hospital were excluded. Data collected from charts were gestational age, birth weight, gender, type of birth, Apgar score; maternal risk factors for infection; use of central venous access and mechanical ventilation; time to start enteral nutrition and duration of parenteral nutrition; use of antibiotic in first 48 hours of life or after this period and if treatment was suspended (ruled-out sepsis) or sustained and if there were positive blood cultures; time for discharge and death.

171 newborns were evaluated in 2011 and 142 in 2016. There was no difference in main characteristics between groups, except for a higher average birth weight in the group after the protocol (2133g versus 2443g; p = 0,002). When stratified by groups of birth weight < 2500g and < 1500g, there were no difference between groups. In 2011, 72 newborns (42%) started antibiotics for early neonatal sepsis, while only 24 (17%) in 2016 (p< 0,0001). Antibiotics were suspended more frequently in 2016: 46% versus 24% in 2011 (p = 0,04). Late neonatal sepsis treatment was more frequent in 2011: 28 newborns (16%) versus 11 (8%) in 2016 (p = 0,02). There was a non-statically significative difference between time to discharge, with a trend to an earlier discharge in 2016. There were 6 (4%) deaths in 2011 and 2 (1%) in 2016 (p = 0,2).

Implementing a protocol that guided antibiotic use by clinical symptoms and positive culture successfully reduced antibiotic use, without increasing mortality or time to discharge. Antibiotics were started less often and suspended more frequently after the implementation of the protocol, for both early and late suspected neonatal sepsis.
ID: 233  
**TITLE:** Developing a tool to detect inappropriate prescribing in neonates (TIP-N): An insight from a retrospective pharmaco-epidemiological study  
**AUTHORS:** Asma Al-Turkait 1; Shalini Ojha 2; Imti Choonara 3; Lisa Szatkowski 4  
**AFFILIATIONS:** 1 Child Health, Division of Graduate Entry Medicine, School of Medicine, University of Nottingham  
2 Child Health, Division of Graduate Entry Medicine, School of Medicine, University of Nottingham  
3 Child Health, Division of Graduate Entry Medicine, School of Medicine, University of Nottingham  
4 Division of Epidemiology and Public Health, School of Medicine, Nottingham City Hospital  

**CONTENT:**

Prescribing drugs to neonates is a complex process. To date, the availability of essential tools to detect inappropriate prescribing is sparse in the paediatric population especially in neonates. Before proposing any tool to rationalise the prescribing of medicine in neonates, there is a need to establish crucial milestones that relates to the current drug use in neonates.

To achieve this, we aimed to identify the most commonly used drugs in neonatal units in the UK over the past 8 years (2010 to 2017).

A retrospective pharmaco-epidemiological study of a large prospectively collected database (The National Neonatal Research Database) was conducted. This study was registered in clinicaltrials.gov (NCT03773289). Anonymised data was analysed to identify the most commonly used drugs across all gestational age groups.

The raw count of the drugs was reported as “n” which corresponds to the: number of neonates prescribed a particular drug at least once across the whole study period.

A total of 642,729 neonates included in the analysis (between 01 January 2010 to 31 December 2017). Benzylpenicillin and gentamicin were the most commonly used antibiotics. A summary of the results is tabulated below.

Benzylpenicillin and gentamicin were the most frequently prescribed antibiotics in accordance with national guidelines. Similarly Caffeine for apnoea in preterm neonates and vitamins for all neonates are recommended in guidelines.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Most five commonly used drugs across different neonatal gestational age groups

**COI:** None declared
ID: 248  
TITLE: UNILATERAL DIAPHRAGMATIC PARALYSIS IN THE NEWBORN: A RARE COMPLICATION OF CHEST DRAINAGE  
AUTHORS: Kaiet Echeverria 1; Pilar Jarque 2; Pilar Cobo 3; Marina Roldán 4; Carmen Garcia 5, Eva Beltran 6  
AFFILIATIONS: Departament of Neonatology, University Hospital Son Espases, Palma de Mallorca, Spain.

CONTENT:

Diaphragmatic paralysis is a well-known complication of cardiac surgery. The damage to the phrenic nerve during the surgical procedure can occur due to traction, section or stretching of the nerve but it could also be caused by a malpositioned chest tube. In that case, direct compression of the nerve by a deeply positioned chest tube causes the paralysis and it may follow a benign course if promptly recognised.

Chest tube insertion is considered as a safe procedure but as an invasive technique it is not free of risks. We report a case of unilateral diaphragmatic paralysis caused by malpositioned chest tube to raise awareness of this rare complication.

A male newborn was delivered after 35 5/7 weeks of gestation, with a birth weight of 2785 grams. He was diagnosed with bilateral pneumothorax that was successfully drained after chest tube insertion. Despite pneumothorax resolution, the patient failed to

Diaphragmatic paralysis is a rare complication of chest drainage but described in medical literature. When unexplained respiratory failure occurs following chest tube insertion, its diagnosis must always be considered. Prompt recognition and removal of the tube led to successful recovery of complete diaphragm function. Recovery time is variable but clearly lower that the paralysis due to cardiac surgery.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 249

TITLE: "sepsis ruled in" in VLBW infants: A 3-NICU collaboration

AUTHORS: Karen Fairchild 1, V Peter Nagraj 2, Katherine Berry 1, Rupin Kumar 1, Douglas Lake 3, J Randall Moorman 3, Noa Fleiss 4, Aaron Wallman-Stokes 4, Rakesh Sahni 4, Ami Rambhlan 5, Zachary Vesoulis 5, Amit Mathur 5, Brynne Sullivan 1

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CONTENT:
Signs of late-onset septicemia (LOS) and necrotizing enterocolitis (NEC) overlap with normal preterm physiology, and about 10-20 sepsis evaluations are performed and antibiotics given for each case of proven LOS or NEC. Early diagnosis and treatment are important for improving outcomes, but unnecessary antibiotics increase multiple morbidities. Our group has previously developed continuous vital sign analytic tools to alert clinicians to potential impending sepsis and we are developing other decision support systems to assist in decisions about starting and stopping antibiotics. The aim of the current retrospective review and analysis was to use clinical variables and signs at the time of LOS/NEC evaluation to develop a model for prediction of ultimate diagnosis of LOS or NEC ruled in versus sepsis ruled out (SRO). Medical records of consecutive very low birth weight (VLBW) infants admitted to 3 NICUs were reviewed, excluding those who died within 3 days of birth or were admitted after 28 days of age. For each infant with at least 1 blood culture sent for suspected LOS/NEC, one workup was reviewed, either the first positive workup or, if none were positive, the first negative workup. Clinical, laboratory and imaging findings prompting the workup were collected. The workup was classified as LOS/NEC if there was a positive blood culture or radiographic diagnosis of NEC and the infant was treated with at least 5 days of antibiotics and as sepsis ruled out (SRO) if cultures and XRay were negative and less than 5 days of antibiotics given. Cases of focal infection and clinical sepsis were not used in modeling.

A baseline risk model included demographic, perinatal, and clinical variables associated with LOS/NEC versus SRO in univariate analysis. A clinical model (with signs, labs, and imaging at the time of workup) was then tested in univariate analysis, followed by a combined baseline and clinical model. Multivariable logistic regression was used to calculate area under the receiver operator characteristic curve (AUC) with confidence intervals determined using bootstrap methods. Models were compared using net reclassification improvement (NRI).

Of 633 VLBW infants meeting inclusion criteria, 451 (71%) had at least one blood culture evaluation reviewed. Of these, 161 were eventually classified as LOS/NEC and 177 SRO (113 were focal infection or clinical sepsis and not included in modeling). Figure 1 is a tornado plot showing the proportion of evaluations with each clinical variable based on the final outcome of LOS/NEC or SRO for each clinical sign. Results of logistic regression models using baseline variables alone, clinical signs alone and the two models combined yielded AUCs [95% CIs] with increasing predictive performance: baseline model AUC = 0.700 [0.641 - 0.760], clinical signs model AUC = 0.736 [0.681 - 0.792] and combined model AUC = 0.790 [0.739 - 0.841]. The continuous NRI of the combined model was 0.657 [0.442 – 0.872] (p<0.0001), which translates to a 66% improvement in prediction over the baseline model.

In a multicenter cohort of VLBW infants, a combined baseline risk and clinical signs model performed better than either model alone to predict the ultimate diagnosis of LOS/NEC versus SRO. Future work will combine continuous analysis of vital sign patterns with a clinical risk score to assist in earlier institution of antibiotics for infants with true infection and withholding or earlier discontinuation of antibiotics in lower risk situations.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1. Tornado plot of clinical signs prompting blood culture evaluations. The size of the horizontal bars represents the proportion of evaluations with each clinical sign based on ultimate designation of LOS or NEC (red bars, left) and sepsis ruled out.

COI: None declared
ID: 253

**TITLE:** EUROPEAN SURVEY ON PREMEDICATION USED FOR NON-EMERGENCY NEONATAL INTUBATION.

**AUTHORS:** Judit Mari 1, Peter Franczia 2, Wojciech Margas 3, Magdalena Bebrysz 3, Renata Bokiniec 4, Joanna Seliga-Siwecka 4

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1 Paediatric Department, University of Szeged, Szeged, Hungary
2 Frabien Consulting, Budapest, Hungary
3 HTA Consulting, Cracow, Poland
4 Department of Neonatology and Neonatal intensive Care, Medical University of Warsaw, Poland

**CONTENT:**

Despite existing recommendations, a wide variation in frequency and type of drugs used for premedication for neonatal intubation still exists. We sought to evaluate the use of premedication for non-emergency neonatal intubation in a group of international neonatal providers and identify attitudes and experience regarding safety, side effects and efficiency of neonatal intubation.

A survey was sent to physicians and neonatal nurse practitioners working within the neonatal intensive care setting in Europe. Respondents were recruited by email. Additionally, a link to the survey was provided on professional neonatal themed internet discussion groups.

718 completed questionnaires from 70 different countries (n=40 European and n=30 Non-European) were analysed. 69.6% responses were provided by neonatologists and 10.3% by paediatric/neonatal trainees.

31.6% (n=227) practitioners reported that their unit does not have a protocol for neonatal intubation. In units without a protocol 60.4% of the practitioners would choose premedication according to personal preference, 37% do not use any drugs for non-emergency intubation. The most frequently reported combination for premedication was fentanyl, atropine and succinylcholine [6.8%]. Majority of the practitioners (78.5%) use the same drugs for term and preterm infants. Only 24.8% of physicians were fully satisfied with their premedication practice.

Despite international recommendations, a significant percent of practitioners continue not to use premedication. Education about potential harms and complications of intubation without analgesia and sedation should be enforced world-wide. A well planned, controlled trial is required in order to overthrow existing false convictions regarding drugs used for neonatal intubation.

**COI:** none declared
ID: 255  
TITLE: EARLY ADMINISTRATION OF ERYTHROPOIETIN IN VERY LOW BIRTH WEIGHT PREMATURE INFANTS  
AUTHORS: Mihaela Demetrian 1; Andreea Avramescu 2, Roxana Iliescu 3, Georgeta Grecu 4  
AFFILIATIONS: Neonatology Dept., Clinical Hospital of Obstetric and Gynecology "Filantropia", Bucharest, Romania  

CONTENT:  

Introduction:  
Since the most incriminated pathophysiological mechanism involved in the prematurity anemia is low serum erythropoietin, a logic conclusion would be that early administration could influence the transfusion requirement in this patient population.  
Purpose: to reduce the need for transfusion and the number of donors and to observe the non-haematological effects after early administration of erythropoietin.  

102 preterm with gestational age ≤30 weeks and weighing ≤1250 grams born between 2018-2019 in the SCOG "Filantropia" were randomized to two batches by the administration of erythropoietin. The EPO group (n = 40) received erythropoietin in the first 7 days of life, doses were 500 IU / kg, x 3 times/week, subcutaneous for 6 weeks. The group without erythropoietin nonEPO (n = 62) received iron therapy only. Otherwise, there were no differences in the therapeutic approach between the two groups.  
Were observed the main effects of erythropoietin on haematological parameters: the evolution of hemoglobin curves, red blood cell counts, number of packed red blood cells transfusions. Also, non-haematological effects of erythropoietin were observed: incidence of intraventricular haemorrhage, ROP, BDP.  

Results  
There were no significant differences between the two groups in respiratory distress, duration of ventilation, oxygen therapy and the incidence of bronchodyplasia.  
There were no significant differences in the incidence retinopathy of prematurity in the two groups, the degree of which had a comparative mean: EPO 1.9 ± 0.9 / nonEPO 1.6 ± 1.3.  
Erythrocyte concentrate transfusions were generally administered at an average hemoglobin of 6.9 ± 1.1 g / dl (Htc 21 ± 3.5%), especially after 30 days of life (31.4 ± 9) in both groups. In the erythropoietin (EPO) group, 10 children received transfusions (24%) with an average of 1.1 ± 0.8 transfusions / patient. In the non-erythropoietin (non-EPO) group, 34 received transfusions (56%) with an average of 1.6 ± 1.3 transfusions / patient.  

Conclusions  
Early use of erythropoietin significantly reduced the need for transfusion. Although the global transfusion need per patient did not decrease significantly, an exposure to fewer blood products from multiple donors could represent a health benefit. Growth of aggressive forms of ROP (≥3) in children who received early erythropoietin therapy was not observed.  

IMAGE / TAB:  

IMAGE / TAB CAPTION:  

COI: None declared
ID: 256

TITLE: THE EFFECT OF MATERNAL RISK FACTORS AND PLACENTAL HISTOPATHOLOGY ON NEONATAL MORBIDITY IN LATE PRETERM INFANTS

AUTHORS: Arife Dutucu 1; Deniz Anuk Ince 1; Şebnem Kupana Ayva 2; Sertac Esin 3; Mustafa Agah Tekindal 4; Özden Turan 1; Ali Ulaş Tugcu 1; Ayse Ecevit 1

AFFILIATIONS: 1 Paediatric Dept., University Hospital of Baskent, Ankara, Turkey
2 Pathology Dept., University Hospital of Baskent, Ankara, Turkey
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CONTENT:

Preterm births are the most important risk factor for neonatal morbidity and mortality. About 65-70% of preterm babies are late preterm who were born between 34 0/7 - 36 6/7 gestational weeks. Late preterms are often considered to be mature functionally and developmentally and therefore they treated as full-term babies, which can result in overlooked problems. Placental evidence of antenatal conditions also likely correlates with morbidity, but there are few studies in the literature. The aim of this study was to investigate the effect of placental histopathology and maternal risk factors on neonatal morbidity and mortality, and to identify problems in the early period.

This study was carried out between January 2018 and July 2018 at our hospital including a total of 62 late preterm infants. We evaluated neonatal morbidities in these infants according to placental pathology and maternal risk factors. Multiple congenital anomalies, chromosomal abnormalities and late preterm newborns born at the external center were excluded from the study. Placenta pathologies according to diagnostic categories (1-Amnion fluid infection sequence, 2-Maternal uterine malperfusion, 3-Full fold perivillous fibrin accumulation, maternal base infarct, 4-Chronic inflammation, 5-Fetal obliterative vasculopathy, 6-Plasentomegaly, 7-Hematoma, 8 normal, 9-other) were evaluated and lower risk factors were investigated.

The most frequent morbidities were feeding intolerance, hyperbilirubinemia and hypoglycemia. The most frequent pathological causes leading to morbidity were chronic inflammation, maternal uterine malperfusion and placentomegaly. Maternal malperfusion in the placenta with hyperbilirubinemia and intracranial hemorrhage; chronic inflammation with polycythemia, feeding intolerance and recurrent hospitalization; fetal obliterative vasculopathy with polycythemia; placentomegaly with early neonatal sepsis and feeding intolerance were found to be statistically significant. Hyperbilirubinemia and feeding intolerance in preeclamptic mothers’ infants; feeding intolerance in infants whose mothers with premature rupture of membrane and early neonatal sepsis and re-hospitalization in infants with maternal infections were found to be statistically significant.

In our study, maternal and placental risk factors were found to be related to morbidities in late preterm infants. Placental examination and evaluation may reveal prediction of morbidities in preterm infants individually. This may help to prevent morbidities and will provide early treatment of the diseases.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 264

TITLE: LOOK AFTER YOURSELF AND YOUR COLLEAGUES – DEBRIEF! STEPS TO FORMALISE THE DEBRIEFING PROCESS ON THE NEONATAL INTENSIVE CARE UNIT

AUTHORS: Elke Reunis 1; Rashmi Mehta 2; Imogen Storey 3; Harsha Gowda 4

AFFILIATIONS: Neonatal Unit, Birmingham Heartlands Hospital, Birmingham, United Kingdom

CONTENT:

76% of doctors reported encountering difficult cases which have affected them either personally or professionally. Of these, the majority reported receiving little or no formal support following these cases (Harrison R, Lawton R, Stewart K, 2014). Research shows that debriefing aids recovery and promotes resilience (Harrison R, Wu A, 2017). So why are we not routinely debriefing in neonatology? We set out to change this on our Neonatal Intensive Care Unit (NICU). Our aim was to create an environment where regular debriefing occurs across the multidisciplinary team in our tertiary NICU.

Kotter’s 8-Step Change Model (Fig.1) was used Oct 2018-March 2019.

1) Sense of urgency created by trainee request for debriefs and volume of challenging cases.
2) Coalition of interested trainees and consultants formed to lead change initiative.
3) Shared vision for regular debriefing established and implementation strategy devised.
4) Departmental qualitative survey of nurses and doctors conducted to identify individuals’ opinions regarding debriefing.
5) Teaching program delivered to illustrated importance of debriefing and approach to leading a hot debrief.
6) Book created to log debriefs happening.
7) Tailored departmental guideline designed, and daily team huddles introduced.
8) Survey results transformed into a motivational video, anonymously sharing the staff quotes with our department.

The survey results showed us that there was a real hunger for “regular debriefs as part of everyday practice.” They reported it “needs to become the norm,” and we need to “make it a set thing.” With this came the call to action for “more training,” to “educate staff to expect debriefs,” and design a “formal debriefing protocol” and “guideline.” Staff identified the need for a culture change with the “recognition of the importance” of debriefing, and the request for “the culture of debrief 2-4 hours post-event.”

These suggestions allowed us to remodel the culture around debriefing. We were able to produce robust guideline, detailing clinical and non-clinical events necessitating a debrief. These changes are sustained by auditing debrief activities, incorporating regular debrief training, using feedback systems for debrief leaders, and sharing the motivational video of staff quotes.

Debriefing needs to “become the norm.” Our approach communicated this vision, empowered staff to ask for debriefs, and informed our design of clinical debriefing guidelines.

Regular multidisciplinary team hot and cold debriefs on our NICU have received positive feedback from the team and highlighted clinical and non-clinical events suitable for future simulation practice and training.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=1d3683e88ebb76e24a0a0df79b0c124-MJAxOS0wNSM1Y2UyNjY2YzEzNWFm

IMAGE / TAB CAPTION: Fig. 1: Kotter’s 8-Step Change Model (Kotter, 1996)

COI: None declared
ID: 265

**TITLE:** DETERMINATION OF THE FUNCTIONAL STATUS OF NEPHRONS USING THE BIOMARKER CYSTATIN C IN SGA NEWBORNS

**AUTHORS:** Afag Akhundova 1; Rauf Baylarov 2; Nushaba Panakhova 1; Sefikhan Hesenov 3; Puste Orujova 1; Nurengiz Hajieva 1

**AFFILIATIONS:** 1 2nd Children Disease Department, Azerbaijan Medical University; 2 Paediatric Department, Azerbaijan State Medical University; 3 1st Children Disease department, Azerbaijan Medical University

**CONTENT:**

As known, SGA newborns, remain in a state of chronic intrauterine hypoxia. They are born with a fewer amount of nephrons, leading to the hypertrophy and the hyperfiltration of residual nephrons, which makes the kidneys of SGA infants more vulnerable to a variety of pathological factors, such as hypoxia and ischemia.

The aim of our research was to determine the levels of Cystatin C in the blood plasma for the study of the renal function in SGA newborns. Cystatin C is a small protein that found in a variety of body fluids, including the blood. It is filtered out of the blood by the glomeruli of the kidneys. The levels of Cystatin C in the blood are stable when the kidneys are functioning normally, but they begin to rise as the function of kidneys declines. The increase in concentrations of Cystatin C occurs as a result of the fall of GFR. Usually, this increase becomes detectable before there is a significant decrease in the function of the kidneys.

81 infants were divided into 3 groups:

- Group 1 included -15 term SGA infants, and 20 Asphyxiated term infants (GA = 37-42 weeks).
- Group 2 consisted of 13 AGA and 8 SGA preterm infants (GA = 33-36 weeks).
- Group 3 consisted of 15 AGA and 10 SGA preterm infants (GA = 29-32 weeks).

Blood samples were taken at 1-3 and 7-10 days of their life. Serum levels of Cystatin C were quantified by Elisa method. The results were compared using the Mann-Whitney test.

While assessing the level of Cystatin C in accordance to the gestational age, we found a statistically significant difference in the level of this marker between full-term and preterm infants only on 7-10 days of life (p1-2 = 0.011, between the 1st and 2nd, p1-3 = 0.017 - between the 1st and 3rd group). [Table 1]

Moreover, depending on the compliance of body weight with the gestational age, significant differences were only observed between the subgroups of the 3rd group. In SGA infants the levels of this marker, which reflects the functional status of the glomeruli, is significantly higher than in AGA infants. (Table 1)

Hypoxia and intrauterine growth retardation do not leave the kidneys of premature infants intact, as well as term infants, and is characterized by the simultaneous involvement in the pathological process of glomerular and tubular epithelium. The higher severity of intrauterine growth retardation, leads to a higher violation of renal function in these infants.

**IMAGE / TAB:**

https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=b00cbd95e418dc0480ca702f28fc228a-MjAxOS0wNSM1Y2UyNjY2YzE0MjNh

**IMAGE / TAB CAPTION:** Table 1. Comparison of the serum Cystatin C levels in SGA and AGA newborn subgroups.

**COI:** None declared
ID: 271

TITLE: SHARED DECISION MAKING IN NEONATAL CARE: A THEMATIC CONTENT ANALYSIS OF PARENTAL & PROFESSIONAL VIEWS

AUTHORS: Vimal Vasu

AFFILIATIONS: East Kent Hospitals University NHS Foundation Trust, Department of Neonatal Medicine, William Harvey Hospital, Ashford, Kent, TN24 0LZ

CONTENT:

Admission of a baby to neonatal care is often anxiety provoking for parents. Information provided by clinicians may not be understood or retained. In addition, establishing how much information should be provided for each of the myriad of different interventions which occur daily on neonatal units is complex with potential legal ramifications if the standard of information disclosure is not in accordance with the prevailing legal standard, the prudent patient test. Here, we present the qualitative data collected as parent of the Consent in Neonatal Medicine (CoNe) study to better understand parental and professional views regarding shared decision making.

With institutional research ethics approval and informed parental consent, we conducted a single-centre cohort study at a tertiary neonatal unit in the UK (June-November 2016) using thematic content analysis of interviews (face to face or via telephone) conducted with parents (n=8) and professionals (n=4) to identify and analyse themes regarding parental and professional views regarding shared decision making regarding 20 neonatal interventions. These were chosen on a pragmatic basis and included commonly performed, potentially low risk procedures along with less commonly performed, potentially higher risk procedures. Thematic content analysis was conducted to identify and analyse themes and an inductive analysis process was used without any a priori hypotheses being considered.

Thematic content analysis of parental data (n=8) revealed the following four key themes: 1. Trust in professional advice and deference to advice 2. Time urgency for intervention 3. Burden of decision-making 4. Mixed information. Thematic content analysis of professionals’ data (n=4) revealed the following six key themes: 1. Parent availability for clinicians to provide information/gain consent 2. Professional dilemma as to what constitutes an emergency and is thus exempt from information disclosure/consent under ‘best interest’ considerations 3. Professional dilemma as to the difference between information disclosure and consent and how to proceed should parents not agree with procedure/intervention 4. Time to provide information/obtain consent and the concept of neonatal care as a package 5. Risk of treatment and adverse outcome 6. Parental burden.

The qualitative aspects of this study identify themes that are relevant for both parents and professionals. Further, the data indicate areas common between the groups: (1) the risk of burdening the parents with decisions, (2) the dilemma of what constitutes an emergency treatment and (3) time to discuss treatments. These data might help better inform clinicians in how to effectively communicate with parents of babies admitted to neonatal care.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 273
TITLE: TOBACCO SMOKING DURING PREGNANCY AS RISK FACTOR FOR BRONCHOPULMONARY DYSPLASIA: A SYSTEMATIC REVIEW AND META-ANALYSIS
AUTHORS: Gema E. González-Luis 1, Elke van Westering-Kroon 2, Maurice J. Huizing 3, Eduardo Villamor-Martinez 4, Eduardo Villamor 5
AFFILIATIONS: 1: Department of Neonatology, Complejo Hospitalario Universitario Insular Materno Infantil de Canarias (CHUIMI), Las Palmas de Gran Canaria, Spain.
2-5: Department of Pediatrics, Maastricht University Medical Center (MUMC+), School for Oncology and Developmental Biology (GROW), Maastricht, the Netherlands.

CONTENT:

Tobacco smoking during pregnancy is associated with a range of severe adverse pregnancy outcomes, including stillbirth, congenital anomalies, intrauterine growth restriction (IUGR), preterm birth, and neonatal mortality. In addition, data from recent observational studies suggest that tobacco smoking during pregnancy may increase the risk of developing bronchopulmonary dysplasia (BPD). However, this association has not yet been systematically investigated. We aimed to conduct a systematic review of studies reporting on tobacco smoking during pregnancy as risk factor for BPD.

PubMed/MEDLINE and EMBASE databases were searched. Studies were included if they examined preterm infants and reported primary data that could be used to measure the association between fetal exposure to maternal tobacco smoking and the presence of BPD. BPD was defined as supplemental oxygen requirement on postnatal day 28 (BPD28; all BPD), supplemental oxygen requirement at the postmenstrual age (PMA) of 36 weeks (BPD36; moderate/severe BPD), or as need for ≥30% oxygen and/or positive pressure at 36 weeks PMA (severe BPD). A random-effects model was used to calculate risk ratios (RR) and 95% confidence intervals (CI).

We found 2094 potentially relevant studies, of which 33 met the inclusion criteria (170,222 infants; 27,335 exposed to maternal smoking; 24,730 cases of BPD). Meta-analysis could not demonstrate a significant association between tobacco smoking during pregnancy and BPD28 (16 studies, RR 1.02, 95% CI 0.92 to 1.12; p=0.678; heterogeneity: I²=30.2%, p=0.121), BPD36 (18 studies, RR 1.10, 95% CI 0.98 to 1.23; p=0.098; heterogeneity: I²=73.4%, p<0.001), or severe BPD (3 studies, RR 1.14, 95% CI 0.52 to 2.48; p=0.734; heterogeneity: I²=56.2%, p=0.102).

Maternal smoking during pregnancy may potentially influence the risk of BPD through direct effects on lung development or, indirectly, by increasing the rate of IUGR, which is recognized as risk factor for developing BPD. However, our data do not suggest an association between maternal smoking during pregnancy and BPD. Nevertheless, some analyses are limited by the high heterogeneity of the included studies.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 283
TITLE: The CHOPIn study: A multicenter study on Cerebellar Hemorrhage and Outcome in Preterm Infants
AUTHORS: Vivian Boswinkel1, Sylke Steggerda2, Monica Fumagalli3,4, Alessandro Parodi5, Floris Groenendaal6, Jeroen Dudink6,7, Manon Benders6, Ronny Knol7, Linda de Vries6, Gerda van Wezel-Meijler1
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5 Neonatal Intensive Care Unit, Istituto Giannina Gaslini, Genova, Italy.
6 Department of Neonatology, University Medical Center Utrecht, Utrecht, the Netherlands.
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CONTENT:
Cerebellar hemorrhage (CBH) is a frequent complication of preterm birth and may play an important and under-recognized role in neurodevelopment outcome. Association between CBH size, location and neurodevelopment is still unknown. The main objective of this study was to investigate neurodevelopmental outcome at two years of age in a large number of infants with different patterns of CBH.

Of preterm infants (≤ 34 weeks) with known CBH, perinatal factors, neuro-imaging findings and follow-up at 2 years of age were retrospectively collected. MRI scans were reassessed to determine the size, number and location of CBH. CBH was divided into three groups: punctate (≤ 4 mm), limited (> 4 mm but < 1/3 of the cerebellar hemisphere) or massive (≥1/3 of the cerebellar hemisphere). Associations between pattern of CBH, perinatal factors and (composite) neurodevelopmental outcome were assessed.

Data of 218 preterm infants with CBH were analyzed. Of 177 infants the composite outcome score could be obtained. Forty-eight out of 119 infants (40%) with punctate CBH, 18 out of 35 infants (51%) with limited CBH and 18 out of 23 infants (78%) with massive CBH had an abnormal composite outcome score. No significant differences were found for the composite outcome between punctate and limited CBH (p = 0.42).

The risk of an abnormal outcome increased with increasing size of CBH. Infants with limited CBH have a more favorable outcome than infants with massive CBH. It is therefore important to distinguish not only between punctate and larger CBH, but also between limited and massive CBH.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 285
TITLE: The BIMP study: Brain Injury in Moderate-late Preterm neonates – frequency and findings at CUS and MRI
AUTHORS: Vivian Boswinkel1,2, Jacqueline Nijboer-Oosterveld,3 Martine Krüse-Ruijter1, Mei-Nga Smit-Wu1, Susanne Mulder-de Tollenaer1, Martijn Boomsma3, Linda de Vries2,4 Gerda van Wezel-Meijler1
AFFILIATIONS: 1 Department of Neonatology, Isala Women and Children’s Hospital (IVKC), Zwolle, The Netherlands
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3 Department of Radiology, Isala, Zwolle
4 Department of Neonatology, Wilhelmina Children’s Hospital, University Medical Center Utrecht, The Netherlands

CONTENT:

Moderate-late preterm (MLPT) infants, born at 32 – 36 weeks gestation, do not routinely undergo neuro-imaging. Therefore, little is known about the incidence of brain abnormalities.

Objective To describe findings on cranial ultrasound (CUS) and magnetic resonance imaging (MRI) and risk factors for brain injury in MLPT infants.

Ongoing prospective cohort study of unselected MLPT infants born at IVKC. Data were collected at three time points. CUS was performed at day 3-4 and before discharge. At term equivalent age (TEA) CUS was repeated and MRI was additionally performed. CUS and MRI were scored using a newly introduced scoring system for abnormalities in the ventricles, white matter (WM) and basal ganglia, including minor changes.

So far, data of 102 infants have been analyzed. At day 3-4, non-physiological periventricular echogenicity (PVE) was noted in 26 out of 102 (25%) infants. At TEA PVE was seen in twelve, corresponding with WM changes on MRI in four. In three additional infants with normal CUS findings, WM changes were seen on MRI. Grade 1 and 2 intraventricular hemorrhage (IVH) were seen in eleven infants, of which one was complicated by a periventricular hemorrhagic infarction. A watershed infarction was found in one infant. No subdural hemorrhages were noted. Moderate preterm infants (32+0 – 33+6 weeks gestation) and those who needed respiratory support were most likely to have abnormal imaging (respectively OR 2.61 95%CI 1.01 – 6.73; p<0.05 and OR 3.97 95%CI 1.40 – 11.28; p<0.05).

Non-physiological PVE and low grade IVH were frequently seen on early CUS. The incidence of WM changes decreased over time. Around TEA neuro-imaging abnormalities were still present in 20% of MLPT infants. Clinical follow up is needed to investigate the association between these findings that may indicate (reversible) brain injury and neurodevelopmental outcome and to consider whether routine neuro-imaging is warranted in (selected) MLPT infants.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
EXOMPHALOS: 9 YEAR EXPERIENCE OF A TERTIARY NEONATAL INTENSIVE CARE UNIT

Sarah Williamson 1; Louise Lawrence 2; Shree Vishna Rasiah 3.

Neonatal Intensive Care Unit, Birmingham Women's & Children’s NHS Foundation Trust, Birmingham, United Kingdom.

Exomphalos is a frequently seen congenital abnormality, with reported prevalence in the UK of 3.8 per 10,000 births. Exomphalos is an isolated finding in 1.4 per 10,000 cases, whereas 1.2 per 10,000 are associated with multiple abnormalities, and a further 1.2 per 10,000 having chromosomal anomalies. Associated abnormalities have been shown to influence long term survival, 1 year survival in isolated anomalies reported as 91%, compared with 81% in multiple abnormalities, and 27% if associated chromosomal anomalies.

Our aim was to describe our experience key outcomes for infant and families with exomphalos admitted to a single surgical neonatal intensive care unit in the West Midlands.

Retrospective case note review of all infants diagnosed with exomphalos and admitted to a single surgical neonatal intensive care unit (NICU) over a 9 year period. Infants were identified and data collected from Badgernet electronic patient record and paper notes between 1st April 2009 and 31st March 2018.

29 infants were identified, 55% male (n=16). Mean gestation 36 weeks (28-40), mean birth weight 2965g (1130-4730g). 59% (n=17) were classified as exomphalos major. 26% (n=8) required intubation at delivery, and 17% (n=5) required inotropic support. 83% (n=24) underwent an echo to look for associated cardiac anomalies. 59% (n=17) had structural anomalies, 4 of these were felt to be significant. 34% (n=10) had other congenital abnormalities, most commonly musculoskeletal (n=5), gastrointestinal (n=4), and ENT (n=3). 34% (n=10) had an underlying genetic diagnosis, mostly commonly being Beckwith-Weideman (n=8).

Overall mortality was 21% (n=6), all infants having exomphalos major. 2 infants had an underlying genetic diagnosis, and 3 significant underlying congenital anomalies. 5 infants were born preterm (28 - 36 weeks). Time of death ranged from day of birth to 2 years of age.

Our experience suggests that infants with diagnosis of exomphalos major and associated congenital or genetic anomalies are at increased risk of mortality, especially if born premature or require ventilatory and / or inotropic support in the postnatal period.

This review enables us to give parents more detailed information during antenatal counselling in our neonatal unit.

Table 1: Associated Anomalies

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Table 1: Associated Anomalies

Non declared
ABSTRACT BOOK
POSTER WALK

ID: 289
TITLE: HYPOXIC ISCHAEMIC ENCEPHALOPATHY IN EXTREME PREMATURITY: A DIAGNOSTIC CONUNDRUM
AUTHORS: Adam King 1; Tim Scorrer 1; Olie Chowdhury 1
AFFILIATIONS: 1 Department of Neonatal medicine, Queen Alexandra Hospital, Portsmouth Hospitals NHS Trust, UK

CONTENT:

Hypoxic ischaemic encephalopathy (HIE) may occur in extremely preterm newborns, but may not be recognised because of the lack of a clear definition in this population, and the fact that their immaturity affects their clinical assessment and need for support compared to term infants. Our literature search found no consistent diagnostic criteria for HIE in the preterm infant. Term infants are assessed for evidence of perinatal hypoxia and encephalopathy based on specific criteria. Modifying these term criteria, we have identified a group of infants who may be described as having a diagnosis of HIE at an extremely premature gestation.

BadgerNet, the UK neonatal patient data management system, was searched for all infants born <28 weeks’ gestation in the ten year period between 01/01/2009 and 31/12/2018 and admitted to our medical neonatal intensive care unit based at a large district general hospital in England. Inclusion criteria were (1) recorded diagnosis of HIE or asphyxia; (2) ten minute Apgar score ≤5; (3) cord pH <7.00, (4) base deficit ≥16. These criteria correspond to cooling criteria A in term newborns. Each individual patient record within the database was then reviewed to assess whether the clinical course was consistent with a hypoxic insult. Data relating to demographic details, pattern of cranial injury and outcome were collected and analysed using Microsoft Excel.

Of 587 extremely preterm infants, 33 (5.6%) met inclusion criteria. Only 4 infants had a recorded diagnosis of HIE or asphyxia; the majority were included based on Apgar score, and/or cord gas values. The 33 infants analysed were born at a median gestation of 25+6 weeks (range 23+2 – 27+6 weeks) with a median birth weight of 769 grams (range 550-1151 g); 85% had antenatal steroid cover. Delivery was by emergency Caesarean in 12 cases, forceps assisted in 2 and vaginal in 19. Of the vaginal births, 11 (53%) were breech presentation. In total, 25 (76%) survived to discharge. Abnormal neurology was noted on inpatient records in 6 (18%), of whom 2 survived to discharge. Significant intracranial pathology was confirmed in 9 infants (27%). Of 22 infants eligible for assessment at 2 years of age, records were complete in 8: of these, 5 were noted to have delayed development.

HIE is difficult to recognise and as such may not be considered in the differential diagnosis for unwell preterm newborns, as diagnostic criteria used in term infants are not readily applicable. Our study attempts to characterise this small but not insignificant group of extremely preterm infants who may have suffered HIE. We propose this subject requires further research, to better define this population, their characteristics and outcomes.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None Declared
ID: 293

**TITLE:** In vitro performance characterization of the customized eFlow Neos nebulizer system with poractant alfa under simulated respiratory distress tidal breathing through a realistic neonatal upper airway replica

**AUTHORS:** Bucholski A1, Schlun M1, Hetzer U1, Bonelli S2, Lombardini M2, Pasini E2, Nutini M2, Pertile M2, Murgia X3, Villetti G2, Civelli M2, Ricci F2, Minocchieri S4, Bianco F2, Salomone F2

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4 Division of Neonatology, Cantonal Hospital Winterthur, Winterthur, Switzerland

**CONTENT:**

Aerosol lung deposition is dramatically reduced in preterm infants due to their breathing pattern and to the narrow cross-section of the airways and ventilation interfaces. Our aim was to determine, in addition to aerosol particle size distribution (PSD) and respirable fraction (RF), the in vitro performance of a customized eFlow Neos vibrating-membrane nebulizer system on undiluted surfactant (poractant alfa, 80 mg/ml) lung deposition when using different clinical neonatal non-invasive ventilation patient interfaces.

Surfactant PSD and RF in presence of different prongs were investigated by laser-diffraction and Next Generation Impactor. Breath simulation studies were conducted in an experimental set-up consisting of a humidified CPAP circuit (5 cmH2O, 5 L/min), the nebulizer, placed between the Y-piece and the ventilation interface (nasal mask or prongs), a preterm upper-airway 3D model (PrINT model, infant of 32 wks gestation and 1.75 kg birth weight), and a breath simulator (tidal volume 9 ml/kg, and respiratory rate 70/min). Collection filters were placed beyond the PrINT cast to estimate the surfactant lung dose. The lecithin content of the collected surfactant fraction was determined by liquid chromatography-mass spectrometry. A total mass of 350 mg, 200 mg/kg dose, of surfactant was nebulized.

Without any interface the volume median diameter was 3.0 ± 0.1 µm with a RF of 93.7%. Mass median aerodynamic diameter (MMAD) with different prong models ranged from 2.52 to 2.81 µm. Irrespective of the ventilation interface, surfactant lung doses ranged between 10 and 19% (Table 1).

The customized eFlow Neos nebulization of poractant alfa produces reproducible surfactant aerosol characteristics and provides high lung deposition under realistic neonatal conditions in vitro. In particular, a better deposition was obtained with the Size S nasal prongs commercially available from Dräger and Inspiration Healthcare.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:**

**COI:** Employment PARI Pharma GmbH
ID: 296

TITLE: PROGNOSTIC MODEL FOR THE DEVELOPMENT OF LETHAL OUTCOMES IN PREMATURE INFANTS WITH SEVERE INTRAVENTRICULAR HEMORRHAGES


AFFILIATIONS: State Institution "Institute of Pediatrics, Obstetrics and Gynecology named after academician O. Lukyanova of National Academy of Medical Sciences of Ukraine", Department of Neonatology, Kyiv, Ukraine
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CONTENT:

Intraventricular hemorrhages (IVHs) in premature infants constitute one of the causes of neonatal deaths, early and late neurological complications. Our previous study showed that mortality rates in the infants with severe IVH were changeless during the 2009 – 2016, they remain high among infants weighing <1000 g (50 % to 50 %), also among infants with weight 1000 – 1499 g (71.4 % and 25.0 %, p = 0.09) and they are significantly higher than in the developed countries of the world. Therefore, the purpose of our study was to work out a prognostic model for the development of lethal outcomes in premature babies.

The study included 76 premature infants: n=40 (weight 903.72 ± 56.61 g, GA 26.15 ± 0.34 weeks) – the group of those, who died, and n=36 (weight 1187.3 ± 58.0 g, GA 28.09 ± 0.37 weeks) – the group of survived. We identified risk factors that were reliably associated with the development of lethal events in infants with IVH and the influence of the genetic models: (DD + DI vs. II) of the ACE, (CA + AA vs. AA) of the AGT2R1, (aa + ab vs. bb) of the eNOS gene and their combinations. The blood of newborns was the material for genetic studies, sampling occurred on the 6-10th day of life after diagnosis. To determine the polymorphic variants of the ACE, AGT2R1 and eNOS genes, the polymerase chain reaction and the restriction analysis of the amplification reaction products were conducted.

In this study, 40 (52.6 %) infants with severe IVHs died, the median incidence of the death was on the 11th day. The simple logistic regression analysis proved the associations between the child death and GA (OR 0.66; p = 0.01), trachea intubation (OR 0.4; p = 0.055); surfactant administration (OR 0.16; p = 0.025); sepsis (OR 3.2; p = 0,027), severe RDS (OR 8.1; p = 0,001), the level of CRP (OR 2.45; p = 0.072), the number of leukocytes (OR1,1; p = 0,01) and platelets (OR 0,99; p = 0,007) on the 6th day of life. The analysis of the lethal case function by Kaplan-Meier method revealed increased risk of mortality in infants with the combination of dominant models of ID & DD ACE gene + 4ab & 4aa eNOS gene. The prognostic model of the development of lethal events has high operational characteristics.

The prognostic model for the development of lethal outcomes in newborns with IVHs, which includes: intubation during resuscitation (β = -4.16), severe RDS (β = 4.4), platelet count (β = -0.02 ) and the level of leukocytes (β = 0.11) for 6th day of life has a sensitivity of 71.43 %, a specificity of 100.0 %, a positive predictive value of 100 %, a negative predictive value of 76 % and an area under the ROC curve – 0.9373.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 300

TITLE: ASSOCIATION OF AGE AT FIRST RESPIRATORY SYNCTIAL VIRUS HOSPITALISATION (RSVH) AND SUBSEQUENT RISK OF ASTHMA

AUTHORS: Jonathan Coutts 1; Richard Thwaites 2; John Fullarton 3; ElizaBeth Grubb 4; Carole Morris 5; Barry Rodgers-Gray 3; Xavier Carbonell-Estrany 6

AFFILIATIONS: 1 Royal Hospital for Children, Glasgow, UK; 2 Queen Alexandra Hospital, Portsmouth, UK; 3 Strategen Ltd, Basingstoke, UK; 4 AbbVie Inc, North Chicago, Illinois, USA; 5 Information Services Division Scotland, Edinburgh, UK; 6 Institut d’Investigacions Biomediques August Pi Suñer (IDIBAPS), Barcelona, Spain

CONTENT:

RSV in early childhood is becoming increasingly well-recognised as a significant risk factor for the subsequent development of asthma. Whether the risk for developing asthma varies with age at first RSVH has yet to be fully explored. A recently published Australian study reported, perhaps somewhat surprisingly, that the burden of subsequent asthma was higher in children with RSVH at ≥6 months than <6 months of age (Homaira et al. J Infect Dis. 2018). The aim of this study was to determine the association between age at first RSVH and subsequent development of asthma.

All live births between 1996-2011 from NHS Scotland Information Services Division (ISD) databases were followed until 18 years of age or until the study period ended in 2014, whichever came sooner. Those who died or moved away from Scotland during the study period were excluded. The rate of asthma-related hospitalisations (ICD-10 codes J45 and J46) and use of asthma medications (bronchodilators, corticosteroids, cromoglycate and related therapy, leukotriene receptor antagonists, and phosphodiesterase type-4 inhibitors) were assessed in children with first RSVH (ICD-10 codes J12.1, J20.5 & J21.0) at <6 months, 6 to <12 months, 12 to <18 months, and 18-24 months. A composite outcome of ‘confirmed asthma’ was defined as a child with an asthma admission and requirement for asthma medication.

Of 740,418 children, 15,791 (2.1%) had ≥1 RSVH at ≤2 years (median age at first RSVH: 143 [IQR 64-274] days). 58.8% (9,281) of first RSVHs occurred at <6 months, 26.5% (4,191) at 6 to <12 months, 10.2% (1,603) at 12 to <18 months, and 4.5% (716) at 18-24 months. The asthma admission rate in those with a RSVH was 148.8/1000 at <6 months, 225.0/1000 at 6 to <12 months, 301.3/1000 at 12 to <18 months, and 342.2/1000 at 18-24 months (p<0.0001 across age groups). Similar trends were found for asthma medication use (<6: 23.1%, 6 to <12: 27.9%, 12 to <18: 28.5%, 18-24: 34.6%; p<0.0001) and confirmed asthma (92.5, 134.3, 188.4 & 215.1/1000; p<0.0001). Compared with the overall RSVH group, children without RSVH had significantly fewer asthma admissions (193.2 vs 46.0/1000; p<0.0001), lower asthma medication use (25.5% vs 14.7%; p<0.0001), and less confirmed asthma (117.6 vs 29.5/1000; p<0.0001).

This study provides further confirmation of the association between RSVH in early childhood and subsequent asthma. Interestingly, older age at first RSVH was associated with higher asthma rates, which may reflect a more competent immune system. It should be noted, however, that due to the declining incidence of RSVH with age, numerically, the largest clinical burden for asthma related to RSV comes from those infants subject to RSVH early in life.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI:

Acknowledgments
Matthew Freddi (Strategen Ltd) for editorial services. Funding for editorial services was provided by AbbVie.

Disclosures
Financial support for this study was provided by AbbVie. AbbVie participated in analysis and interpretation of data
ID: 305  
TITLE: ANALYZING THE EFFECT OF NEONATAL ANTIBIOTIC TREATMENT IN THE ABSOLUTE NUMBER OF IMMUNE CELL POPULATIONS IN PRETERM INFANTS  
AUTHORS: Diana Verónica Reyes-García 1  
Ruth Gabriel-Rodríguez 2, Edith Buendía-Castro 2, Guadalupe Cordero-González 1, Sandra Carrera-Muiños 1, Irma Alejandra Coronado-Zarco 1, Gabriela González-Pérez 2  
AFFILIATIONS: 1 Neonatal Intensive Care Unit, National Institute of Perinatology, Mexico City, Mexico  
2 Department of Physiology and Cellular Development, National Institute of Perinatology, Mexico City, Mexico  
CONTENT:  

Preterm infants are highly susceptible to infectious and inflammatory diseases due to the immaturity of their immune and gastrointestinal systems. Neonatal sepsis, necrotizing enterocolitis (NEC) and pneumonia, are common diseases in this population which are treated with antibiotics. Antibiotic treatment has been associated with intestinal microbiome dysbiosis and linked to the increased risk of NEC, sepsis and death in neonates, and allergy, asthma, overweight and obesity in childhood and adulthood. The aim of our study was to analyze the effect of neonatal antibiotic treatment in the absolute number of immune cell populations in preterm infants.  

The study included 90 preterm infants equal or less than 32 weeks gestation, untreated or treated with antibiotics during hospitalization in the NICU at the National Institute of Perinatology in Mexico City. Venous peripheral blood was collected at birth, 15 days of life, and discharge, and complete blood counts were performed upon parental written informed consent. Infants were classified as: Control Group (not antibiotic treated), Group A1 (treated once with ampicillin/amikacin), Group A2 (treated once with tazobactam-piperacillin/vancomycin), Group A3 (treated with two or more antibiotic schemes), Group A4 (treated with two or more antibiotic schemes including clarithromycin). Maternal infectious history, and neonatal anthropometric, clinical and laboratory data were analyzed.  

Study groups were integrated as follows: control group (n=16), group A1 (n=15), group A2 (n=5), group A3 (n=14), and group A4 (n=40). There were not significant differences in gestational weeks and anthropometric data at birth among study groups, except for a lower weight in group A4 compared to controls. Chorioamnionitis and premature rupture of membranes were more frequent in neonates from groups A3 and A4, respectively. The most frequent clinical diagnoses per group were: group A1 (early-onset sepsis), group A2 (late-onset sepsis and NEC), group A3 (late-onset sepsis, septic shock and NEC), group A4 (early- and late-onset sepsis, and pneumonia caused by atypical pathogens). The absolute number of leukocytes, lymphocytes, monocytes, neutrophils and platelets from birth to discharge were equivalent between untreated and antibiotic-treated preterm infants.  

Neonatal antibiotic treatment did not alter the absolute number of leukocytes, lymphocytes, neutrophils, monocytes and platelets in preterm infants suggesting antibiotics do not affect neonatal immune cell compartments at short-term. Nevertheless, in order to confirm these results, detailed analysis of the phenotype and function of T cell, B cell, NK cell and monocyte subpopulations are required.  

IMAGE / TAB:  

IMAGE / TAB CAPTION:  

COI: None declared
ID: 307
TITLE: PATIENT AND PRESCRIBER FACTORS AND THE PROLONGATION OF ANTIBIOTICS AFTER BIRTH IN INFANTS LESS THAN 29 WEEKS.
AUTHORS: Mohamad Rami Alturk
John Baier
AFFILIATIONS: Department of Pediatrics and Child Health, University of Manitoba, Winnipeg, Canada

CONTENT:

Objective: The objective of this study is to delineate whether patient-related or prescriber-related factors account for the prolongation of antibiotic therapy beyond 48 h in premature infants whose initial blood cultures are negative.

Retrospective review of infants born <29 weeks born between January 2011 and December 2012. Infants who had positive blood cultures or who died in the first 48 h were excluded from analysis. Antibiotic courses were categorized as prolonged if antibiotics were continued for greater than 48 h and not prolonged if antibiotics were stopped by 48 h. Neonatologists were classified as high prescribers if they prolonged antibiotics for more than the median rate for the overall group.

Seventeen of 59 (29%) infants had empiric antibiotics continued for greater than 48 h despite negative blood cultures. Both patient-related factors and the neonatologist at 48 h of life were significantly associated with prolongation of antibiotics. Patient-related factors associated with prolongation of empiric antibiotics were positive maternal Group B streptococcus (GBS) status (5/17 versus 4/42); p¼.054), white blood count >25,000 (7/17 versus 1/42); p<.001), rupture of membranes (ROM) duration (187 ± 253 h versus 47 ± 89 h; p¼.015). Increased number of risk factors was associated with increased likelihood of prolongation. Risk factors for sepsis were similar between high and low prescribing neonatologists with high prescribers prolonging antibiotics with a lower number of risk factors.

The decision to prolong empiric antibiotics in culture negative preterm infants is related both to patient and prescriber-related factors.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=9571a5f00650d322b6e88f61353032ce-MjAxOS0wNSM1Y2UyNjY2Yzi2ZGUx

IMAGE / TAB CAPTION:

COI: None declared
ID: 313

TITLE: The use of psychotropic medication in pregnancy: supportive management of the maternal-infant dyad

AUTHORS: Katie Mayers; Kathryn Johnson

AFFILIATIONS: Leeds Neonatal Service, Leeds Children's Hospital, Leeds General Infirmary

CONTENT:

Many pregnant women experience mental health problems, particularly anxiety and depression, and it is not uncommon for women to require psychotropic medication in pregnancy. It is well recognised that babies born to women taking such medication can develop withdrawal symptoms termed Neonatal Behavioural Syndrome (NBS) after birth. Infants with NBS are often admitted for observation, disrupting the maternal-infant bond, as well as creating a significant resource burden for neonatal units.

Locally we have created new guidance which aims to be permissive, standardising and normalising care within safe parameters for babies born to women taking psychotropic medication in pregnancy.

Our work aimed to understand management pathway of babies at risk of NBS in our busy service (10,000 deliveries per year).

We reviewed the local perinatal mental health (PMH) database over an 18 month period (January 2017-September 2018). All women who were on psychotropic medication during pregnancy, whose babies were admitted to the neonatal service, were identified.

The database reviewed includes only women seen by the PMH Team, and not those prescribed psychotropic medications (particularly the Selective Serotonin Reuptake Inhibitors) in primary care.

Our work therefore is likely to underestimate both the true number of infants at risk of NBS and the potential positive effect on mothers and infants on any change in practice.

201 women registered to the PMH team delivered in the period observed. 81 received psychotropic medication and 19 had babies admitted to the neonatal service. 1 baby was born at 24 weeks so excluded.

10 babies were admitted for clinical reasons other than NBS. 2 babies were poly-substance exposed. 8 babies were admitted for observation for NBS due to psychotropic medication alone with a median stay of 3 days. 1 baby received treatment for NBS.

Following the introduction of the new guidance in 2018 no baby has been admitted to the neonatal service purely for observation of NBS following the use of psychotropic medication in pregnancy.

Conversely no baby was admitted from normal postnatal care as a result of NBS symptoms.

The use of psychotropic medication in pregnancy is not uncommon. Admission & the resulting separation of mother from baby to observe/treat for NBS has the potential to cause significant harm in this vulnerable group.

Our work shows it is possible to safely offer normal postnatal care for infants at risk of NBS, both promoting maternal-infant bonding and freeing capacity within the neonatal service.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 315

TITLE: Clinical case of severe neonatal thrombocytopenia due to maternal idiopathic thrombocytopenic purpura: refractory to IVIG and platelet transfusions, responsive to glucocorticoids

AUTHORS: Nikitina I.V.1, Lenushkina A.A.1, Krogh-Jensen O.A.1,2, Vinogradova M.A.1, Morozov L.A.1, Zubkov V.V.1,2, Degtyarev D.N. 1,2

AFFILIATIONS: 1 Federal State Institution “National Medical Research Center for Obstetrics, Gynecology and Perinatology named after Academician V.I. Kulakov” of the Ministry of Health of the Russian Federation, Moscow, Russia
2 Federal state autonomous educational institution of higher education. I.M. Sechenov First Moscow state medical university of the Ministry of Health of the Russian Federation (Sechenov university), Moscow, Russia

CONTENT:

Risk of thrombocytopenia in neonates born to mothers with immune thrombocytopenic purpura (ITP) can reach 75%, while severe platelet nadir (below $50 \times 10^9$) and prolonged low platelet level ($\geq 4$ weeks) is quite a rare situation and happens in $0.2-1.5\%$ of affected neonates. The aim of this report is to present clinical case of severe persistent neonatal thrombocytopenia (due to maternal ITP) refractory to Ig-therapy and highly responsive to predisolone.

Female infant was born in National Medical Research Center for Obstetrics, Gynecology and Perinatology (Moscow, Russia) to a 31-year-old mother at 38 weeks of gestation. The mother was known to have ITP for 7 years prior to become pregnant. She received I

Apparently in small amount of patients with severe neonatal thrombocytopenia due to maternal ITP, immunoglobulins are not effective due to some characteristics of damaging maternal antibodies. In such cases start of corticosteroids may be indicated despite of moderate risk of adverse reactions as it has immediate effect and significantly reduces the likelihood of severe hemorrhagic syndrome.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 317
TITLE: RELATIONSHIP BETWEEN SKIN DEPTH AND BILIRUBIN CLERANCE IN VERY PRETERM NEONATES UNDERGOING PHOTOTHERAPY
AUTHORS: Silvia Foligno
Daniele De Luca
AFFILIATIONS: Division of Pediatrics and Neonatal Critical Care, "A.B eclere" Medical Centre, South Paris University Hospitals, APHP - Paris - France

CONTENT:

Few data are available about the use of phototherapy in preterm neonates. Some data seem to suggest a possible negative influence on mortality;(1) some hypothesized that this could be due to the irradiation of internal organs. The combination of 2nd generation transcutaneous bilirubinometry and high frequency ultrasound made possible the measurement of skin bilirubin and depth, respectively. We aim to study the relationships between skin depth and the efficacy of phototherapy in preterm neonates.

This is a prospective cohort study enrolling neonates needing phototherapy according toNICE guidelines. Total serum(TSB)and transcutaneous(TcB) bilirubin were simultaneously measured before the onset of LED phototherapy, which was provided for 24h. TSB has been remeasured at the end of phototherapy (after 24h) and TcB after 6h of phototherapy in patched skin areas. TcB has been measured in the forehead using Bilicheck®(Philips inc). Phototherapy efficiency has been estimated as the bilirubin clearance (delta between measurements before, after or during phototherapy). Skin depth has been measured using a “hockey stick”, microlinear ultrasound probe (CX50, Philips inc) on the right upper abdominal quadrant as previously described.(2) Clinical data including predicted mortality were realtime recorded.

95 babies (GA 30.5 (SD 3.2); BW 1453 (SD 636); male/female ratio 60/34; CRIB-II: 4 [0-9.7]) have been enrolled. There was a significant correlation between skin depth and DeltaTcB (calculated before-after 6h of therapy) in covered areas (r=0.213; p=0.04), while no correlation is evident with DeltaTSB (r=0.04; p=0.67). Moreover, there is no significant correlation between mortality predicted by CRIB-II score and DeltaTcB (r=0.011; p=0.921) or DeltaTSB (r=0.08; p=0.465).

Skin depth is directly correlated to the efficacy of phototherapy (in terms of dermal bilirubin clearance). Skin depth does not influence the circulating bilirubin clearance and there is no relationship between mortality and the bilirubin clearance.

REFERENCES
1. Morris BH, NEJM 2008
2. Ofri A, J Pediatr Surg 2018

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: D. De Luca in the past has received travel grants and research assistance from PHILIPS inc, outside of the present work.
ID: 322

TITLE: THE EFFECTS OF EARLY TOUCHSCREEN USE ON NEURODEVELOPMENTAL OUTCOMES AT 24 MONTHS

AUTHORS: Tríona Casey 1; Conal Wrigley 2; Dawn Fisher 3; Karen Kinsella 4; Teresa Berkery 5; Andrea Hemmingway 6; Leanna Fogarty 7; Prof Mairead Kiely 8; Prof Deirdre Murray 9.

AFFILIATIONS: 1-9 INFANT Research Centre, Department of Paediatrics and Child Health, Cork University Hospital, Cork, Ireland

CONTENT:

Children under two years are spending increasing amounts of time on touchscreen devices, despite a lack of evidence on the impact of such use on later development. Whilst some reports suggest that fine motor skills may be improved by touchscreen use, a recent systematic review recommended reducing screen-based sedentary behaviour for young children. Our aim was to investigate the effects of early touchscreen use (18 months) on children’s later neurodevelopment (24 months), using a standardised psychometric tool targeting distinct developmental domains (cognition, language, motor skills).

Children were recruited as part of an ongoing birth cohort study. Parents of typically developing first born children were asked about their child’s touchscreen use at 18 months. We defined “touchscreen” as a mobile phone or tablet device, with “touchscreen use” including active (interactive games) or passive engagement (watching videos). Rate of use was logged as “Never”, “Occasionally”, “2-3 times per week” or “Daily”. Standardised developmental assessments were conducted with each child at 24 months using the Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III). The effects of previous touchscreen use at 18 months on Bayley-III scores at 24 months were examined (7 variables: 3 composite and 4 scaled scores across cognitive, language and motor domains).

Complete data was available for 72 children (41 Male; 31 Female). Children’s rate of touchscreen use at 18 months was reported as never (n=32), occasionally (n=33), 2-3 times per week (n=5) and daily (n=2). For analysis the groups were categorised as “No use” (n=32) and “Some use” (n=40). A trend to reduced scores were seen across all domains in those children with touchscreen exposure at age 18 months (Table 1). These differences were statistically significant in the areas of expressive language and composite motor score with an effect size of 0.25 and 0.24 respectively. Moreover, maternal education was not found to be associated with either touchscreen use or Bayley-III outcomes.

This study provides the first clear evidence of the hindering impact of touchscreen use at 18 months on expressive language skills at 24 months. Our study also demonstrates the negative effects of early touchscreen use on motor development at 24 months. The persistence of these detrimental effects on later development needs to be established.

IMAGE / TAB:
https://www.eiseverywhere.com/eeselectv3/v3/events/351149/submission/files/download?fileID=16b9849ce0ee7a501ea63252eb372cf-MjAxOS0wNSM1Y2UyNjY2YzJjZDg2
IMAGE / TAB CAPTION: Comparison of 24 month Bayley-III neurodevelopmental outcomes for children with no touchscreen use and any touchscreen use at 18 months

COI: None declared
**ID:** 323

**TITLE:** Ureaplasma spp. colonization is associated with worse respiratory outcome in extremely low gestational age infants

**AUTHORS:** Rashmi A. Mittal, Sarah J. Tapawan, Abdul A. Alim, Bin H. Quek, Victor S. Rajadurai

**AFFILIATIONS:** Department of Neonatology, K.K. Women’s and Children's Hospital, Singapore

**CONTENT:**

**Background:** Ureaplasma spp. colonization has been associated with development of chronic lung disease (CLD) in preterm neonates. However, its relationship with the severity of CLD is not known.

We retrospectively analyzed data for extremely low gestational age neonates (ELGAs, GA less than 28 weeks) born between January 2016 and December 2018 with respect to Ureaplasma spp. colonization (n=184). Tracheal aspirate (TA) was sent for Ureaplasma spp. detection on grounds of clinical suspicion. All Ureaplasma+ neonates were treated with Azithromycin for 10-14 days. Data was analyzed for neonatal characteristics and outcomes for ELGAs who survived up to 36 weeks. Severe CLD was defined as requirement for respiratory support or need for oxygen (FiO2) >30% at 36 weeks.

The neonates in whom TA was sent (n=59) were of a significantly lower GA (25.9±1.1 vs 26.6±1.1, p=0.02). Ureaplasma+ neonates (23/59) had significantly higher incidence of leukocytosis and preterm premature rupture of membranes (PPROM)>3 days as compared to the Ureaplasma- group [15/23 (65%) vs. 12/36 (33%) and 13/22 (59%) vs. 9/36 (25%), p<0.05 respectively). The incidence of severe CLD was higher in Ureaplasma+ infants as compared to Ureaplasma– and all ELGAS (83% vs. 65% vs. 43% respectively). The FiO2 requirement at 36 weeks and the incidence of oxygen-use at discharge was significantly higher in the Ureaplasma+ group [31±10 vs. 23±4, p=0.003; and 17/22 (77%) Vs. 15/32 (47%), p=0.03, respectively).

In our centre, TA Ureaplasma colonization is associated with worse respiratory outcome at 36 weeks and at discharge. However, as not all ELGAs were screened for Ureaplasma, it is possible that this outcome is observed in those with a significant antenatal history of PPROM or leukocytosis in the first week of life. Further studies are required to evaluate the role of Ureaplasma spp. in long-term respiratory morbidities in ELGA infants.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 324
TITLE: USE OF A DECISION MAKING TOOL TO REDUCE ELECTIVE EXTUBATION FAILURE RATES IN A TERTIARY NEONATAL UNIT
AUTHORS: Olubunmi Akinnawonu1; Vimal Vasu 2;
AFFILIATIONS: Neonatal Intensive Care Unit
William Harvey Hospital
Ashford
Kent
UK

CONTENT:

Though there has been an increasing focus on use of decision making tools (DMT) for intubation in critical care, there has been less emphasis on use of DMTs to ensure safe and successful elective extubation. Data suggest that approximately 40-50% of extremely preterm (EP) babies require re-intubation within 72 hours following-elective extubation failure (EEF) (1). Re-intubation has a number of potential risks and side effects. Here we present data regarding the use of an elective extubation DMT in a level 3 neonatal unit. Our hypothesis was that use of the DMT would reduce the elective extubation failure rate on the neonatal unit.

We conducted a baseline evaluation (01/08/17-31/07/17) using routinely collected neonatal data (Badger net, Clevermed, Edinburgh) to establish the proportion of EP babies who required re-intubation within 72 hours following a first episode of elective extubation (outcome). The elective extubation DMT (as shown in figure three) was then introduced into clinical practice along with staff education (02/01/18-28/2/18) and the outcome re-measured for a 10 month period (01/03/18-31/01/19). A total of 22 infants were included in the survey in the pre-intervention group and 13 infants in the post intervention group. Initially presented as a poster at the British Association of Perinatal Medicine (BAPM) in September 2018 (as shown in figure four), but since then 5 more infants have been included.

The data suggest a reduction in elective extubation failure rates in extreme preterm infants compared to baseline levels, from 40.9% to 23% (as shown in figures one and two).

This is an improvement in elective extubation success rate after more infants were included. Reduction in extubation failure now 23% as opposed to 25% previously (as shown in figures one and two and table one). However, the infant characteristics of the post intervention group were significantly different for Birth weight and gestational age (as shown in table one). They were similar in other aspects like percentage of males in both groups, surfactant administration and antenatal steroid administration.

Although the sample size is small, and the results not statistically significant, our preliminary data suggest that use of an elective extubation DMT may be of benefit in reducing elective extubation failure in extreme preterm infants.

It may also allow for collaboration between the clinician and the nursing staff and uniformity of practice in the elective extubation of extreme preterm infants.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=c6458f5a4f5899df61f506abce4dc875-MjAxOS0wNSM1Y2UyNy8yY2JIMTI5

IMAGE / TAB CAPTION: Figure one: Graph demonstrating a reduction in extubation failure rate between baseline and intervention groups.
Figure two: Graph showing extubation failure rate in the poster presented at BAPM conference in September 2018.
Figure three: Decision mak

COI: None declared
ID: 327

TITLE: MACHINE LEARNING-BASED INDIVIDUAL PREDICTION FOR NEONATAL JAUNDICE

AUTHORS: Sijie Song1, Imant Daunhawer2, Julia Vogt2, Jonas Müller3, Mingying Li1, Gerhard Jorch1,4, Sven Wellmann2,5, Xiaoyun Zhong1

AFFILIATIONS: 1 Department of Neonatology, Chongqing Maternal and Child Health Hospital, Chongqing, China; 2 Adaptive Systems and Medical Data Science, Department of Mathematics and Computer Science, University of Basel, Basel, Switzerland; 3 Division of Neonatology, University of Basel Children’s Hospital (UKBB), Basel, Switzerland; 4 Department of Pediatrics, University Hospital Magdeburg, Magdeburg, Germany; 5 Division of Neonatology, University Children’s Hospital Regensburg (KUNO), University of Regensburg, Regensburg, Germany.

CONTENT:

Post-discharged newborn infants are often readmitted for severe jaundice (neonatal hyperbilirubinemia) and acute bilirubin encephalopathy still represents a significant cause of morbidity and mortality throughout the world, especially in developing countries. Machine learning methods may help to identify infants at risk from clinical data available right after birth and before discharge to improve clinical management in this vulnerable population.

Clinical variables of 300 newborns in Chongqing Maternal and Child Health Hospital were collected in the first quarter of 2019, including gestational age (GA), birth weight (BW), delivery mode, sex, umbilical cord pH, Apgar score, maternal blood group, daily type of feeding and body weight, serial transcutaneous bilirubin (TCB) values. For a subgroup of patients additional variables were available such as infant’s blood group and coombs test. A random forest algorithm was used, composed of an ensemble of decision trees, each of which learned to discriminate between the two classes phototherapy vs. no phototherapy, initiated and performed according to the American Academy of Pediatrics. The predictive performance was evaluated by area under the receiver operating characteristic curve (AUC).

The baseline characteristics of the patients were, median (95% CI), GA 38.5 weeks (35.4-41.3), BW 3173g (2190-3911), pH 7.25 (7.07-7.38), exclusive breastfeeding 82% and Caesarean section 60.4%. Our computational model was able to predict an upcoming phototherapy treatment 43 hours in advance on average with an AUC of 0.85 based on clinical variables available for all newborn infants. The most influential variables, in terms of variable importance and listed in decreasing order, were found to be: GA, pH, BW, hours since birth, ratio bilirubin BW, bilirubin, Apgar 1 min, ABO group mother. Including subgroup information, infant’s blood group and coombs test, the AUC increased to 0.93.

By using machine learning methods, we developed a computational model for the early detection of severe neonatal jaundice, which can detect with high AUC, sensitivity and specificity whether a neonate will need a phototherapy before discharge. We are currently about to increase the data base to further train the algorithm and thus to further improve the predictive power.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
RNA-BINDING PROTEIN RBM3 PREVENTS NEURAL STEM/PROGENITOR CELL (NSPC) APOPTOSIS AND PROMOTES NEURONAL DIFFERENTIATION AFTER HYPOXIC-ISCHEMIC (HI) BRAIN INJURY

Xinzhou Zhu 1; Jingyi Yan 1; Catherine Bregere 2; Josef Kapfhammer 2; Raphael Guzman 2; Sven Wellmann 1,3

1 University Children's Hospital of Basel (UKBB), Basel, Switzerland
2 Department of Biomedicine, University of Basel, Basel, Switzerland
3. University Children's Hospital of East Bavaria (KUNO), Regensburg, Germany

Hypoxic-ischemic (HI) brain injury is one of the leading threats across all age groups from newborn infants to adults. Neural stem/progenitor cells (NSPCs) play critical roles in neuroregeneration after HI injury. Previously, the RNA-binding protein RBM3 has been shown to express in nestin-positive NSPCs and doublecortin (Dcx)-positive neuroblasts in rodent brain, but the functions of RBM3 in NSPCs remain largely unknown. In this study, we demonstrate that RBM3 can protect NSPCs against apoptosis and promote neurogenesis after HI injury.

RBM3 WT and KO mice were used in this study. In vitro experiments, NSPCs were isolated from neurogenic niches. Cultured NSPCs were challenged with oxygen glucose deprivation (OGD) to mimic hypoxic ischemia. NSPC apoptosis was measured by TUNEL assay. Neuronal differentiation was performed after OGD by withdrawing growth factors. Immunostaining was used to assess neuronal differentiation. An in vivo HI model was applied by ligating the right common carotid artery of adult mice and exposing mice to 8% hypoxia for 20 min. The mice were recovered for 7 days with BrdU injection. The infarction volume was measured by Nissl staining. The numbers of TUNEL+ apoptotic NSPCs were counted. Newborn neuroblasts and neurons were stained with BrdU/Dcx or BrdU/NeuN antibodies, respectively.

The effects of RBM3 were detected in the two neurogenic niches, subventricular zone (SVZ) and dentate gyrus (DG).
1. In vitro, more apoptotic cells were observed in RBM3 KO NSPCs after OGD stress. Both SVZ- and DG-derived NSPCs showed similar results.
2. In vivo, RBM3 KO mice showed a larger infarction volume than WT mice after HI injury.
3. In vivo, apoptotic cells were in significantly higher numbers in the SVZ and DG regions of RBM3 KO mice after HI injury.
4. In vitro, less neuronal differentiation was observed from RBM3 KO NSPCs after OGD stress. Both SVZ- and DG-derived NSPCs showed similar results.
5. In vivo, the newborn neuroblasts (BrdU+Dcx+) and neurons (BrdU+NeuN+) were significantly fewer in the SVZ and DG regions of RBM3 KO mice after HI injury.

Our results show that the absence of RBM3 dramatically exacerbated NSPC apoptosis and inhibited the neuronal differentiation potential of NSPC after OGD stress in vitro. In an in vivo HI model, the insult caused larger infarction and more neuronal loss in RBM3-depletion mice. Neurogenesis was also impaired when RBM3 was depleted. Taken together, our data suggest that RBM3 protects NSPCs against apoptosis and promotes neurogenesis after HI injury.
Skin injuries are among the most common complications for hospitalised neonates. Younger neonates are more frequently injured due to minimal skin layers, which are additionally thinner with decreasing gestational age (0.9 preterm-1.2mm term). The current standard of skin injury assessment uses only the naked eye. Thus, neonatal skin injuries are increasingly difficult to quantify and assess for severity due to minimal tissue depth. While there are several neonatal skin risk assessment tools, these do not assist the bedside clinicians actual assessment of an injury (length or depth). Therefore, investigators of an epidemiologic study developed tool to enhance skin injury assessment and measurement.

Adult wound and neonatal literature was searched for key elements of skin assessment, injury assessment tools, injury measurement, and clinical image photography. Commercial wound cameras were compared for efficacy and cost efficiency for documentation and image collection of injuries against an iOS (operating system) application. Development of skin injury assessment tools considered skin colour changes, normal neonatal skin tones, injury size (often < 2cm), severity scales, injury locations, mechanical forces involved in injury aetiology and the descriptive language. Additionally, tool development considered cost, materials, feasibility and suitability for the neonatal clinical setting.

Commercial wound cameras were not more efficacious or cost efficient than the IOS application. The IOS application was more intuitive for clinicians. A metric graduated colour (MGC) tool, comprising of 15 colours, measuring 60 mm and displaying metric dimensions was developed along with a lanyard card tool depicting injury severity stages. The MGC tool offers a discernible reference for initial injury/wound bed assessment and comparison over time; while the lanyard card provides definitions and images of neonatal skin injuries related to mechanical force (pressure, friction, shear and/or stripping) to aid consistency in the description for documentation of injuries. Additionally, the MCG tool provides a focal point which enhances clinical photographs, and a measurement reference for both injury colour and size.

Initial evaluation of these tools showed promise in improving assessment and measurement of neonatal skin injuries, in conjunction with clinical photography. Formal evaluation is currently underway in a multicentre study. The adoption of these injury tools into neonatal care globally has the potential to allow for benchmarking of this hospital-acquired complication.
ID: 339

TITLE: The impacts of maternal factors on neonatal and infant blood pressure: a systematic review.

AUTHORS: Aisling Ahluwalia (1)
Stephen Bremner (2)
Dionne Janis (3)
Simin Baygani (4)
Laura Butte (5)
Heike Rabe on behalf of the INC Haemodynamic Adaptation Group (6)

AFFILIATIONS: 1. Brighton and Sussex Medical School, UK
2. Brighton and Sussex Medical School, UK
3. BC Children’s Hospital, Canada
4. LILLY, USA
5. Critical Path Institute, USA
6. Brighton and Sussex Medical School, UK

CONTENT:

A comprehensive understanding of the factors contributing to neonatal and infant blood pressure is vital in ensuring optimal provision of support for newborns to achieve safe blood pressure levels. There is an absence of a global consensus of the influential maternal factors, demanding a need for the collation of existing evidence around the topic.

A systematic search of published literature was performed in MEDLINE, PubMed, Embase, CENTRAL and CINAHL to identify papers relating to maternal factors affecting blood pressure of neonates up to 3 months of age. Summary data from eligible studies were extracted and compared.

A total of 5299 studies were identified and of these, 15 were eligible for inclusion. Topics elicited were sociodemographic factors, maternal health status, medications and smoking during pregnancy. Few studies reported on each maternal factor and provided inconsistent results about their influences on neonatal blood pressure.

Limited data and ambiguity in current published literature means that there is insufficient evidence to draw definitive conclusions about the extent to which the elicited maternal factors correlate with neonatal blood pressure. Further research is required to allow advancements in effective evidence-based practice.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 340

TITLE: CHANGES IN THE APPLICATION OF THERAPEUTIC HYPOTHERMIA IN NEWBORNS WITH HYPOXIC-ISCHEMIC ENCEPHALOPATHY: A RETROSPECTIVE ANALYSIS

AUTHORS: Corline Parmentier 1; Linda de Vries 2; Mona Toet 3; Lauren Weeke 4; Floris Groenendaal 5

AFFILIATIONS: Wilhelmina Children’s Hospital, University Medical Center Utrecht, Utrecht, The Netherlands

CONTENT:

Several trials have shown that therapeutic hypothermia (TH) reduces death and disability in infants with moderate to severe hypoxic-ischemic encephalopathy (HIE). Increasing clinical experience with the application of TH and positive results concerning safety may have led to an increase in the use of TH in infants with milder HIE. The aim of this study was to determine whether the infants treated with TH during the initial years after the implementation of this neuroprotective intervention in our hospital were more severely affected by HIE than the infants cooled during the subsequent years.

We performed a retrospective, single center study in newborns with HIE who were treated with TH from February 2008 up to and including July 2017. Thompson scores, Sarnat scores and aEEGs of the infants treated during the first 57 months after the implementation of hypothermia in our hospital (February 2008 until October 2012) were compared to those from the infants treated during the subsequent 57 months (November 2012 until July 2017).

From February 2008 through July 2017, 222 newborns with HIE were treated with TH. Sarnat scores were documented for 215 newborns: 37 (17.2%) had mild HIE, 125 (58.1%) had moderate HIE and 53 (24.7%) had severe HIE. One hundred and seventeen infants were cooled in the first period, and 105 were cooled in the second period. The infants cooled in the second period had lower Thompson scores (median = 9, interquartile range 7 to 12) than the infants treated in the first period (median = 10, interquartile range 8 to 12), p = 0.002. The proportion of infants with mild HIE was lower in the first period (6.8%) than in the second period (29.6%), p < 0.001. There was no significant difference in the aEEG background patterns between the two periods (p = 0.571).

A substantial number of infants cooled in our hospital had mild HIE. Based on Thompson and Sarnat scores, the infants treated during the second period had milder HIE than the infants treated during the first years after the implementation of TH in our hospital. Further research is necessary to evaluate the value and safety of TH for infants with mild HIE.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 341

TITLE: EARLY NASAL CONTINUOUS POSITIVE AIRWAY FILURE PREDICTION IN PRETERM INFANTS LESS THAN 32 WEEKS' GESTATIONAL AGE

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CONTENT:

Early Continuous Positive Airway Pressure (CPAP) and surfactant rescue replacement are effective treatments for neonatal respiratory distress syndrome (RDS). CPAP is frequently the first respiratory support in preterm infants, but some neonates fail and need intubation and surfactant replacement. Demographic and clinical variables associated to CPAP failure may vary among centres.

Objectives: To analysed incidence and factors associated with CPAP failure in preterm infants with respiratory distress syndrome (RDS).

Single centre study. Retrospective evaluation of prospectively defined and collected data. Inclusion criteria were: consecutively admitted preterm infants of 24-31 weeks of gestational age, inborn, not intubated at NICU admission, managed with CPAP as first respiratory support, admitted between January 2004 and December 2017. CPAP failure (CPAP-F) was defined as the need of intubation and surfactant administration in the first 72 hours of life, the infants that were successfully managed with CPAP alone were defined as CPAP successes (CPAP-S). Demographic, respiratory and clinical data associated with CPAP-F were studied by logistic regression analysis.

Results 562 infants met inclusion criteria, 252 (44.8%) were CPAP-F and 310 (55.2%) were CPAP-S. CPAP-F, compared to CPAP-S infants, had lower GA (p=0.001), BW (p=0.019), lower incidence of ANS (p=0.01) and higher incidence of caesarean section (p=0.002). We performed a Decision Tree analysis testing the following variables: FiO2 in the first hours of life, GA, BW, gender, type of delivery, 5' Apgar. The best predictor of CPAP-F was FiO2 ≥0.23 between 180 and 240 minutes of life. FiO2≥0.23 between 180 to 240 min was strongly associated with CPAP F (AUC 0.86, sensibility 84%, specificity 80%). We obtained ROC curves analysis for the infants 29-31 weeks (AUC 0.90, sensibility 88%, specificity 84%), and 24-28 weeks (AUC 0.84, sensibility 82%, specificity 79%). By logistic regression analysis, FiO2≥0.23 between 180 and 240 min of life was the strongest factor associated with CPAP-F (OR and 95%CI 16.01 [10.34-24.81]).

We found that an FiO2≥23 between 180 and 240 minutes of life is a good predictor for CPAP failure in preterm infants with GA from 24+0/7 to 31+6/7 weeks at birth managed with CPAP as primary respiratory support. The accuracy of this model for higher and lower GA group (24+0/7-28+6/7 weeks’ GA and 29+0/7-31+6/7 weeks GA) could lead to uniform FiO2 threshold criteria for RDS surfactant replacement.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=effa915862f0aed580e bdd2a10b5105-MjAxOS0wNSM1Y2UyNyY2YzM1NGY0
IMAGE / TAB CAPTION: Table1. Basic population details. Data are given as or n (%) or median [interquartile range]. $\chi^2$-square or Fisher, and Mann-Whitney test were used for the statistical analysis. Abbreviations: CPAP: continuous positive airway pressure; CPAP-S: CPAP success

COI: None declared
ID: 343

TITLE: EYE-TRACKING DURING NEONATAL AIRWAY MANAGEMENT

AUTHORS: Michael Wagner 1; Peter Gröpel 2; Katharina Bibl 1; Monika Olischar 1; Marc A Auerbach 3; Isabel T Gross 4

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CONTENT:

Eye-tracking devices are an innovative tool to understand provider behavior during stressful medical tasks. Eye tracking technology enables simulation instructors as well as researchers to analyze the focus of different health care providers during critical simulated and real situations. Analysis of gaze behavior has shown that novice providers are more dependent on vital signs monitoring than experts, which leads to more distraction from clinical assessment of the newborn. The goal of this study was to assess participants’ gaze behavior and experience with an eye tracking device during airway management in a simulated neonatal resuscitation.

This study was as observational simulation-based study. Medical students and emergency medicine residents at Yale University School of Medicine participated during a simulated newborn resuscitation training session. The team member assigned to airway management wore head-mounted eye-tracking glasses that recorded gaze behavior during the scenario. Main outcome measures were airway providers’ gaze, dwell time (total amount of time a participant fixates) and usability of eye tracking glasses. We assessed distractors during airway management and the visual attention of healthcare providers while ventilating at different times of interest (TOI) including during ventilation only, chest compressions, umbilical vein catheter insertion, and endotracheal intubation.

Data from 13 participants were included. There were significant differences in dwell time (total amount of time a participant fixates on a specific area) during the scenario (p < 0.001), with participants spending twice as much time on the newborn and instruments as on the monitor and other staff. Participants spent about 25% more time focusing on another provider while the provider was inserting the umbilical vein catheter than in all other TOIs (p = 0.04). The use of the glasses was perceived easy and not disturbing.

Eye tracking glasses enhance our understanding of providers gaze and perspective during simulated neonatal airway management. The gain of knowledge with identifying the participant’s perspectives during training, could be used to augment and adapt future training. Future studies will better characterize the ideal use in real situations.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 344
TITLE: THE SPONTANEOUSLY VAGinally DELIVERED EXCLUSIVELY BREASTFED INFANT DISCHARGED WITHOUT ADDITIONAL INVESTIGATIONS – AN ENDANGERED SPECIES?
AUTHORS: Robert McGrath 1; Jan Milešin 1, 2, 3, 4
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CONTENT:

Medical overuse is defined as the provision of healthcare for which net benefits do not exceed net harms. There is an ever growing body of literature exploring medical overuse with the number of publications about overuse having nearly tripled from 2014 to 2016, much of this inspired by the burgeoning debate around what constitutes “too much medicine”. This trend is not specific to adult medicine and there is a small, but growing body of research focused on paediatric overuse. Studies focused on overuse and overmedicalisation within neonatology are fewer still.

We performed a retrospective observational cohort study in a large tertiary level maternity hospital (Coombe Women & Infants Univeristy Hospital, Ireland). Manual chart review of all babies born in August and December 2017 was undertaken. Infants born <37 weeks gestation, infants with a congenital or chromosomal abnormality, infants admitted to the neonatal unit for management beyond observation and those whose chart was unavailable for review were excluded from analysis. Our primary outcome was to establish number of infants born by spontaneous vaginal delivery (SVD), receiving routine care and exclusively breastfed until discharge. Our secondary outcomes included the number of these in whom non-invasive and invasive investigations were performed beyond accepted routine neonatal care.

Of 1376 infants born in the study period, 701 in August 2017 and 675 in December 2017, 1137 (83%) were eligible for inclusion with 239/1376 (17%) excluded based on the aforementioned exclusion criteria. Of included infants 576 were male. Mean gestation at birth was 39.7+1.3 weeks and mean birth weight was 3494.5+464.5g. 386/1137 (14%) were born via SVD, 231/1137 (20%) via vaginal delivery post induction of labour, 182/1137 (16%) via instrument assisted vaginal delivery and 338/1137 (30%) via lower segment caesarean section, elective or emergency. Of included infants 164/1137 (12%) were born via SVD and breastfed exclusively until discharge. Of these 137/164 (83%) underwent no further invasive investigations beyond accepted routine care, and 77/164 (47%) underwent no further investigations either non-invasive or invasive beyond accepted routine neonatal care until their discharge.

In a large tertiary maternity hospital, 164/1137 (14%) of term infants were born via SVD and exclusively breastfed until discharge. 77/1137 (7%) of breastfed term infants born via SVD underwent no further investigations beyond routine neonatal care. We ask when did a diagnosis of “normality” become the exception and not the rule? We propose that further research in the field of medical overuse within maternal and neonatal care is justified.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 350

TITLE: INTRAUTERINE AND PERINATAL COMPLICATIONS IN IUGR INFANTS DUE TO MATERNAL INHERITED THROMBOPHILIA

AUTHORS: Luciana-Valentina Grozavu-Arsene 1,2; Ioana-Diana Voicu 1; Monica-Mihaela Cirstoiu 1,2

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CONTENT:

Intrauterine growth restriction (IUGR) remains a frequent cause of perinatal morbidity and mortality, which appears in up to 10% of the pregnancies, characterized by the inability of the fetus to reach its biological growth potential, with an estimated fetal weight below the 10th percentile given for the equivalent gestational age. The responsible factors are often detected, either it is about genetic disorder, infections or congenital anomalies, but in up to 25% of them the causes remain unknown. For some of these, the answer may be thrombophilia, a coagulation abnormality, that can be either inherited or acquired, affecting about 15% of the Caucasian population, including factor V Leiden or prothrombin gene mutation.

We conducted a study collecting data from the Bucharest University Emergency Hospital archive records, including 343 patients with singleton pregnancy admitted at the Obstetrics and Gynecology Clinic, over a period of one year. We analyzed the correlations between inherited thrombophilia and IUGR using blood test samples and ultrasound evaluation. Patients were tested for thrombophilic gene mutation for factor V Leiden, prothrombin G20210A, methylenetetrahydrofolate reductase (MTHFR) C677T/A1298C, PAI, factor XIII, endothelial protein C receptor (EPCR) G4600A/C4678G. The patients were distributed in two groups, one consisting of 314 patients, and the other consisting of 29 patients matching our criteria and diagnosed with IUGR, divided by the ultrasound evaluation and birth weight percentile.

In the second group, representing 8.45% of the patients, we found a positive association between FV Leiden mutation, C677T MTHFR gene mutation and IUGR. 6.89% of the patients in the second group presented with FV Leiden mutation, comparing to only 2.54% in the first group, being 2 to 3 times more prevalent in the fetuses affected by IUGR. Similarly, 55.17% of the patients in the second group presented with MTHFR C677T genotype comparing to 30.25% in the first group. For the remaining types of thrombophilia, the difference was not significant or relevant. We also encountered 5 cases with middle cerebral artery/umbilical artery pulsatility indices ratio smaller than 1, representing the population at risk for a higher maternal and fetal morbidity and mortality, out of which 3 were affected by IUGR, concluding that 60% of the total cases with hemodynamic redistribution were affected by IUGR.

The results showed a positive correlation between FV Leiden and C677T MTHFR gene mutations, being up to 3 times more frequent in IUGR fetuses. Although routine screening is not considered cost-efficient, pregnant patients should undergo tests for inherited thrombophilia as the management of these cases is challenging, by the risk/benefits of leaving the fetus in utero vs the complications of prematurity with short and long-term health consequences.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 351
TITLE: CLINICAL OUTCOMES OF CHILDREN WEANED FROM PARENTERAL NUTRITION AFTER NEONATAL GASTROINTESTINAL SURGERY.
AUTHORS: Paola Roggero 1, 2, Nadia Liotto 1, Pasqua Piemontese 1, Michela Perrone 1, Giorgio Fava 3, Francesca Taroni 4, Maria Angela Pavesi 5, Maria Lorella Gianni 1, 2, Fabio Mosca 1, 2
AFFILIATIONS: 1 Neonatal nutrition centre. NICU Fondazione IRCCS Ca’ Granda Ospedale Maggiore Policlinico 2 University of Milan. Department of Clinical Sciences and Community Health 3 Department of Pediatric Surgery, Fondazione IRCCS Ca’Granda - Ospedale Maggiore Policlinico, Milan, Italy. 4 Pediatric Nephrology, Dialysis and Transplant Unit, Fondazione IRCCS Ca’ Granda - Ospedale Maggiore Policlinico, Milan, Italy. 5 Radiology Unit, Pediatric Division, Fondazione IRCCS Ca’ Granda - Ospedale Maggiore Policlinico, Milan, Italy.
CONTENT:
The majority of children with intestinal failure (IF) due to short bowel syndrome (SBS) [dependence on parenteral nutrition (PN) for at least 90 days] are nowadays capable to be weaned from PN. Scarce evidences are available regarding the follow-up setting after intestinal adaptation. The aim of the study was to investigate the occurrence of morbidities after intestinal adaptation in children who underwent neonatal gastrointestinal (GI) surgery.

In our Home PN Centre we develop a multidisciplinary and long term follow-up to obtain a primary and secondary prevention of the unsuspected and life threatening complications after intestinal resection. Specifically, patients after intestinal adaptation enter in a follow-up program that includes dedicated staff in gastroenterology, nutrition, paediatrics, surgery, nephrology and radiology. Each patient underwent to a serial exams/clinical evaluations including stools assessment for steatorrhea and haematochezia, endoscopy, nutritional intake, urinary analysis, ultrasound and X-ray follow through of GI tract and Breath H2 test.

We included 47 children (27 males) with IF after neonatal GI surgery. The mean GA at birth was 32.8±5.1 wks; age at the last visit was: 7.8±5.8 yrs (0.6-24 yrs). Causes of SBS were: NEC (9/33), multiple bowel perforations (6/33), volvulus (5/33), intestinal aganglionosis (4/33), gastrochisis (2/33), intestinal atresia (7/33). Duration of PN of was 1.1±1.8 yrs (3 months-9 yrs). Length of small bowel residual was 51±39 cm (14-160 cm), 13/33 children had totally preserved colon, whereas 16/33 had a partial residual colon. Among 33 infants weaned from PN, 42.4% developed morbidities during the follow-up (3/33: anastomotic ulcers with clinical anemia, 3/33: gallstones, 3/33: kidney stones, 2/33: symptomatic D-lactic acidosis, 1/33: acute pancreatitis and cholecystitis and 2/33: venous trombosis. The occurrence of morbidities was found after 4.5±3.3 yrs (range 0.1-10.7 yrs) the weaning from PN.

This study suggests that the occurrence of morbidities after PN weaning is not a rare event. Therefore a multidisciplinary and long term follow-up is mandatory.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 353

TITLE: IS THE GROWTH VELOCITY DURING TRANSITION PHASE FROM PARENTERAL TO ENTERAL NUTRITION RELATED WITH BODY COMPOSITION IN PRETERM INFANTS?

AUTHORS: Nadia Liotto 1, Daniela Morniroli 1, 2, Paola Roggero 1, 2, Domenica Mallardi 1, Michela Perrone 1, Camilla Menis 1, Anna Banfi 1, Maria Lorella Giannì 1, 2, Fabio Mosca 1, 2.

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2. Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy.

CONTENT:

Progress has been made to optimize the nutrition of preterm infants but the transition phase from parenteral to enteral nutrition (TF) remain a critical period for the achievement of an adequate growth. Nevertheless poor data are available regarding the nutritional management of this critical period and its relationship with the quality of growth of very low birth weight infants (VLBWI). According with these data the aim of this study was to evaluate if the weight growth velocity (GV) and nutritional intakes during TF is related with body composition of VLBWI al term corrected age (TCA).

A chart review was conducted on VLBWI born at author’s institution from 2015 to 2017. Weight parameters and nutrient intakes [energy (E): kcal/kg/day] and protein (P): g/kg/day] were collected by computed medical chart. GV (g/kg/d) has been calculated using an exponential model.

A cohort of 98 VLBWI was categorized according with GV during TF in G1: GV 50% (M-PNI) and enteral nutritional intakes >50% (M-ENI).

All infants included underwent anthropometric measurements at discharge and at TCA and body composition assessment in term of percentage of fat mass (FM) and fat free mass (FFM) deposition at TCA by using an air displacement plethysmography.

The mean birth weight and gestational age were 1243±209 g and 30.2±1.9 weeks. No differences in basal characteristics and comorbidities’ occurrence were found among groups. The total P and E intakes during TF were similar among groups [E: 104.0±20.6 vs 109.2±13.5; P: 4.07±1.03 vs 3.9±0.6 respectively for G1 and G2].

During M-PNI, G2 had higher enteral P and a slightly higher enteral E intakes compare to G1 [1.4±0.7 vs 1.1±0.5 (p=0.03) and 53.5±21.7 vs 46.3±16.1 (p=0.06) respectively]. During M-ENI, G2 showed higher parenteral P and E intakes compare to G1 [1.7±0.9 vs 1.3±0.7 (p=0.002) and 43.9±23.4 vs 30.7±17.2 (p=0.01) respectively].

At discharge and at TCA, weight, length and head circumference were similar among groups. At body composition assessment, G2 had higher FFM compare to G1 (83.6± 4.7 vs 82.1±4.3% respectively for G2 and G1; p=0.03).

An adequate GV (> 15g/kg/d), is supported by high enteral protein and energy intake during M-PNI and high parenteral energy and protein intakes during M-ENI.

Although GV during the TF seems to not influence the quantity of growth at discharge and at TCA, an adequate GV during this critical period is associated with an improvement in quality of growth at TCA.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 357
TITLE: LOW CD44 LEVELS COMPENSATED BY ENHANCED RHAMM EXPRESSION IN THE DEVELOPING LUNG MAY BE DEPENDENT ON THE GESTATIONAL AGE
AUTHORS: Laszlo Markasz 1, Richard Sindelar 1;
AFFILIATIONS: 1. Department of Women’s and Children’s Health, Uppsala University, Uppsala, Sweden

CONTENT:

The extracellular matrix component hyaluronan (HA) has a significant role in lung development. CD44 and the receptor for HA-mediated motility (RHAMM) are two major receptors for HA, involved in cellular proliferation, differentiation, and motility. The role of CD44 in fetal lung development is not well established. We have previously shown how RHAMM expression HA content changes in the lung due to various perinatal and maturational factors (Markasz et al, Early Hum Dev, 2018; Johnsson et al, Biol Neonate, 2003). This study complements our knowledge on CD44 expression in the postnatal lung development by analyzing human lung specimens from ventilated newborn infants at different gestational and postnatal ages with a variety of different lung diseases.

Ninety-three postmortem lung samples were analyzed from infants born 1990–1996, at a postnatal age of 0–228 days and gestational age 23-41 weeks. Immunofluorescence staining was performed with antibody for CD44. Representative sections were examined by standard fluorescence microscopy. Analysis of 279 digital images was performed by Image J software. CD44 expression and the clinical data were analyzed together with RHAMM expression, lung air and HA content by two-dimensional hierarchical clustering.

Patients could be sorted into six groups by hierarchical clustering analysis (Figure 1). Extremely preterm (Group 1 and 2) and moderately/term neonates (Group 3 and 4) appeared separately. Strong negative correlations appeared between RHAMM and CD44 expression when analyzing Group 3 and 4 but not with Group 1 and 2 (Figure 2). No correlations between CD44 expression level and postnatal age or gestation age at death were observed.

Several studies indicate a possible interaction between CD44 expression and the expression of RHAMM. We could show that RHAMM expression increases in the lung if low CD44 levels occur in moderately and term neonates but not in extremely preterm neonates. Our study suggest that the possibility for compensation for low CD44 with RHAMM may be dependent on the gestational age at birth.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1- Figure 2

COI: None declared.
ID: 360  
**TITLE:** Nottingham Neonatal Palliative Care- Quality Improvement evaluation  
**AUTHORS:** Sarah Hill  
Natalie Batey  
Toni Wolff  
Anjum Deorukhkar  
**AFFILIATIONS:** Nottingham University Hospitals  

**CONTENT:**

The UK has seen a 50% increase in the prevalence of children (including neonates) with life threatening and life limiting conditions (LLC), Fraser et al 2012. NHS England funded The Chameleon Project, a 12 month quality improvement project for the East Midlands to improve and evaluate the quality of children’s end of life care (EOL). We hypothesised the Chameleon Project will lead to; improved, identifiable documentation of neonatal resuscitation plans, increased awareness of the potential for parallel care plans for antenatally diagnosed LLC, better coordination and satisfaction with care and improved ability to audit the national guidance.

Neonatal deaths were identified for the 12 months before and 12 months during the Chameleon project. Data was collected on antenatal diagnoses, demographics and documentation of care plans. Children 28 days) who died before neonatal unit discharge, or following planned EOL care at home were included. Individual staff interviews were conducted and parental feedback obtained. The Chameleon project funded a paediatric team with specialist interest in palliative care. Locally the lead clinician’s role was to raise awareness of choice for families of neonates with LLC, promote the network pathway, offer clinical support and advice and develop local documentation including a neonatal PRP and resuscitation sheet.

31 babies were identified during the Chameleon project period compared to 21 the previous year. In 16 (52%) cases during the project an easily identifiable resuscitation plan was present in front of the notes. This was significantly better compared to 3 (14%) the previous year. 21 deaths were anticipated during the study period compared to 18 the preceding year. Improved documentation allows greater ability to audit compliance with NICE guidance. In the project period, 9 babies had antenatal diagnoses, 5 had antenatal counselling (1 parallel care baby plan), 4 had none. In the previous year, 10 had antenatal diagnoses, 3 had antenatal counselling (1 parallel care baby plan), 7 had none. During the project parents felt ‘heard’ and empowered to make EOL care plans for their babies and staff reported increased confidence in coordinating and supporting the families with EOL care plans.

The Chameleon project has improved awareness for the need of EOL care plans in babies with LLC. Morale around palliative care has improved, staff feel supported and confident in the implementation of EOL care. Confirmatory diagnosis of LLC in the antenatal period remains a challenge due to inherent uncertainty. Availability of appropriate antenatal and postnatal documents means a greater number of neonates have palliative care plans in place.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 361

TITLE: TREATMENT OF PRETERM INFANTS WITH SEVERE RESPIRATORY FAILURE AND PULMONARY HYPERTENSION: THE SAFETY AND EFFICACY OF NITRIC OXIDE THERAPY

AUTHORS: Simona Negro 1, Sara Cecchi 1, Caterina Coradeschi 2, Martino Landi 2 and Barbara Tomasini 1

AFFILIATIONS: 1 Maternity and Childhood Department, Division of Neonatal Intensive Care, University Hospital of Siena, Siena, Italy.
2 Paediatric Residency School, University Hospital of Siena, Siena, Italy.

CONTENT:

The incidence of persistent pulmonary hypertension of the newborn (PPHN) is 5.4 per 1000 live births in premature infants, determining high mortality and morbidity, such as refractory hypoxic respiratory failure (HRF). Inhaled nitric oxide (iNO) has been showed to improve oxygenation, lowering pulmonary vascular resistance and improving lung flow, in term babies; but it cannot be recommended for the routine treatment of HRF in premature infants, due to the absence of guidelines and the high risk of bleeding. The aim of the study was to evaluate the efficacy of iNO treatment in preterm newborns affected by HRF and PPHN, and its safety.

All newborns born ≤32 weeks of gestation between 2015-2018, who developed HRF (FiO2>0.40-0.50, PaO2<12 cmH2O) with or without PPHN, were retrospectively enrolled. SatO2/FiO2, Oxygenation Index (OI) and echocardiography were used for the diagnosis of PPHN. Infants with congenital anomalies, hydrops and those who died soon after birth, were excluded. Clinical characteristics and outcomes of infants with HRF responsive to conventional treatments (Not Treated Group) and those of newborns with HRF not responsive to common therapies and who developed PPHN with the need of iNO (Treated Group), were compared. Effectiveness of iNO was evaluated by recording changes of MAP (mean airway pressure), FiO2, SpO2/FiO2 and OI before, and 3±1, 6±1, 12±3, 24±6, 48±6 and 72±12 hours after beginning therapy.

Among 157 newborns enrolled, 13 developed HRF not responsiveness to conventional therapies and were treated with iNO [mean (SD) age at the beginning of iNO: 10 (9) days]. The Treated Group showed a lower gestational age, birth weight and Apgar score, a higher FiO2 in delivery room and a higher frequencies of gestosis and intrauterine growth restriction during pregnancy, compared to Not Treated Group (p<0.05). iNO significantly improved oxygenation after 6-8h of treatment in all cases (Fig.1). No significant deterioration of intraventricular haemorrhage (IVH) was observed during treatment. A worse respiratory outcome, a reduced hemodynamic stability, a later close of patent ductus arteriosus, a higher incidence of necrotizing enterocolitis, retinopathy of prematurity, IVH and major mortality rate were observed in the Treated Group compared to the Not Treated Ones (Chi-square, p<0.05).

Preterms with HRF and PPHN respond to iNO administration, without increasing the risk of major intracranial bleeding. Their worse outcome could be related to their critical condition at birth and to the late beginning of iNO, as rescue therapy. iNO is not recommended for the routinely treatment of PPHN in preterms, but it should be considered carefully since, improving oxygenation, may reduced mortality and morbidity of subjects at risk.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=5530de676f5fa134c164d1a01049f308-MjAxOS0wNSM1Y2UyNjY2YzNhZjRm

IMAGE / TAB CAPTION: Figure 1. Changes in FiO2 (A), OI (B), SatO2 (C), SatO2/FiO2 (D) before and after iNO treatment in the Treated Group

COI: None declared
ID: 362

TITLE: TIMELINESS OF VACCINATIONS IN PRETERM INFANTS IN THE NETHERLANDS

AUTHORS: Elsbeth D.M. Rouers1,2, Guy A.M. Berbers1, Josephine A.P. van Dongen2, Elisabeth A.M. Sanders1,3, Patricia Bruijning-Verhagen1,2

AFFILIATIONS: 1 Centre for Infectious Disease Control, National Institute for Public Health and the Environment, Bilthoven, the Netherlands
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3 Department of Paediatric Immunology and Infectious Diseases, Wilhelmina Children’s Hospital, Utrecht, The Netherlands

CONTENT:

In the Netherlands, preterm infants receive the immunisations at the same chronological age as recommended for term infants without correction for gestational age (GA). The aim of this paper was to describe the timeliness of the routine Dutch national immunisation schedule in preterm infants in their first year of life and to evaluate possible determinants of delay.

This study is part of a prospective cohort study evaluating the immunogenicity against the vaccines of the national immunisation programme in preterm infants. Preterm infants were recruited between October 2015 and October 2017 and stratified according to GA (<28, 28-32 and 32-36 weeks). Data from the baseline parental questionnaire, monthly parental questionnaires and medical records were used to determine the immunisation age and proportion of infants timely receiving the first immunisations (between 42 and 63 days). Results were compared between the GA and birth weight (BW) groups. Determinants associated with timeliness of immunisation were studied by multivariate logistic regression analysis.

Delayed start of immunisation occurs in 39.5% of preterm infants in the Netherlands. The proportion of infants receiving the first immunisation not on time was highest for the group with GA <28 weeks (63%). The mean age of the first immunisation across all GA groups was 62.7 days (range 33-118) and differed significantly between GA group < 28 weeks and the other two GA groups of 28-32 and 32-36 weeks (p < 0.001). Similar results were seen when stratified by BW. Multivariate analysis showed that low SES and prolonged hospitalisation beyond 37 weeks GA each negatively influenced timeliness of the first immunisation.

These findings indicate that start of immunisations was often delayed in preterm infants and differs for different GA groups, being highest (63%) in infants < 28 weeks GA. Lower SES and prolonged hospital stay beyond 37 weeks GA are important determinants of timeliness. Efforts to improve timeliness should focus most on counselling parents in lower SES.

IMAGE / TAB:

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COI: None declared
ID: 365
TITLE: EPIDEMIOLOGY OF BLOOD CULTURE PROVEN EARLY-ONSET NEONATAL SEPSIS: 8-YEAR EXPERIENCE FROM A UK CENTRE
AUTHORS: Sunitha Vimalesvaran 1
Anja Hawkins 2
Sankara Narayanan 3
AFFILIATIONS: 1 & 3 Neonatal Department, West Hertfordshire Hospitals NHS Trust, United Kingdom
2 Microbiology Department, West Hertfordshire Hospitals NHS Trust, United Kingdom

CONTENT:

Neonatal sepsis remains a major cause of mortality, with an estimated 400,000 annual deaths worldwide. The incidence of neonatal sepsis varies in different geographic regions; reflecting differences in resources, maternal and infant risk factors and prevention strategies. It remains one of the most common neonatal diseases, even in high-income countries. We aimed to determine the incidence and etiology of early-onset sepsis (EOS) using positive blood cultures in our centre. We defined EOS as infection occurring <72 hours after birth. We also examined trends of antibiotic treatment episodes in neonates <72 hours old, within the same time period.

This was an 8-year, retrospective single-centre observational cohort study. This study was registered with hospital clinical audit service and conformed to local information governance standards. Epidemiological, clinical and microbiological data from all infants with culture-proven sepsis over an 8-year period (Jan 2011-Dec 2018) was collected. Positive blood cultures, which were deemed to be contaminant, were excluded. Data on antibiotic treatment episodes was extracted from the neonatal electronic patient database. Descriptive statistics were performed on demographic data. Hospital live birth denominators were used to calculate incidence rates (per 1000 live births). Chi-square test was used to assess for statistical significance (p<0.05) of categorical variables.

We identified 47 cases of EOS between 2011 and 2018. GBS was the leading cause (n=34, 0.8/1000 live births) followed by E.Coli (n=9, 0.21/1000 live births). Demographic data is shown in Table 1. Relative to our live birth cohort, the EOS population had significantly higher preterm (p<0.05) and very low birth weights (p<0.05) babies. The highest incidence of EOS was in 2018 (2.8/1000 live births), with a statistically significant increase in trend, p=0.02. There was an unusual rise in incidence of EOS in 2018. E. Coli sepsis was higher in preterm babies (n=5, 44%) compared to term babies (n=5, 13%). Incidence of GBS sepsis is notably rising with 10 cases in 2018, compared to 3 in 2011. Overall mortality rate was 6.4%.

We also report an increase in number of infants treated with antibiotics for suspected EOS (2011: 121/1000 live births versus 2018: 217/1000 live births) during study period.

We report a high burden of neonatal EOS at our centre compared to national average (0.7/1000 live births). GBS and E. coli are the most common causes of EOS in our term and preterm babies, respectively. This data allows us to benchmark against national standards and drive research/quality improvement. There are ongoing efforts at our centre to try sepsis prediction tools such as Kaiser Permanente Sepsis calculator to reduce antibiotic exposure.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=f024a36c56454cfbdfa7610d798db788-MjAxOS0wNSM1Y2UyNjY2YzNjZjli

IMAGE / TAB CAPTION: Table 1: Demographic and EOS Incidence Data
COI: None declared
ID: 368

TITLE: DEMOGRAPHIC CHARACTERIZATION AND CARE OF PREGNANT WOMEN WITH PRE-ECLAMPSIA AND THEIR NEWBORNS IN A REFERENCE CENTER IN THE SOUTHERN REGION OF BRAZIL

AUTHORS: Paulo de Jesus Hartmann Nader 1,2; Silvana Salgado Nader 1,2; Nance Nardi 1; Lindolfo Meirelles 1; Melissa Camassola 1; Augusta Harff 2

AFFILIATIONS: 1. Pediatric Dept, Universidade Luterana do Brasil, Canoas, RS, Brazil
2. University Hospital, Canoas, RS, Brazil

CONTENT:

Preeclampsia (PE) is a specific syndrome of pregnancy with a global action ranging from 3 to 5%. PE is the major causes of fetal and maternal mortality and morbidity, being one of the main causes of prematurity. In the United Kingdom there was a reduction of more than 90% of maternal mortality with the control of the disease in prenatal care and at the time of termination of pregnancy. With the short-term and long-term risks inherent to PE during pregnancy, in the newborn and in the mother, it is necessary to decide the best time to interrupt gestation because the healing process occurs through the withdrawal of placenta. Because PE is a disease associated with inflammatory etiology, the effects on the newborn can also occur, since the circulating factors in the pregnant woman can reach the fetus. There is a higher incidence of bronchopulmonary dysplasia, cerebral lesions such as stroke and developmental deficit. It is important to know the result obtained in the pregnant women with PE as well as the birth conditions of these infants in order to better evaluate the results of the management, as well as to identify the risk factors involved in the disease, in order to plan possible preventions.

Retrospective, cross-sectional study. To characterize the population of pregnant women with preeclampsia (PE) in relation to risk factors and newborns' birth conditions for neonatal asphyxia and fetal nutrition status. The cases (162 patients) corresponded to all births diagnosed with PE in the years 2016 and 2017. The maternal variables were demographic data, obstetric gestational age, number of pregnancies, type of delivery, previous hypertensive disease, PE, restricted intrauterine growth, preterm birth, blood pressure at birth. The newborns variables were APGAR: 1st and 5th minutes, birth weight, adequacy of weight for gestational age. Student’s t-test and chi-square test were applied. Significance level was considered p < 0.05.

The incidence of PE in pregnant women was 2.3% with an average mother’s age above 30 years. Preterm delivery had an incidence of 43.3%, with 19% of late preterm infants. Newborns small for gestational age (SGA) corresponded to 23.6% of mothers with PE. There were no differences between the groups, in relation to being primiparous. Regarding birth weight, the PE sample showed a mean weight 400 g lower when compared to the control group (p <0.001). The SGA were 23.6% of the sample in the PE group (p <0.001). In the PE group there were 2 deaths due to fetal loss. The 162 PE postpartum women, 67 (41.3%) were hospitalized for the management and follow-up of PE. There was no difference in relation to ethnicity when comparing the 2 groups. Patients group not follow at high-risk hospitalization had a higher number of SGA, premature babies and apgar score below 7 in the first minute (p <0.001).

The prevalence of PE was 2.3% in pregnant women in HU Canoas, with a mean mother’s age above 30 years. The most severe cases were responsible for newborns with gestational age less than 34 weeks and birth weight less than 1,000 g. Apgar score below 5 in the fifth minute was found in 2.5% of mothers with PE. Monitoring PE during pregnancy reduces the risk of fetal malnutrition and perinatal asphyxia.
COI: None declared
ID: 371

TITLE: THE PREDICTION OF ASTHMA IN CHILDHOOD FOR PRETERM BABIES - A CYTOKINE STUDY IN SALIVA

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CONTENT:

Asthma is a chronic airway inflammatory disease and affects approximately 5% of the population in Taiwan. In addition, preterm infants have higher risk of developing asthma than full-term infants. Previous studies revealed that some cytokines were associated with asthma or atopic disease and those cytokines were mainly detected from serum or sputum, which were difficult to be obtained in infants. To date, few researches on the salivary cytokines of prematurity were reported. Thus, the goal of our study was to find the relationship between asthma and salivary cytokines, which is noninvasive, in the early life of prematurity.

We collected preterm babies from August 2012 to May 2017 and excluded those who had bacterial infection within seven days of life, maternal sepsis and maternal clinical chorioamnionitis. Their gestational age, birth weight, Apgar score, comorbidity, intubation time, infectious times were documented. The salivary cytokines on the first (D1) and seventh (D7) day of life were detected by MILIPLEX. We followed-up these patients at OPD or by phone interviewing and also recorded the status of re-admission. We defined asthma as using inhaled selective beta-2 agonists and/or inhaled corticosteroid treatments more than twice in one year, or taking oral leukotriene modifiers for more than one month. Kaplan-Meier or Cox-regression were used for analyzing data between the asthma and non-asthma groups.

A total of 125 preterm infants were enrolled in this study. Eighteen children were diagnosed with asthma. They had younger gestational age, lower Apgar score at the first minute, longer duration of intubation during the first admission and more hospitalizations due to respiratory tract infection than those in non-asthma group (p= 0.036, 0.049, 0.021, <0.001 respectively). The numbers of hospitalization due to respiratory syncytial virus infection was also higher in asthma group than that in non-asthma group (p= 0.002). The incidences of bronchopulmonary dysplasia, retinopathy of prematurity, and patent ductus arteriosus were not different between the two groups. In salivary cytokines, the levels of D1, D7 interleukin (IL)-10 and D1 tumor necrosis factor (TNF)-α were significantly higher in asthma group compared with non-asthma group (p= 0.036, 0.019, 0.012 respectively).

Early-life salivary cytokines as IL-10 and TNF-a of prematurity were associated with the risk of developing asthma in childhood. To know salivary cytokines may help us early intervene on high risk infants to prevent the occurrence of asthma in premature infants.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 380

TITLE: ALPHA-LACTALBUMIN ENRICHED WHEY PROTEIN CONCENTRATE TO IMPROVE GUT, IMMUNITY AND BRAIN DEVELOPMENT IN PRETERM PIGS

AUTHORS: Charlotte Holme Nielsen 1; Duc Ninh Nguyen 1; Anne B. Lau Heckmann 2; Per Torp Sangild 1; Thomas Thymann 1; Stine Brandt Bering 1

AFFILIATIONS: 1 Comparative Pediatrics and Nutrition, University of Copenhagen, Denmark
2 Arla Food Ingredients, Viby, Denmark

CONTENT:

Background: Preterm birth predisposes to developmental complications including immature gastrointestinal and immune functions, postnatal growth restriction and delayed neurodevelopment. Human milk is important for neonatal development, but infant formula supplementation may be needed to secure proper growth. Alpha-lactalbumin (α-La) is a major component of human milk (~4 g/L in early milk), and its biological activity may contribute to the benefits of breastfeeding. We hypothesized that supplementation of milk with an α-La-enriched whey protein concentrate (WPC) would stimulate gut, immune and brain development in preterm neonates.

Methods: We tested this by feeding cesarean-delivered preterm pigs (90% gestation) dilute bovine milk (2:1 in water) without (REF group, n = 22 from two separate litters), or with α-La enrichment of WPC provided at two different levels (HIGH 18 g/L, LOW 6.3 g/L, n = 19-20). Total protein contents was 27 g/L (REF) and 55 g/L in the two enriched diets. All pigs were reared by identical procedures, and clinical variables and functional endpoints (e.g., T-maze cognition test) were assessed at intervals during the study. Gut microbiota and organ weights were recorded at day 19.

Results: Both HIGH and LOW pigs grew faster than the REF pigs, but with no difference between the two supplemented groups (29 vs. 19 g/kg/d). The HIGH pigs had higher bone mineral composition and density but lower relative intestinal weights and proximal villus heights than LOW pigs. Other gut endpoints (e.g., intestinal brush border enzymes, goblet cell density) and immune parameters (e.g., phagocytic capacity, lymphocyte subsets) were similar between REF, HIGH and LOW pigs. Likewise, cognition outcomes (open field, spatial T-maze tests) did not differ between HIGH and LOW groups, and both were similar to values in REF pigs. Relative to LOW pigs, the HIGH pigs had higher colon microbiota alpha-diversity and levels of acetic and butanoic acid, and tended to have reduced gut transit time (p = 0.07).

Conclusion: Protein supplementation of milk with WPC improved growth in preterm pigs. Further enrichment with α-La, beyond the levels in human milk, had marginal effects on food transit and gut microbiota, but did not affect gut, immunity or brain functions. WPC may be a good supplementary milk protein source for both preterm and term infants.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: The project is partly sponsored by Arla Food Ingredients, Viby, Denmark. The other authors have no conflicts of interest to declare.
ID: 381

TITLE: FENTANYL PRE-MEDICATION FOR LESS INVASIVE SURFACTANT ADMINISTRATION

AUTHORS: Dina Sava 1, Liam Willgress 1, Paul Clarke 1

AFFILIATIONS: Neonatal Intensive Care Unit, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK

CONTENT:

Less invasive surfactant administration (LISA) is being increasingly used as an alternative to endotracheal surfactant administration, however the optimal premedication dose and agent for LISA is unclear. We reviewed our unit’s experience with using routine fentanyl sedation for the LISA procedure in the NICU.

Prospective audit using a bespoke data collection proforma completed contemporaneously after each LISA procedure performed on our NICU between June 2018 and February 2019. Our unit guideline recommended a single dose of fentanyl 100 mcg/kg as the standard pre-medication regime given minimum 5 minutes before LISA, with atropine optional. We reviewed number of babies for whom a single fentanyl dose achieved successful premedication, and incidence of side effects associated with LISA.

Ten babies (5 on nasal high flow, 5 on nCPAP) received pre-medication for LISA at median postnatal age 5 (2-40) hours. Median (range) gestation was 32 (27-37) weeks and birth weight 1700 (775-3520) g. A single fentanyl 100 mcg/kg dose achieved good sedation before LISA in only 5 (50%) babies, though one required naloxone for prolonged apnoea; 4 babies required a second 100 mcg/kg dose before undergoing successful LISA, and LISA was abandoned in lieu of INSURE (Intubate-Surfactant-Extubate) in one due to poor sedation with the standard 100 mcg/kg dose. Overall LISA was deemed successful in 8 (80%) babies (1 abandoned; 1 catheter later presumed misplaced). No baby had fentanyl-induced chest rigidity, and none received or required atropine. Of the nine who had LISA, associated side effects were: bradycardia (<100/min) n=3, desaturation (SaO2 <80%) n=6, apnoea n=4, surfactant reflux n=2.

Fentanyl 100 mcg/kg achieved satisfactory pre-medication before LISA in only 50% of babies. This dose failed to adequately sedate a significant minority (40%), yet caused prolonged apnoea in one baby (10%). Fentanyl may not, therefore, be the ideal pre-medication for LISA. Randomised trials are required to determine the optimal drug and pre-medication regimen for LISA in preterm babies.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: N/A
ID: 385
TITLE: NEONATAL HYPOXIC-ISCHEMIC BRAIN INJURY AND HEART RATE VARIABILITY – POTENTIAL PITFALLS INVESTIGATED IN A PIGLET MODEL
AUTHORS: Mette Vestergård Pedersen 1; Ted Carl Kejlberg Andelius 1; Mads Andersen 1; Hannah Brogård 1; Nikolaj Bøgh 2; Camilla Omann 2; Kasper Jacobsen Kyng 1; Tine Brink Henriksen 1
AFFILIATIONS: 1 Department of Paediatrics, Aarhus University Hospital, Aarhus, Denmark
2 Department of Cardiothoracic and Vascular Surgery, Aarhus University Hospital, Aarhus, Denmark

CONTENT:

Heart rate variability (HRV) has been suggested as a novel biomarker for diagnosis and prognosis in neonatal hypoxic-ischemic encephalopathy (HIE). However, several factors may influence HRV measures and obscure the prognostic value of point-of-care HRV. Therefore, we aimed to investigate the influence of seizures and cardiac arrhythmias on HRV measures in normothermic piglets subjected to a hypoxic-ischemic (HI) insult. We also aimed to investigate the influence of temperature changes on HRV in piglets without HI subjected to hypothermia.

To investigate the effect of seizures and cardiac arrhythmias, six newborn piglets were anaesthetized and subjected to a standardized global HI insult. Seizures and cardiac arrhythmias were identified from aEEG and ECG which was recorded continuously prior to, during, and for 24 hours after HI. HRV measures were calculated prior to, during, and after seizures and cardiac arrhythmias. To investigate the effect of temperature changes, four newborn piglets without HI were anaesthetized and subjected to active whole-body cooling. Two piglets went from normothermia to hypothermia (33.5-34.0 C) and two piglets went from hypothermia to normothermia. HRV measures were calculated during the temperature changes. All HRV measures were calculated in 5-minute epochs using Kubios Premium®.

This abstract includes preliminary results from three of the six piglets subjected to HI: Three seizure events and three cardiac arrhythmias were detected and analyzed (Figure 1A). During seizures standard deviation of normal-to-normal interval (SDNN) increased during one event. Power in low frequency domain (LF) decreased during one event but increased in another. Power in high frequency domain (HF) increased during one event. During all cardiac arrhythmia events SDNN, LF, and HF increased. Final results from six piglets subjected to HI will be presented at the conference.

Preliminary results from two piglets without HI subjected to hypothermia: SDNN increased during initiation of hypothermia in one piglet and during rewarming in another piglet (Figure 1B). Final results from four piglets without HI subjected to hypothermia will be presented at the conference.

Our preliminary results show that HRV is affected by cardiac arrhythmia and might be affected by seizures. This underlines the importance of scrutinizing the ECG and EEG prior to the analyses of HRV measures. Temperature changes might also influence HRV, which may hamper the use of HRV in neonates with temperature instability or changes e.g. during cooling or re-warming.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 387

TITLE: Hear Me! Permanent Childhood Hearing Impairment (PCHI) In Hypoxic Ischemic Encephalopathy (HIE)- Single Centre 9 Year Cohort Study

AUTHORS: Dr. Ebtehal Hamed, Paediatric Registrar ST4
Co authors:
Dr Nazakat Merchant- Consultant Neonatologist
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AFFILIATIONS: Department of Neonatology, Watford General Hospital, West Hertfordshire Hospitals NHS Trust, UK

CONTENT:

HIE and PCHI both present a significant clinical burden with high morbidity and mortality. PCHI in HIE increases the risk for further developmental delay. Evidence through metanalysis of moderate-severe HIE showed a 5.4% incidence of PCHI with no difference in the cooled and uncooled groups (Edwards 2010). There is currently no published data on mild HIE. Also the specificity and sensitivity of newborn hearing screen test is not known in infants with HIE. An unexpectedly high proportion of PCHI was noted in our HIE follow up.

Aim of our study was to establish the incidence of PCHI and to investigate the contributing risk factors that may increase risk of acquiring PCHI in infants with HIE.

Single centre retrospective cohort study of term & near term infants with HIE over 9 years (2010-18). Deaths & babies with temporary hearing impairment due to middle ear effusion were excluded. Detailed demographic & clinical data were collated. Babies who failed the Newborn Hearing Screening Programme (NHSP) had diagnostic ABR. Age appropriate behavioural audiological follow up testing was done as per British Society of Audiology. Aetiological investigations were offered for SNHL as per British Association of Audiovestibular Medicine guidelines. Results were analysed using STATA 12 and Microsoft excel.

Incidence of PCHI 8.8% (8/91) in our cohort of HIE infants was significantly higher than previously reported. Between groups of HIE with or without hearing loss, there was no significant difference in birthweight, gestation, gender, delivery, Apgars-10 minutes, ventilation days, severity of HIE or aminoglycoside treatment. Babies with PPHN, lower Apgars at 1 & 5 minutes or loop diuretics treatment were significantly more likely to have PCHI.

Amongst 8 PCHI babies, 6 had bilateral sensori-neural hearing loss (SNHL), 1 had unilateral SNHL and one had unilateral auditory neuropathy. Mean degree of hearing loss was 51.4 (±SD 14.4) dBHL. Aetiological investigations for SNHL were normal MRI IAMS, negative for CMV in all and negative genetics (Connexin 26 & A1555G mutation) in bilateral SNHL. NHSP detected all infants with hearing loss in HIE with 100% sensitivity and 97.59% specificity.

Our study reported detailed methodology for hearing loss in HIE. It raises the awareness that infants with PPHN & diuretic medication are vulnerable to PCHI. We hypothesise that acute perinatal hypoxia even with early recovery may be associated with hearing loss. NHSP has high sensitivity and specificity which is reassuring. Further research is needed with a larger cohort to look at these risk factors and long-term neurodevelopmental outcome.

IMAGE / TAB:
https://www.eiseverywhere.com/eeselectv3/v3/events/351149/submission/files/download?fileID=6136728b0c40bbb645dd3fb867c07529-MjAxOS0wNSM1Y2UyNjY2YzQ2OGFj

IMAGE / TAB CAPTION:

COI: None declared
ID: 388

TITLE: NEONATAL ENCEPHALOPATHY: ALTERED HYPOXIA-INDUCIBLE FACTOR (HIF1) AND HYPOXIC RESPONSIVE CYTOKINES FROM NEONATES TO EARLY CHILDHOOD.

AUTHORS: Kelly L1,2,5, Zareen Z1, O’Dea M1,2,5,7, T. Strickland, 1-2 D. Sweetman3, D. McDonald5, E.J. Molloy1-7

AFFILIATIONS: 1Discipline of Paediatrics, Trinity College Dublin; 2Trinity Translational Medicine Institute, St James Hospital; 3Neonatology, National Maternity Hospital; 4UCD School of Medicine and Medical Sciences, University College Dublin; 5Tallaght University Hospital; 6Neonatology, Our Lady’s Children’s Hospital, Crumlin; 7Coombe Women’s and Infant’s University Hospital, Dublin, Ireland.

CONTENT:

Neonatal Encephalopathy (NE) is associated with hypoxia-ischaemia and induction of inflammation. Persistent inflammation is associated with brain injury in this cohort. HIF-1α (hypoxia-inducible factor-1 alpha) mediates the responses of mammalian cells to hypoxia/ischemia by inducing the expression of adaptive gene products (e.g., vascular endothelial growth factor (VEGF) and erythropoietin (EPO). The aim of this study was to evaluate associations between VEGF and EPO and HIF 1α in NE at birth and early childhood.

Patients were recruited from The Coombe Women and Infants University Hospital, Dublin, The National Maternity Hospital, Dublin and Our Lady’s Children’s Hospital, Crumlin.

Ethical approval was granted and parental consent was obtained. We included infants with NE who had therapeutic hypothermia as well as a cohort of children post-NE at school-age and a group of children with non-NE cerebral palsy. All groups were compared to age-matched controls.

Samples were treated with lipopolysaccharide (LPS) (1ng/ml) and compared with vehicle controls. Whole blood RNA was isolated, cDNA was synthesized and analysed by quantitative PCR for expression of HIF1α and multiplex cytokine analysis for VEGF and EPO.

Statistical analysis was performed using ANOVA and t-test with Graphpad Prism Version 7.0.

HIF-1α was increased in children with non-NE CP (p<0.04) versus controls and there were non-significant increases in neonatal NE and childhood NE versus controls. Higher EPO was seen in neonates with NE compared to age-matched controls as well as decreased VEGF. At school-age, children post NE were significantly LPS hyporesponsive (p<0.05) compared to controls with similar VEGF and EPO responses.

Alterations in the HIF 1α pathway are found in children with NE at birth and later in childhood. Persistent changes in systemic inflammation are found in childhood in children who had NE and also those with non-NE CP. This could present a possible future therapy with propyl hydroxylases as in other disorders related to the HIF pathway.

IMAGE / TAB:

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COI: None declared
ID: 389

TITLE: ACOUSTIC ANALYSIS OF PRETERM AND TERM NEONATAL BREATH SOUNDS USING DIGITAL STETHOSCOPE TECHNOLOGY

AUTHORS: Lindsay Zhou 1, 2
Ashwin Ramanathan 2
Pramodkumar Pharande 1
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2. Department of Paediatrics, Monash University, Melbourne, Australia
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CONTENT:

Digital stethoscope (DS) technology has been used to assess normal and abnormal breath sounds in children (Ref 1). However, this technology has not been used to characteristics breath sounds of preterm or full-term neonates. This study aims to use DS to record, characterise and compare breath sounds of preterm and full-term newborns using computerised spectral analysis.


A commercially available DS was used to record breath sounds for 1 minute of preterm and term babies at a tertiary neonatal unit in Melbourne, Australia. Babies were self-ventilating in air, 24-48 hours old; those with respiratory distress or known lung anomalies were excluded. Recordings were extracted, filtered, and computerised spectral analysis performed using Fourier transform. Spectral characteristics analysed included avg. frequency, spectrum slope (SL), power at different frequency bands, and mel-frequency cepstral coefficients (MFCCs). Frequency, SL and power relate to the distribution of sound power in the frequency domain; MFCCs represent smoothed log magnitude spectra in the nonlinear mel-scale of frequency, and are known to depend on chest shape and resonance of breath sounds.

Fifty self-ventilating term and preterm infants were recruited and recordings made after informed consent. 3 recordings were excluded due to poor sound quality. After exclusions, there were 23 babies in the term group (mean gestational age 39 weeks, mean birth weight 3495g), and 24 babies in the preterm group (mean gestational age 32 weeks, mean birth weight 1801g). Average frequency (median, IQR) was 231.85 (178.52-311.53) Hz in the term group, and 247.41 (207.45-350.06) Hz in the preterm group (p=0.23). There were significant differences in MFCCs (mean, sd) between the term and preterm groups – MFCC2 3.02 (0.3) vs 2.73 (0.21) (p<0.001), MFCC3 0.77(0.11) vs 0.56(0.18) (p<0.001), MFCC5 0.30(0.07) vs 0.22 (0.07) (p=0.002), and MFCC6 0.22(0.05) vs 0.26(0.06) (p=0.028). Differences between SL and power between the two groups were not statistically significant.

Recording breath sounds using DS is quick, feasible and showed statistically significant differences in the MFCC values comparing self-ventilating preterm and term infants. This may relate to inherent chest wall and lung resonance characteristics of preterm babies. Further study using this novel method is required to characterise breath sounds of preterm babies over time, those on respiratory support, and those with clinical disease.

IMAGE / TAB:

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COI: There are no conflicts of interest to declare.
TITLE: EFFECTS OF LESS INVASIVE SURFACTANT ADMINISTRATION (LISA) ON NICU COURSE IN THE FIRST WEEK OF LIFE

AUTHORS: Bugter IAL 1; Janssen LCE 2; Dieleman JP 3; Andriessen P 1; Niemarkt HJ 1

AFFILIATIONS: 1 Department of Neonatology, Máxima Medical Centre, Veldhoven, The Netherlands
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CONTENT:

Less invasive surfactant administration (LISA) has been established to reduce the need of intubation and mechanical ventilation and to improve survival rates without bronchopulmonary dysplasia in preterm infants with respiratory distress syndrome (RDS). As in many of these infants mechanical ventilation is avoided during the first days of life, we hypothesize other aspects of NICU care changed as well. The objective of this study was to quantitatively investigate whether NICU care has changed since implementation of LISA, with regard to diagnostic procedures and treatment in the first week of life.

We performed a single centre, historical cohort study in our level III NICU. Infants born at <32 weeks of gestation who received surfactant by LISA (time period: June 2014 - December 2017) were compared to infants who received surfactant after intubation (time period: January 2012 - June 2014). Infants who were intubated in the delivery room because of clinical condition (apnoea, sepsis) were excluded. Outcomes were divided into two groups: diagnostic procedures and treatment in the first week of life. Protocols on blood transfusion, antibiotic treatment and feeding did not change between both periods. Data was collected from electronic patient files and compared by univariate analysis through Students T-test, Mann Whitney-U test, Pearson Chi-Square test or Linear by Linear Association.

LISA and control cohort consisted of n=169 and n=162 infants, respectively. Baseline characteristics did not differ between the groups (Table 1). Compared to controls, LISA patients received a higher total surfactant dose (208 vs.161 mg/kg; p<0.001) and needed multiple gifts more frequently (32.5% vs. 22.8%; p=0.049), but less mechanical ventilation (35.5% vs. 77.8%; p<0.001). They received less X-rays (1.0 vs. 3.0, p<0.001) and blood gas examinations (3.0 vs. 6.0, p<0.001) in the first week. LISA patients received less inotropic drugs (9.5% vs. 19.1%; p=0.012), blood transfusions (24.9% vs. 42.6%, p=0.001), umbilical catheters (37.9% vs. 52.5%, p=0.008) and had shorter duration of antibiotic therapy (3.0 vs. 4.0 days, p<0.001). Moreover, enteral feeding was advanced faster (120 vs. 100 ml/kg/d; p=0.024) and birth weight was regained more often (55.9% vs. 32.8%, p<0.001) at day seven.

Our findings show that the implementation of LISA has changed NICU course of preterm infants with RDS in the first week of life. LISA patients underwent fewer diagnostic and therapeutic procedures, which are associated with a risk of adverse outcomes. Our results underscore the beneficial effect of LISA in preterm infants.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileId=da6e58fc071af86027030132537d99644-MjAxOS0wNSM1Y2UyNjY2YzQ4MmJk

IMAGE / TAB CAPTION: Table 1 Baseline characteristics of the study population and diagnostic and therapeutic procedures in the first week of LISA group compared to control group. * shows significance (p<0.05). GA = gestational age. MV = mechanical ventilation.

COI: No conflict of interest
TITLE: PENTOXIFYLLINE AS RESCUE THERAPY IN SEVERE NEONATAL SEPSIS: AN OBSERVATIONAL STUDY

AUTHORS: Serife Kurul 1; Rob Taal 1; Robert Flint1,2 ; Karel Allegaert 1; Irwin Reiss 1; Sinno Simons1.

AFFILIATIONS: 1 Department of Pediatrics, Division of Neonatology, Erasmus University Medical Center - Sophia Children's Hospital, Wytemaweg 80, 3015 CN, Rotterdam, The Netherlands
2 Department of Pharmacy, Erasmus University Medical Center, Rotterdam, The Netherlands.

CONTENT:

Neonatal sepsis is one of the main causes of death and morbidity in preterm neonates. Neonatal sepsis is associated with an excessive neonatal inflammatory response that is strongly correlated with mortality and morbidity. By modulating the hyper inflammatory response, pentoxifylline (PTX) is a high potential candidate for treatment in neonatal sepsis. PTX is not registered for this indication and is only used in a few neonatal intensive care units. Here we present our experience with pentoxifylline.

In this observational study we describe the use of intravenous PTX in the last year at our level III NICU. PTX was started as a last resort for critically ill neonates with sepsis as a 3-day course with 30 mg/kg/day infusion over 6 hours, according to local protocol. The Dutch Inspection of Health Care gave permission to administer PTX therapy next to antibiotic treatment in refractory sepsis in premature neonates.

PTX was started 14 times at our center, with one patient receiving PTX treatment twice (table 1). All patients had clinical symptoms of severe sepsis and associated inflammatory response, with exception of one case.

The sepsis-mortality rate was 50%. The patients who survived received PTX therapy for 3 days. PTX therapy was often started much later than antibiotic treatment. The median time between the onset of infection and the start of PTX therapy was 21.1 hours (2.4 - 94.6).

Tachycardia in one patient was speculated to be related to PTX. However, this could also have been context specific, considering that tachycardia is very common in sepsis. No other adverse events attributed to PTX administration were observed.

Our study indicates that PTX therapy may be effective and safe as an additional treatment for sepsis. To be effective PTX must probably be started as soon as possible and ideally concomitant with antibiotic treatment. If PTX therapy is delayed, the devastating effects of the hyper inflammatory response might be irreversible. This might have occurred in part of our population because PTX was used as a last resort in the majority of the patients.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1: Characteristics of the patients

COI: None declared
ID: 402

TITLE: PRENATAL ENDOTOXIN EXPOSURE ADVERSELY AFFECTS KIDNEY DEVELOPMENT IN PRETERM PIGS

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CONTENT:

Intrauterine bacterial infection predisposes to preterm birth and is associated with dysregulated development of several organs, including gut, lungs and brain. However, it is unclear if such neonatal organ complications result from immaturity alone, (e.g. reduced gestational age) or from prenatal insults (e.g. inflammation induced by chorioamnionitis, CA). Using preterm pigs as a model for preterm infants, we investigated plasma proteomic responses after preterm birth, with and without exposure to endotoxin. Plasma proteomic profiling was employed to search for unrecognized organ responses to prenatal inflammation, reflected by changes in the composition of plasma proteins.

Preterm pigs were exposed to intra-amniotic endotoxin (LPS, 1 mg/fetus, n=37) or saline (SAL, n=32) three days before preterm delivery by cesarean section at 90% gestation. Blood and organs were collected at birth and after five days of rearing in incubators. Mass spectrometry (MS)-based label-free proteomics was applied to indicate plasma parameters affected for each group at d 1 (n=26-28) and 5 (n=12). mRNA and protein levels of selected genes in tissue or plasma were validated by qPCR, ELISA and Western blot analyses.

Fetal endotoxin induced inflammation (higher amniotic fluid cytokines and immune cell infiltration), together with higher plasma creatinine levels at birth and urinary μ-albumin levels at d 5, indicating renal dysfunction. Plasma proteomics also revealed LPS effects on several proteins related to kidney function. Levels of leucine-rich alpha-2-glycoprotein 1 (LRG1) were increased and correlated with creatinine levels, while inhibitor of carbonic anhydrase (ICA) and angiotensin-converting enzyme (ACE) levels decreased. In kidney tissue, the density of MPO-positive cells and expression of genes related to injury and inflammation (KIM-1, NGLA, HIF1A, CASP3, TLR2, TLR4, IL8, LTF, S100A9, LYZ, IFNG, TBET) were increased at birth. MPO cell density and TLR2/TLR4 expression remained elevated until day 5.

Prenatal inflammation after endotoxin exposure induces kidney injury in preterm pigs. Immature epithelial barriers (e.g. lung, gut, skin) may explain that intra-amniotic endotoxin exposure induces both local and systemic (e.g. kidney) effects. Short-term prenatal infections may contribute to acute kidney injury (AKI) at preterm birth and LRG1 may be an early biomarker of AKI in preterm infants.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 406

TITLE: PLENARY AUDITING OF RECORDINGS OF NEONATAL STABILIZATION - LESSONS LEARNED

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CONTENT:

Recording of neonatal stabilization including video and physiological parameters was implemented at the Neonatal Intensive Care Unit (NICU) of the Leiden University Medical Center. To improve the quality of care, recordings are reviewed during weekly plenary audits since 2014. Audits take place after morning handover (lasting ±20 min) and are chaired by a coordinator not involved in hands-on care. During these audits, provided care is reviewed, discussing mask technique, protocols and decision alternatives. Concluding the audit, all lessons learned are captured. The aim of this study is to provide insight in how plenary audits can contribute to improvements in the quality of care.

This is a longitudinal observational study. We analysed all notes made during audits and minutes sent out after audits by categorizing and counting all lessons learned that were captured.

From February 2018 until February 2019, 40 plenary audits were conducted. 22 (20-25) NICU staff members were present, with consultants being represented the most, and nurses being underrepresented. During these audits, a total of 131 lessons learned were captured. 38% of all lessons were applicable to the medical staff, 4% to the nursing staff, 40% to both medical and nursing staff, 8% to obstetrics, and 9% to others. Most lessons learned were connected to equipment (16%; e.g. correct order of starting up devices), trial protocols (14%; e.g. correct order of trial procedures), decision alternatives (14%; e.g. how to act in case of an obstructive respiratory pattern), and physiology of neonatal transition (9%; e.g. larynx function). As a direct consequence of these audits, NICU staff members three times agreed that the local protocol for neonatal stabilization should be adapted.

During plenary audits conducted at our NICU, many lessons learned could be captured, especially lessons connected to equipment and trial protocols. Frequent audits of neonatal stabilization allow staff members to recognize and address deficits in knowledge or skills, thus improving the quality of care they provide. Furthermore, alternative approaches can be plenary discussed, allowing the protocol for neonatal stabilization to be improved.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared.
Numerous clinical studies have aimed at finding a strategy to reduce the pain newborn infants are subjected to by their medical conditions and also by medical and caring procedures. Little is however known about whether the outcome measures in these trials are valid for the specific type of pain or group of infants included in the studies. There are today over 40 published scales, consisting of behavioral or physiological signals or a combination of both. The aim of this study was to evaluate the reporting of pain scales assessments that were most commonly used in all the published trials examining interventions related to neonatal pain.

A systematic and broad search up to January 2019 was performed in Embase, PubMed, PsycInfo, Cinahl, Cochrane Library, Scopus and Luxid. Randomized and quasi-randomized clinical trials on neonatal pain were included. Title and abstract screening followed by full text screening were performed by two independent researchers using an online tool for the preparation of systematic reviews (Covidence). Disagreements were resolved by a third researcher or in discussions within the group, as recommended in the Cochrane handbook. Data extraction and quality assessment were also performed by two researchers independently.

The systematic search retrieved 3715 scientific articles. Following screening, 342 studies with a total of 16210 infants were included, reporting data from the use of at least one neonatal pain assessment scale. Ninety per cent of the studies concerned procedural pain where the most frequently used pain scales were PIPP or PIPP-R (43%), followed by NIPS (17%). For ongoing or post-operative pain there was a more unclear pattern with COMFORT (24%) and NFCS (10%) as the most reported. We observed a wide variation of pain scales (Fig 1) and found numerous studies where pain scales were used that were not validated for the studied population or type of pain. In 11 papers self-constructed study-specific scales were used. The most frequent sources of procedural pain were heel lance (28% of the studies) followed by venipuncture (10%) and ROP-screening (5%).

This is the first scoping review reporting systematically how neonatal pain scales are used in clinical trials. There are a few validated pain assessment scales used in most clinical studies. It is crucial to choose an appropriate scale, validated for the type of pain and population of infants included in the study. The inappropriate use of pain scales raises serious concerns on ethical conduct of research and waste of resources.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Fig 1. Pain scales reported in the 342 included studies. Example of “other” are different sedation scales and neurological assessment scales.

**COI:** None declared
ID: 410

TITLE: FIRST HOUR OF CARE, IMPLICATIONS FOR SHORT AND LONG TERM OUTCOMES IN PRETERM BABIES

AUTHORS: Dr Julia Arthur
Dr Doris Wari-Pepple

AFFILIATIONS: Luton and Dunstable University Hospital NHS Foundation Trust

CONTENT:

The first hour of care, “the golden hour” of neonatal life, adopted from adult trauma is a concept aimed at providing evidence based care within the first hour of post-natal life. It has been shown to improve neonatal outcomes. In 2017, Health Education East of England (EoE), United Kingdom, implemented standards with emphasis on antenatal management, thermoregulation, respiratory and fluid management, medication and ongoing care. The Neonatal Intensive Care Unit in Luton and Dunstable hospital, a tertiary level Unit in the EoE implemented these as our standard of care. The aim of this study was to examine the first hour of care management and implications for outcomes in preterm babies.

We carried out a single centre observational study looking at inborn preterm babies less than 35 weeks gestation admitted to our neonatal unit between 1st November 2018 and 28th February 2019. Data was collected prospectively from the first hour of care documentation, Badger net, drug charts, observation charts and clinical notes up till discharge home or from discharge letters if the baby was repatriated back to local hospital before 36 week corrected age.

Data studied included antenatal steroids given, history of Prolonged rupture of membranes (PROM) baby’s temperature in the delivery unit, admission temperature on the neonatal unit, time of first intubation, need for rescue surfactant, initial blood sugar level, time to establish full feeds, oxygen requirement at 36 weeks corrected age.

50 babies met criteria for the study. 1 died before 36 weeks corrected gestation. Average gestational age was 29+6 weeks (range 23+3 - 34+6 weeks). 34% of babies had bronchopulmonary dysplasia (BPD) at 36 weeks corrected age. Out of these, 94% received a complete antenatal steroid course, 41% recorded admission temperatures out of normal range (36.6 - 37.6), history of PROM in 58%, evidence of chorioamnionitis on placenta histology in 47%, 94% were intubated within the first hour and received surfactant, 58% required rescue Surfactant after 12 hours. 64% had initial hypoglycaemia (range 0.2-2.4). All initial blood cultures were negative, 29% had one episode of blood culture positive sepsis, none had confirmed Necrotising Enterocolitis, 17.6% had grade 3 -4 IVH and 47% received medical treatment for patent ductus arteriosus (PDA). These babies achieved full feeds on average of 17.5 days.

This study emphasises optimal care in the golden hour. Pre term babies that developed BPD had higher incidence of abnormal admission temperatures, hypoglycaemia, risk for sepsis, delay in achieving full feeds and PDA treatment. All had admission temperature recorded and 94% received antenatal steroids. Following on from this study quality improvement projects will focus on improving the golden hour and ongoing management in the neonatal unit.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: No conflict of interest
ABSTRACT BOOK
POSTER WALK

ID: 415
TITLE: LASER TREATMENT OF RETINOPATHY OF PREMATURITY IN MÁXIMA MEDICAL CENTER: A RETROSPECTIVE STUDY
AUTHORS: CHEGW Mesman 1,2; FT Kerkhoff 3; P van Beek 1; S de Geus 3; JP Dieleman 4; D van de Ven 5; HJ Niemarkt 1; P Andriessen 1
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CONTENT:

Retinopathy of prematurity (ROP) is the primary cause of visual impairment and childhood blindness. However, the incidence of ROP in each individual neonatal intensive care unit (NICU) is relatively low and the specific ROP laser treatment experience among ophthalmologists is limited. Therefore, in 2006, Máxima Medical Center has started a national ROP treatment program for early ROP treatment, resulting in referral of patients from other NICUs and general hospitals to MMC for laser treatment. This study aimed to describe the population and treatment characteristics and outcome in premature infants with ROP who underwent laser treatment in MMC within the current treatment program.

In this retrospective study, conducted between 2006 and 2018, all MMC inborn and referred outborn patients with ROP laser indication who underwent laser treatment were included. We evaluated several aspects, including neonatal characteristics, anesthesiological treatment and ophthalmological outcome. Therefore, de-identified data were abstracted from electronic medical records and surgery reports. The severity of ROP, the affected zone of the retina and signs of vasoproliferation define laser indication according to criteria based on the Early Treatment ROP (ETROP) study. The primary outcome measure was the prevention of retinal detachment, examined by using ophthalmoscopy around ten days after laser treatment. The results are given in median [25th-75th percentile] or percentages.

142 patients (gestational age 25.7 [24.8-26.7] weeks; birth weight 748 [650-876] gram) were included of whom 77% were referred from other NICUs. Postnatal age and postmenstrual age at the time of laser treatment were respectively 80 [69-95] days and 37.7 [36.1-39.3] weeks. The majority of the patients was supported by any kind of (non-)invasive respiratory support (70%) or received supplemental oxygen (52%). 84% of the patients were intubated before laser treatment of whom 66% was extubated postoperatively in the operation room. The duration of the laser treatment was 42 [33-55] minutes. In total 270 eyes were diagnosed with laser indication according to the ETROP criteria. The ETROP laser indications that occurred most were ‘Prethreshold Type 1’ (68.3%) and ‘Threshold’ (23.9%). In 97.4% (95%CI: 94.7-98.7) of the eyes, retinal detachment was prevented using laser treatment (figure 1).

Máxima Medical Center, as one of the ten Dutch NICUS, has become a national expertise center for laser treatment of ROP in an extremely vulnerable population. The national ROP treatment program is very successful since only 2.6% (95%CI: 1.3-5.3) of the eyes required additional treatment after performing laser treatment. This is considerably less than the success rate mentioned in the ETROP-study (9.1%).

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1: Ophthalmological results of n=270 eyes, concerning the overall success rate of laser treatment according to diagnosis, in which the specific diagnosis refers to the laser indication according to criteria based on the Early Treatment ROP (ETROP)

COI: None declared.
ID: 416

TITLE: Educational achievements of children who underwent neonatal cardiac surgery for cyanotic congenital heart disease

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CONTENT:

Patients with congenital heart disease (CHD) are at increased risk for neurodevelopmental delays, such as deficits in motor function, cognition and language. These deficits may impair educational achievements. Especially children with complex CHDs were found to be at risk for possible neurodevelopmental deficits. Therefore, the educational achievement of children diagnosed with univentricular heart physiology (UVHP) or transposition of the great arteries (TGA) are of special interest. These primary cyanotic CHDs require cardiac surgery during the neonatal period. The aim of our present study was to evaluate the academic performance and graduation of this specific patient cohort.

Data of CHD patients registered with the National Register for Congenital Heart Defects (NRCHD) in Germany was analyzed for this exploratory study. Information pertaining to the educational achievements were ascertained with an online survey performed among the NRCHD patient cohort in 2017. For this study, a subgroup analysis among patients diagnosed with TGA (n=173; 36.3%) and UVHP (n=304; 63.7%) was conducted. Patients born between 1992 and 2011 were included. The primary focus of the survey was to assess data regarding their school careers and graduation.

Median age of the total sample was 13 years (range 5-25) and 1/3 of participants were female (same distribution in the subgroups). A noteworthy number of patients had been diagnosed with behavioral or learning disorders and received early supportive therapy or remedial teaching before and during their school careers. Median age of the whole patient cohort at school enrollment was 6 years (range 5-8). The large majority of study participants were enrolled at a normal elementary school (77.1%; German general population: 93.5%). Half of the study group (45.8%; German general population: 53%) graduated from an academically higher ranked secondary school form (≥ISCED level 3). We could not detect a significant difference between CHD subgroups regarding achievement of a high or low ISCED level. Only patients with UVHP (8.0%) reported not graduating school.

The majority of patients undergoing neonatal cardiac surgery had average school careers. These results are of great importance to CHD patients, affected families and treating physicians. However, study participants were still confronted with academic difficulties and frequently required additional support. This emphasizes the need for long-term follow-up examinations and regular developmental assessments to identify at risk patients.

IMAGE / TAB:
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COI: Constanze Pfitzer will receive a travel grant for the 3rd Congress of joint European Neonatal Societies in Maastricht by the company Chiesi.
CONGENITAL HEART DEFECTS AND NEURODEVELOPMENTAL FOLLOW-UP

AUTHORS: Mette Marie Baunsgaard 1, Mette Høj Lauridsen 1,2, Charlotte K Gilberg 3, Dorthe B Wibroe 3, Trine Haugsted 3, John R Østergaard 1,2, Vibeke E Hjortdal 1,4

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CONTENT:

Children with congenital heart disease (CHD) have previously been shown to be at an increased risk of impaired cognitive development from as early as infancy. We have followed a group of children born with and without a CHD from early pregnancy. Our aim in the present study, was to assess their birth biometrics and their cognitive development at the age of 18 months. This was done using the The Bayley Scales of Infant and Toddler Development-Third Edition (Bayley-III) and the ages and stages questionnaires third edition (ASQ-3). We hypothesised that the children with a CHD would have significantly lower developmental scores than the children without a CHD.

Recruitment of women expecting fetuses with and without heart defects took place at Aarhus University Hospital between 2014 and 2016. We performed Magnetic resonance imaging of the fetuses twice during pregnancy. In the present study we present follow-up of 13 children with- and 27 children without a CHD. At the average age of 18 months a physiotherapist and an occupational therapist performed the blinded Bayley-III assessment. The Bayley scores were converted to percentiles. At the same age their parents completed the ASQ-3 according to age (ASQ-3, 18 months) as well as the questionnaires for a 6-month older child (ASQ-3, 24 months). We calculated the corresponding z-scores. We used the Pearson chi2-, z- and t-test to compare the results between those with and those without a CHD.

Children with CHDs were born with significantly smaller head circumferences (P = 0.025). Also, they achieved significantly lower scores in the ASQ-3, 24 months communication (P =0.0498) and gross motor (P = 0.046) categories. There were no significant performance differences between the two groups in the Bayley-III assessment.

Children with CHDs show significantly lower scores in ASQ-3, 24 months communication and gross motor categories compared with their age equivalent peers. This may be indicative of impaired cognitive development; next follow-up will be at 36 months of age.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: The authors have no conflicts of interest
ID: 437

TITLE: ACHIEVING EARLY ENTERAL FEEDING WITHIN 8 HOURS OF BIRTH: A SERIES OF QUALITY IMPROVEMENT INITIATIVES OVER 5 YEARS IN A TERTIARY NICU

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CONTENT:

The importance of providing early enteral feeds to premature babies is increasingly evident. Offering early breast milk contributes to gut maturation and feed tolerance, and may be protective against necrotising enterocolitis. There is evidence that delaying feeds, conversely, can be associated with prolonged hospital stays and an increased incidence of late onset sepsis. There are many drivers for a delay in commencing feeds; often there is concern around perinatal events – and the very practical consideration of needing mother to express milk to enable giving it. As a unit there has been a long standing proactive approach to feeding; despite this we were failing to achieve feeding within the first few hours of life. Over the last few years, we have put in place several measures in order to facilitate early delivery of milk to our most vulnerable patients.

A multi-faceted quality improvement project was undertaken within our medical tertiary NICU. This has been in the form of several coexisting PDSA cycles surrounding the introduction of a new feeding guideline in 2016. The guideline risk stratifies infants under 36 weeks gestation, all were to receive enteral feeding on the first day of life and optimistically within 6 hours of birth. This guideline represented a significant change in practice by prioritising enteral nutrition even in the most high risk infants. Enhancing breastfeeding and midwifery support, staff education around preterm nutrition; and the attitude to the use of donor expressed milk were important. Additionally a collaborative effort with maternity (Project Joey) to enhance golden hour care was completed.

Amongst our preterms (<27 weeks); the number of babies recorded as NBM on the first day has reduced from 58% in 2012, to 100% eligible babies receiving an enteral feed on day 1. (Two were excluded for surgical conditions). All babies received either maternal or donor expressed milk. The average time to first enteral feed in our unit is now 7 hours, reduced from 18 hours in 2012 (range 2 – 19 hours). 89% of eligible preterms in 2018 (40/44) received MEBM during their stay. 66% received donor milk as their first feed, and 93% received DEBM at least once during their admission. Overall early feeding improved for all preterm infants (<36 weeks) with the number of babies receiving any breast milk (maternal and/or donor) increasing from 21% to 50%. These results demonstrate significant improvement in the practice of early feeding; though with increasing reliance on donor breast milk.

Over time we have made significant improvements to early feeding in premature babies admitted to our unit. This has been a result of many interventions working in parallel. The most important factor in the success of this project has been evolving staff understanding and support of early enteral feeding through positive leadership and reinforcement at all levels. Our next initiative will be to improve volume of maternal expressed milk over donor

IMAGE / TAB:
IMAGE / TAB CAPTION:

COI: None declared
ID: 438  
TITLE: EVALUATION OF SUCCESS, TECHNICAL QUALITY AND VITAL PARAMETERS IN LESS INVASIVE SURFACTANT ADMINISTRATION (LISA) WITHOUT SEDATIVE PREMEDICATION  
AUTHORS: Authors: Ellen de Kort 1,2; Suzanne Kusters 3; Hendrik Niemar 1; Carola van Pul 3; Irwin Reiss 2; Sinno Simons 2; Peter Andriessen 1  
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CONTENT:  
Less Invasive Surfactant Administration (LISA) is a technique in which surfactant is administered via a thin catheter in spontaneously breathing infants on nasal continuous positive airway pressure. As in endotracheal intubation, LISA requires laryngoscopy, which is known to be a very distressing and potentially painful procedure and is frequently complicated by adverse physiological events. However, in contrast to endotracheal intubation, LISA is frequently performed without sedative premedication. Aim of this study was to assess success and technical quality of the procedure and the patient response to LISA without sedative premedication.  
Prospective observational study in 86 neonates < 32 weeks’ gestation treated with LISA according to a standardized protocol including atropine but without sedative premedication. Only the first LISA per patient was included. Data collection included patient characteristics, number of attempts needed for a successful procedure, and quality of technical conditions determined with the Viby-Mogensen intubation score. In 37 neonates, heart rate (HR) and oxygen saturation (SpO2) data from 20 minutes before until 30 minutes after start of LISA were collected. Changes in HR and SpO2 compared to baseline, and differences in HR and SpO2 between patients with good versus inadequate technical quality and between success versus failure of the first attempt were calculated.  
LISA was successful at the first attempt in 45 patients (52%). Success rates were dependent on caregiver: 29% for residents, 32% for neonatal nurse specialists, 30% for fellows and 72% for neonatologists (p = 0.003). Quality of technical conditions was available for 76 LISAs and was good in 45 procedures (59%). In successful first attempts, good technical quality was significantly more frequent compared to failed first attempts (76% versus 35%, p = 0.001). HR significantly increased compared to baseline but SpO2 did not change significantly (figure 1). Bradycardia < 80/min did not occur and desaturations < 80% occurred in 20 patients (54%). There were no significant differences in HR and SpO2 for patients with good versus unacceptable technical quality and for patients with success versus failure of the first attempt.  
LISA without sedative premedication led to a low procedural success rate, frequent inadequate technical quality and a high incidence of oxygen desaturations. To improve patient comfort, the use of sedative premedication should be strongly considered. Since maintaining spontaneous breathing is the keystone in LISA, drugs with minimal effect on the respiratory drive should be evaluated. To prevent bradycardia, the use of atropine is recommended.

IMAGE / TAB:  
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IMAGE / TAB CAPTION:
COI: None declared
TITLE: IMPROVING HYPOTHERMIA IN PRETERM INFANTS AT ADMISSION TO A TERTIARY NEONATAL UNIT – A QUALITY IMPROVEMENT PROJECT

AUTHORS: Caroline Woolley 1; Pinki Surana 2; Laura Gilbert 3; Rachel OSullivan 4; Gurpreet Sunsoay 5; Danika Simkins 6

AFFILIATIONS: Neonatal Intensive Care Unit, Heartlands Hospital, Birmingham, England

CONTENT:

Hypothermia in preterm infants is associated with increased morbidity and mortality. The National Neonatal Audit Programme (NNAP) recommends temperature between 36.5-37.5˚C at admission to the neonatal unit (NNU) for babies born at <32weeks gestation. Our tertiary NNU was a national outlier for the NNAP measure of appropriate temperature at admission for two consecutive years 2016 and 2017 with only 39% and 52% infants respectively having normothermia; whilst the national average being 65%.

A baseline retrospective audit was conducted on all hypothermic infants born <32 weeks between Apr17-Mar18 to ascertain areas that can be targeted to improve admission temperature. Incomplete documentation of thermal-control measures, variable theatre temperature, procedures in delivery-suite and transportation on resuscitaire rather than in transport incubator were the themes linked with hypothermia. A quality improvement (QI) initiative (Sep18) was implemented by a team of nurses and doctors. Staff awareness was raised about the importance of euthermia in preterm infants in NNU meetings and posters (Fig 1) highlighting good practice was displayed around NNU. A prospective audit was conducted between Dec18-Feb19 to evaluate compliance with above measures and improvement, if any.

21 babies included in the audit period, mean gestation of 28+5weeks (23– 31+3weeks) and birth-weight of 1150g (500g-1790g). All had temperature measured after admission and 62% were normothermic, 5(24%) were hypothermic and 3(14%) were hyperthermic. 18(86%) had their temperature measured in delivery suite. 16(76%) had transport incubator used and 15(72%) a transwarmer. Of the 5 hypothermic babies at admission, 3 were hypothermic in delivery-suite. 4 babies were hyperthermic before transfer. Of these, 3 remained hyperthermic at admission. All hyperthermic babies had transwarmers. Only 37% of babies born in theatre compared to 75% of babies born in delivery rooms were normothermic at admission. 4 of the 5 hypothermic babies were born in theatre (average theatre temperature 23˚C) . Births out of hour’s or at weekends and time to transfer to NNU did not influence the admission temperatures.

Following the QI, rates of normothermia at admission improved from 52% to 62%. QI highlighted importance of establishing normothermia before transfer to facilitate normothermia at admission and hence the importance of actively measuring the temperature at the earliest point during initial stabilisation and making adjustments accordingly. Monitoring theatre temperature closely will also be part of our continuous QI project.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Poster used for staff education

COI: None Declared
ID: 446

TITLE: PREVALENCE AND DIFFERENCES OF IDEAL CARDIOVASCULAR HEALTH IN URBAN AND RURAL AREAS OF TYROL – PRELIMINARY DATA FROM THE EVA-TYROL STUDY

AUTHORS: Christoph Hochmayr 1
Anna Schmid 2
Nina Gande 3
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CONTENT:

There is evidence that early adoption of a healthy lifestyle has positive effects on cardiovascular health (CVH) in adulthood. In order to measure and promote CVH in teenagers and young adults the American Heart Association developed the concept of the so-called health metrics including four health behaviours (non-smoking, ideal Body Mass Index (BMI), regular physical activity, favourable dietary patterns) and three health factors (total cholesterol, blood pressure and fasting blood glucose).

The aim of this study is to I) assess the prevalence of ideal CVH and II) compare the health metrics among teenagers according to their origin from the urban or rural area.

The Early Vascular Aging (EVA) study is a cross-sectional study conducted among 2102 pupils and apprentices in North and South Tyrol, aged between 14 and 19 years. The ideal health behaviours are defined as never smoked a cigarette, 4-5 points in a healthy diet score, a BMI below the 85. Percentile and more than 60 minutes of physical activity per day. With regard to the health factors, blood pressure values after 10 minutes at rest below the 90. Percentile, fasting blood glucose below 100mg/dl and cholesterol levels below <170 mg/dl were considered as ideal. The classification in urban and rural areas considers population density, infrastructural facilities, commuter integration and reachability of centres (defined by Statistik Austria).

2102 adolescents participated in the study (44% male, mean age 16.5 years). 29.4% of the participants were smokers, 7.8% reported a healthy diet and 42.6% had the ideal amount of daily activity. Ideal BMI was found in 78.1% and ideal systolic blood pressure in 68.1%. 66.7% had optimal cholesterol levels and 99.3% showed an ideal fasting blood glucose. For evaluating differences between urban or rural origin, data was available from 1728 teenagers. We found no significant differences for smoking status (p=0.27), dietary behaviour (p=0.78), fasting blood glucose (p=0.36), BMI (p=0.19) or blood pressure (p=0.32). Teenagers whose main place of residence is in the urban area showed a significant higher proportion of ideal physical activity (47.2% vs. 37.8%, p<0.01). Likewise there were more urban adolescents with ideal total cholesterol levels (69.5% vs. 64.5%, p=0.016).

With regard to smoking, healthy diet or ideal daily activity the examined adolescents showed a poor health behaviour. Apart from the differences shown for ideal physical activity and cholesterol levels the urban and rural areas do not
considerably differ in CVH. This might be due to the numerous sporting activities throughout Tyrol. To sum up, the necessity of further promotion of ideal CVH is indicated.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
EXCLUSIVE HUMAN MILK DIET IMPROVES OUTCOMES WHILE MAINTAINING GROWTH

A human milk diet is the gold standard for infants. Fortifiers are added for optimal nutrition, energy and protein requirements for appropriate growth of preterm infants. An exclusive human milk diet (EHMD) consists of mother’s own milk (MOM) or donor human milk (DHM) with human milk based fortifier (H2MF) and human based cream (Cr). An EHMD is better tolerated than a partial human milk diet with cow milk based fortifier (CMBF) for extremely low birthweight (ELBW) infants. An EHMD is shown to decrease the incidence of necrotizing enterocolitis (NEC) and sepsis, while improving feeding tolerance and earlier attainment of full feeds. Some centers that have adapted an EHMD have struggled with growth.

In a prospective chart review ELBW (≤1000 g) infants admitted to St. Joseph's Women’s Hospital’s NICU from October 2013 to November 2015 were fed either a partial human milk diet or EHMD. For the first 7 months of study period, infants received a partial human milk diet with MOM or DHM fortified with CMBF. For a 5 month period infants received a partial EHMD, with some feeds including H2MF and hydrolyzed protein concentrated liquid CMBF. For the final 12 months infants received an EHMD with H2MF and Cr. Data collected included days of MOM, total parenteral nutrition (TPN), and central lines, number of feeds held, growth parameters, and NEC. Clinical characteristics and outcomes were compared for those receiving a partial human milk diet and an EHMD.

A total of 91 ELBW infants met criteria for inclusion. Demographic and clinical characteristics of the populations were similar; infants were of similar gestational age and birth weight. The mean birth weight in the overall population was 778 g. Those infants receiving an EHMD had a statistically significant increase in number of days on MOM, decreased number of days with feeds held, and decrease in both medical and surgical NEC. Infants who did not receive an EHMD had significantly higher odds of developing any NEC (p<0.0001). There was no statistical difference in the growth, as measured by weight gain, head circumference, and length. While the number of days with a central line and days on TPN did not reach statistical significance, there was a decrease of 6-7 days in the EHMD group, which may be clinically significant.

ELBW infants who received EHMD with early fortification had similar growth to those fed CMBF. There was a clinical decrease in line and TPN days that was not statistically significant. There was no change in length of time to full feeds. EHMD fed infants showed a significant decrease in NEC and surgical NEC. This supports the use of EHMD to improve clinical outcomes while maintaining adequate growth in ELBW infants.

COI: I have received honoraria from Prolacta Bioscience, after the period of this data collection.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1. Outcomes of Exclusive Human Milk Diet Compared to Partial Human Milk Diets
ID: 454

TITLE: THE EARLY SERUM BIOCHEMICAL MARKER FOR EVALUATING THE RISK OF METABOLIC BONE DISEASE IN EXTREMELY LOW BIRTH WEIGHT INFANTS

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CONTENT:

Parenteral nutrition (PN) is important source for nutrition in preterm infants who could not tolerate enteral feeding but the precipitations of solution limited the intake of calcium and phosphorus. Those who had prolonged PN should be aware of the development of metabolic bone disease. The purpose of this study was to explore the early marker of metabolic bone disease by analyzing the serial change of serum biochemical in extremely low birth weight (ELBW).

We retrospectively collected data on ELBW delivered in our hospital. Inclusion criteria were: premature infants <30 weeks gestation, BW 14 days) and control group (Nil per os <14 days). The intake of calcium and phosphate in the first 14 days and serum level of calcium, phosphorus and alkaline phosphate at day 7,14,28,42,56 and 112 were compared. Osteopenia is diagnosed by radiographic changes.

Totally 95 preterm infants are included, and 35 of them was in the group of prolonged PN. All infants do not have recommended intake of calcium and phosphate in the first 14 days. Compared to control group, the infants in the prolonged PN group have lower calcium intake since day 11, and lower phosphate intake since day 6. Significant lower serum phosphorus level (mg/dL) was noted in the prolonged PN group on day 14 (3.65±1.2 mg/dL vs 4.67±1.45, p<0.01), 28 (3.21±0.95 vs 5.83±1.18, p<0.001), 42 (3.94±1.1 vs 6.22±0.78, p<0.001) and 56 (5.06±1.16 vs 6.11±0.78, p<0.01). Higher levels of alkaline phosphatase(U/L) was found since two months old in the group of prolonged PN(458±189 vs 335±111, p<0.05). There is no significant difference in serum calcium level between two groups in all time point. Osteopenia is diagnosed in 4 patients the prolonged PN group but none in the control group.

Prolonged PN exposure cause lower intake of calcium and phosphate in early life, and associated with early hypophosphatemia noted since 2 weeks old. The serum calcium level is not affected and higher alkaline phosphatase level was noted since 8 weeks after birth. Routine monitoring serum phosphate level started 2 weeks after birth is important to prevent osteopenia in ELBW infants.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
Emerging evidence demonstrates that mother/infant separation interrupts the bonding process and that can have a profound and lasting effect on maternal mental health, breastfeeding and long-term morbidity for mother and child. Our Neonatal service had high term admission rate (8.8% in 2017, national average 6%), against a low (25%) occupancy of the 6 transitional care beds, resulting in average 2.2 days separation per mother/infant pair. Our objective was to reduce term admissions and thereby mother/infant separation. Baseline data and process mapping revealed that neonatal hypoglycaemia was a primary preventable cause of term admission (10 admissions/month) and was an area of initial focus.

All inborn term infants admitted in NICU were included. Using quality-improvement methodology, a golden hour care protocol for at-risk infants for hypoglycaemia was implemented, including evidence-based pathways for neonatal hypoglycaemia, skin to skin and early breast feeding, at risk infant cards, and Glucogel posters. Perinatal service board rounds, daily patient safety meetings, weekly term admission review meetings were introduced to enhance collaborative working with Maternity Services. Improvement was defined as 50% reduction in term hypoglycaemia admissions and an overall reduction in term admissions. Changes were tested in iterative PDSA cycles. Monitoring process over time with ‘run charts’ helped us understand special cause variations that enabled timely action.

We achieved more than 50% reduction in hypoglycaemia admissions (Figure 1). The percent of at-risk infants receiving golden hour care increased from 50% to 90%. The proportion of babies with active feeding plan raised to 90% from 20%. Glucogel administration compliance on eligible babies reached 60% with rising trend following implementation of a simplified poster visual step by step administration aid. Transitional care occupancy increased from 25% to 70% in one financial year ensuring mother and infants remain together, avoiding unnecessary separation. Different workstreams running in parallel with the hypoglycaemia project, such as use of sepsis proforma, timely antibiotic treatment discontinuation, early discharge and antibiotic administration on postnatal ward on set times contributed to an overall reduction in term admissions from 8.8 % to 6.7 %.

The implementation of a quality improvement intervention promoting golden hour care for at risk infants for neonatal hypoglycaemia has reduced their admissions in our level 2 neonatal unit. We adopted a collaborative approach and data driven improvement actions to foster a culture of shared responsibility for mother/infant care. This minimized inappropriate mother infant separation and an overall reduction in term admissions to neonatal unit.
ID: 457

TITLE: Impact of computer calculation program for individualized parenteral nutrition on selected clinical parameters of extremely low birth weight (ELBW) infants

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CONTENT:
Adequate nutrition supply in the first weeks of life of preterm neonates is an essential part of intensive care. It may influence the efficacy of treatment in critically ill neonates, their extrauterine growth and development. Malnutrition increases risk of infection and mortality rates, extends duration of mechanical ventilation and hospitalization. Parenteral administration is often necessary to meet nutritional needs of premature neonates in their first days or weeks of life. The aim of the study was to assess the effects of introduction of a computer calculation program for individualized parenteral nutrition (PN) on selected clinical parameters of ELBW infants in a tertiary NICU.

Retrospective medical records analysis of 94 ELBW preterm infants born over a one-year period before (2013, 47 patients) and after (2016, 47 patients) introduction of computerized provider order entry (CPOE) for parenteral nutrition. Composition of PN on the 1st, 3rd and 7th day of life (DOL) was analyzed. Growth was assessed based on difference in weight, head circumference and body length percentiles on Fenton charts. Duration of PN and selected neonatal complications were also analyzed. Abdominal surgery, congenital malformations, inborn errors of metabolism and death before 7th day of life were considered exclusion criteria. Statistical analysis was performed with Mann-Whitney test, t-Student test and chi2 Pearson test; p<0.05 was considered significant.

Both groups were comparable with regard to birth weight (786 vs 786 g, ns) and gestational age (27 vs 27 weeks, ns). Analysis revealed that respectively on the 1st, 3rd and 7th DOL more energy (mean 32.2 vs 62.9; 45.4 vs 69.9; 73.6 vs 85.1 kcal on, p<0.01), fluids (mean 84.1 vs 97.7; 118.7 vs 145.9; 147.5 vs 164.2 ml, p<0.01), protein (mean 1.9 vs 2.6; 2.8 vs 3.3; 3.2 vs 3.8 g, p<0.01), lipids (mean 0.1 vs 1; 0.9 vs 2.2; 2.4 vs 2.9 g, p<0.01) and carbohydrates (mean 6.1 vs 7.4; 7.3 vs 8.7; 10.4 vs 11.5 g, pp>0.05) and conjugated hyperbilirubinemia (21 vs 9%, p=0.08). There were no significant differences in growth parameters between groups. Duration of PN was significantly shorter in the CPOE group (mean 31 vs 25 days, 0.01>p>0.05).

It has been found that CPOE has a positive impact on the quality of PN and compliance with guidelines. The use of CPOE may shorten the duration of PN. It seems that CPOE can also have beneficial effects on selected clinical outcomes of ELBW, however it requires further studies on a bigger group of patients.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: Non declared.
ID: 460

TITLE: PRETERM INFANT BREATHING IN THE DELIVERY ROOM: WHAT TRIGGERS?


AFFILIATIONS: Department of Pediatrics, Ribeirão Preto School of Medicine, University of São Paulo, Brazil.

CONTENT:

Carotid corpuscles are important O2 sensors, being important for breathing in humans. Studies show that they are also able to detect reductions in pH, increase in blood glucose and in lactate plasma concentration. Recent studies suggest that pH, glucose and lactate are fundamental to stimulate inspiratory and expiratory responses at the birth. A challenging metabolic situation, such as pH ≤ 7.22; glycemia > 85 mg/dL and lactate ≥ 5 mmol/L stimulate the carotid sinus in mammals. Thus, we analysed the influences of these factors in the breathing patterns at birth in preterm infants and also the association with ventilatory assistance in the delivery room.

Cohort study. Very-low birth weight infants born at tertiary hospital were included (2016 - 2018). Newborns with malformations, deaths, or requiring cardiac massage were excluded. The patients were divided in three groups:

- Group 1. Orotracheal intubation in the delivery room, due to respiratory distress or apnea.
- Group 2. CPAP in delivery room, but CPAP failed during the first 72 hours of life.
- Group 3. CPAP in delivery room and patients that didn’t require assistance ventilatory.

The association between pH ≤ 7.22; glycemia > 85 mg/dL and lactate ≥ 5 mmol/L in the first hour of life and respiratory outcomes was analysed. The relative risks and their 95% confidence intervals were calculated by adjusting a log-multinominal regression model. The software used was SAS 9.4.

During the period 398 patients were born, 78 were excluded due to the exclusions criteria, 320 patients were elected for analysis. The number of patients in the Group 1, 2 and 3 was respectively, 116 (36.2%), 85 (26.6%), 119 (37.2%); with weight average 824, 999 and 1187 grams and gestational age medium 26, 27 and 30 weeks, respectively. Among the patients who presented challenging metabolic situation 47.1% did not require ventilatory support, and 22% required orotracheal intubation [RR(CI95%) to intubated= 0.51(0.33; 0.73) and RR(CI95%) to spontaneous breathing= 1.53(1.16; 2.03)]. Lactate ≥ 5 mmol/L and pH ≤ 7.22 were associated with successful ventilation, while, glucose > 85 mg/dL alone is not associated, with relative risk, respectively 1.97 (CI95%1.17; 3.33); 1.70 (CI95%1.20; 2.41); 1.36 (CI95%0.90; 2.06). There was no association between metabolic status and CPAP failure. (Table 1)

Adequate breathing in the delivery room is associated with more than those presented in the literature, such as gestational age and birth weight. A challenging metabolic situation is associated to respiratory activation in VLBW infants at the birth, as demonstrated in our results. Clinical study should be performed to provide adequate metabolic status in preterm infants at birth to favour the spontaneous breathing in delivery room.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 465

TITLE: EFFECT OF ADRENALINE ON SURVIVAL AND NEUROLOGICAL OUTCOME IN A NEWBORN PIGLET MODEL OF HYPOXIC CARDIAC ARREST

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CONTENT:

Guidelines for drug use in neonatal resuscitation are based on extrapolations from adult literature. Adrenaline is an integral component of all published neonatal resuscitation algorithms. However, the evidence on effect and safety of adrenaline in neonatal resuscitation is sparse. Therefore, it is crucial to determine, whether or not adrenaline improves survival and outcome. In a piglet model of neonatal cardiac arrest (CA) we investigated adrenaline vs. placebo on survival and brain lactate/N-acetyl-aspartate (NAA) ratio.

A total of 24 piglets <24 hours of age were anesthetised. Hypoxia was induced by clamping the endotracheal tube and maintained until CA or severe bradycardia. CA was defined as mean arterial blood pressure (MAP) <20mmHg AND heart rate (HR) <60bpm. Cardiopulmonary resuscitation (CPR) was commenced 5 minutes after CA and performed according to the 2015 international neonatal resuscitation guidelines. The piglets were randomized to either CPR + adrenaline or CPR + placebo (saline, same volume as the adrenaline infusion). The investigators were blinded to the intervention. If resuscitation was successful, therapeutic hypothermia was induced. The primary outcome was survival. Secondary outcome was lactate/NAA ratio, obtained by Magnetic Resonance Spectroscopy (MRS) 6 hours after resuscitation.

We present preliminary results from the first 15 animals. Baseline- and CA characteristics were similar between study groups pre-randomization. Groups had comparable duration of hypoxia prior to CA (mean time from hypoxia to CA; 20 min vs. 24 min) and metabolic acidosis prior to resuscitation (median pH: 6.75 in both groups). Clinical arrest rhythms were asystoli (60%) and ventricular fibrillation (40%), with no between-group differences. Following randomization, survival rate was significantly higher with adrenaline administration (n = 7/8 (87.5 %)) than with placebo (n = 2/7 (28.6 %); P = 0.04)). MRI/MRS data are pending; the analyses will be ready in September.

In this preliminary analysis, resuscitation involving adrenaline rather than placebo improved survival after neonatal hypoxic cardiac arrest. Data from the last 9 piglets are pending and MRI/MRS data are pending.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 469

TITLE: VITAL SIGN PATTERNS AND TIMING OF SEVERE IVH IN VLBW INFANTS

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CONTENT:

Severe intraventricular hemorrhage (sIVH, grade 3-4) occurs in about 10% of very low birthweight (VLBW) infants and may be present at birth or occur or worsen in the first minutes to days after birth. Our groups previously reported an association between abnormal vital sign patterns (heart rate, blood pressure, and oxygenation) and sIVH but their temporal and causal relationship remains to be elucidated. In this study, we sought to further characterize vital sign patterns in the first week after birth in infants with early or later timing of cranial ultrasound (CUS) evidence of sIVH.

The study included all VLBW preterm infants admitted to the NICU 2009-2016 with every-two-second vital sign data including invasive arterial blood pressure measurements stored for the first 7 days after birth. Timing of CUS screening was based on clinician discretion with CUS day 1-2 for some infants and days 3-5 and 7-10 for all infants. Infants with sIVH were divided into 2 categories: early sIVH (on day 1-2) and late sIVH (no sIVH day 1-2 and sIVH day 3 or later). Each infant with sIVH was matched by GA to 2 infants with no IVH. Infants with grade 1-2 IVH were excluded. Hourly mean arterial blood pressure (MABP), heart rate (HR), and systemic oxygenation from pulse oximetry (SpO2) were analyzed using the Kruskal-Wallis test followed by the Dunn Test for post-hoc comparison.

129 VLBW infants were included (GA mean 25.0 +/- 2.5 weeks): 9 and 23 infants in the early and late sIVH groups, respectively and 97 in the GA-matched no IVH group. Infants with sIVH had significantly higher mean HR over the first week from birth compared to those with no IVH: early sIVH 169± 7, late sIVH 162± 7, no IVH 153± 12 (P <0.01). There was a trend toward higher HR beyond day 2 in infants with early versus late sIVH. Infants with sIVH also had lower SpO2: early sIVH 92.2 ± 0.82, late sIVH 91.5 ± 1, no IVH 93.9 ± 0.75 (P < .0.01). There was no significant difference in mean SpO2 between early and late sIVH groups. Mean MABP was not significantly different between groups (Figure).

In this cohort, infants with sIVH had significantly higher mean HR and lower SpO2 in the first week after birth compared to GA-matched infants with no IVH. Ongoing studies are examining more specific abnormalities of vital signs and their interactions in relation to timing of discovery of sIVH on cranial ultrasound.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure: Relationship between vital signs in the first 7 days after birth and early or late sIVH. Upper panels: Hourly mean values for HR, MABP, and SpO2 in infants with early sIVH (day 1-2, n=9, red), late sIVH (day 3 or beyond, n=23, blue) and GA-matched

COI: None declared.
ID: 472

TITLE: LONG TERM NEUROLOGIC effects of neonatal caffeine treatment in a rabbit model of preterm birth

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AFFILIATIONS: 1 Department of Development and Regeneration, Cluster Woman and Child, Group Biomedical Sciences, KU Leuven University of Leuven, Belgium
2 Department of Pediatrics, Lund University, Skåne University Hospital, Lund, Sweden
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CONTENT:

Caffeine is commonly administered to improve respiratory outcomes in preterm infants. However, through its action on the adenosine receptor it might affect brain development. Clinical studies show that caffeine is beneficial for neurologic outcome at 18 months, with a less pronounced effect at pubertal age. Animal studies show more conflicting results on brain-related outcomes. Herein we aimed to investigate the (pre)pubertal effects of neonatal caffeine administration in a rabbit model of preterm birth. The preterm rabbit model is very appropriate for assessment of neuro-cognitive impairments as the rabbit is a perinatal “brain developer”, similar to the human.

Rabbit does underwent cesarean section at 29 days of gestation, corresponding to 24-28 wks in humans in terms of brain development (full term 32 days). Each wet nurse fostered two of her own term vaginally born pups and 7-8 preterm pups. Pups were randomly allocated to enteral administration of either saline or caffeine for 7 or 17 days respectively. At postnatal day 70-84, neurobehavioural tests were performed to assess anxiety, motor activity, learning and memory through: Open Field test (OF), Dark-Box and Object Recognition Task (ORT). Brains were harvested for immunostaining of neurons (Neu-N), synapses (Synaptophysin), myelin (MBP) and astrocytes (GFAP). Seven preterm saline, 8 preterm caffeine, 8 preterm caffeine 17d, 5 term saline (controls) and 5 term caffeine 7 d were analyzed.

Birth weight was lower in the preterm (n=38) than in term pups (n=14) (37.6±1.0 vs 57.7±2.3g; p<0.0001); no difference between the treatment groups. Survival was lower in preterm saline than in term pups (33% vs 85%;p=0.03); whereas caffeine treated preterm pups did not differ from term control pups. In the OF test, preterm saline pups covered less distance compared to controls (435.5±55.8,8 vs 1272±842.7m;p=0.048) and were more likely to stay in the peripheral zone (92.7±10.9 vs63.0 ± 33.3 %;p=0.029). Corresponding differences were not present between preterm caffeine pups and term controls. The term caffeine group and the preterm caffeine 17 d group were comparable to term control pups. In the ORT no differences were found between groups. Histologic analysis of neuron density, synaptic density or myelin did not reveal any differences between groups in any of the analyzed regions.

This is the first study reporting long-term effects of caffeine in an animal model of preterm birth. At a clinically comparable dose and duration caffeine appeared to be safe without affecting the structure of neurons, astrocytes, synapses, or myelin. Postnatal caffeine appeared to improve anxious behavior seen in preterm rabbits at prepubertal age. Future studies might explore the effects of caffeine in preterm pups with acquired brain damage.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Neu-N stain of a caffeine treated animal. Hippocampal CA1, CA3, dentate gyrus, hypothalamus, caudate nucleus and amygdala were analyzed on each slide. There were no differences in neuron density in any of the regions.
COI: None declared
ID: 474

TITLE: NEONATAL AND NEURODEVELOPMENTAL OUTCOMES OF NEONATES AFFECTED BY EXTREME AND PROLONGED PREMATURE RUPTURE OF MEMBRANES IN MULTIPLE PREGNANIES.

AUTHORS: Catheline Hocq 1; Bénédicte Van Grambezen 2; Olivier Danhaive 3

AFFILIATIONS: 1,2,3 Neonatal Unit, Cliniques Universitaires St Luc, Brussels, Belgium

CONTENT:

Extreme preterm premature rupture of membranes (PPROM) < 26 weeks occurs in up to 1 % of pregnancies. Multiple pregnancy is a major risk factor for PPROM, occurring at an earlier gestational age than in single pregnancy. Our goal is to describe neonatal and long-term neurological outcomes of extreme PPROM, which are poorly defined, by comparing PPROM and non-PPROM siblings of twin pregnancies.

This is a retrospective, single-center study (2011-2018), including 8 multiple pregnancies (7 twin and 1 triple) during which a single fetus experienced PPROM ≥ 25 weeks and >14-days latency from birth and severe oligohydramnios (amniotic fluid index < 5). Neonatal complications (mortality, bronchopulmonary dysplasia (BPD) at 28 days and 36 weeks (mild/moderate/severe by Jobe’s classification), pulmonary hypertension (PH, defined as need for inhaled nitric oxide, iNO), intraventricular hemorrhage (IVH grade 1-4) and necrotizing enterocolitis (NEC) were compared between PPROM and non-PPROM siblings, as well as neurodevelopmental follow-up at 1, 2 and 3 years (4 pairs). Values are expressed in median (inter-quartile range). We used Chi-square test and Wilcoxon statistical tests.

Age at PPROM was 16 w (15-21). Latency was 53 d (37-74). 2 pregnancies resulted in stillbirths. Gestational age at birth was 28 w (25-30) for live births. Birth weight were 1045 (725-1575) versus 1120 g (797-1630). iNO was needed for 5/6 PPROM twin vs none in controls (p = 0,005). 2 siblings died < 48 h. There were 2 pneumothoraces in PPROM vs none in controls. Mild BPD occurred in 1 vs 3, moderate BPD in 1 vs 2 and severe BPD in 2 vs none. Respiratory support at 36 w was 60% vs 0% (p <0,05). IVH occurred in none of PPROM twins vs 1 in non-PPROM (grade III). Non surgical NEC occurred in 1 vs none. Neurodevelopmental follow-up was available for 4 pairs (table 1). There were no statistical differences between groups. A diagnosis of autism was established at 18 months for 2 siblings who were homozygous. 2 PPROM infants developed mild behavior disorder vs. none in the non-PPROM group.

Even though PPROM twins showed a greater incidence/severity of BPD and PH, we could not demonstrate significant differences in neurodevelopmental outcomes. Despite size and design limitations, our study supports offering conservative antenatal care and fully supportive postnatal management in extreme and prolonged PPROM in twin pregnancies. Larger multicenter studies are warranted in order to establish definite recommendations.

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IMAGE / TAB CAPTION: Neurodevelopmental follow-up

COI: None declared
ID: 477

TITLE: Unfavorable evolution of enterocolitis: the mystery continues...

AUTHORS: Couto, L.D.C.A.; Souza, T.R; Ferreira, C.H.F.; Calixto, C.; Carnevale-Silva A.; Aragon D.C.; Maiolini, B.L; Silva, A.C.B.; Souza, G.A; Martins-Filho, P.F.; Toffolo, R.O.; Fukamichi, S.L; Gonçalves-Ferri, W.A.

AFFILIATIONS: Department of Pediatrics, Ribeirão Preto School of Medicine, University of São Paulo, Brazil

CONTENT:

Necrotizing enterocolitis ( NEC) is a serious multifactorial disease that affects premature newborns, presenting high morbidity and mortality, oftentimes requiring surgical treatment that may result in short bowel syndrome. This study aims to identify factors that could indicate the severe evolution of the NEC and the needing for surgical intervention.

This retrospective cohort study is based on medical records of all patients weighing less than 1500 grams diagnosed with NEC from 2010 to 2018 at HCFMRP - USP - Brazil. NEC diagnosis was based on radiological findings (grade IIB or III Bell's stage). Patients with malformations were excluded. The patients were divided into 2 groups: whether they need or not laparotomy. Clinical and laboratory data were collected from patients. For statistical analysis of the categorical variables, Fisher's Exact analysis was used and the Wilcoxon Test was used for the continuous variables.

Between 2010 and 2018, 1196 children under 1500 grams were hospitalized, of whom 65 were diagnosed with enterocolitis. Of these, 28 need laparotomy and 37 received only clinical treatment. The following data were collected from patients 72 hours prior to NEC onset: vasoactive drug use, lower mean blood pressure, worst laboratory values (pH, lactate, hemoglobin), thrombocytopenia, tachycardia, and the need of blood transfusion. The gestational age, antenatal corticosteroid treatment, length and type of enteral diet, caffeine treatment, length of umbilical catheter use were assessed as well. There was no significant difference between the groups that had the most favorable outcome (clinical treatment) and the group that needs surgery (Table 1).

In the present study, we could not find any association between severe outcome (need of surgical treatment) and clinical or laboratory factors. Further studies are needed to evaluate possible predictive factors of unfavorable evolution of enterocolitis.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 479

TITLE: EARLY DETECTION OF GMS TRAJECTORIES IN VERY LOW BIRTH WEIGHT INFANTS

AUTHORS: Odoardo Picciolini 1; Matteo Porro 1; Camilla Fontana 2; Maria Lorella Gianni 2; Nicola Pesenti 3; Giovanna De Bon 1; Giovanna Lucco 1; Fabio Mosca 2

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CONTENT:

Concerns about preterm infants’ long-term outcome have arisen due to their increased survival. The availability of accurate tools for the early detection of infants at risk for negative outcome is of utmost importance. General Movements (GMs) assessment evaluates the integrity of the central nervous system. However, there is a limited understanding of how GMs’ trajectories may evolve over time.

We aimed to investigate GMs’ trajectories in a cohort of very low birth weight infants up to three months of corrected age (CA) in order to detect the GMs’ trajectories that might be addressed for early intervention and follow-up examination over time.

We conducted an observational, longitudinal study. A total of 216 very low birth weight infants (birth weight <=1500 g) were enrolled. Serial GMs were recorded at 31±1, 35±1, 40±1 weeks of gestational age (GA) and at three months CA. Longitudinal GMs’ trajectories were described for each infant based on two evaluations from 31±1 to 40±1 weeks and compared with GMs at three months of CA. GMs’ trajectories were classified as following: Normal-Normal (N-N); persistence of poor repertoire (PR-PR); persistence of Cramped Synchronized GMs (CS-CS); Normal – Poor Repertoire (N-PR); Poor Repertoire – Normal (PR-N); Poor Repertoire – Cramped Synchronized (PR-CS); Cramped Synchronized – Poor Repertoire (CS-PR); Normal – Cramped Synchronized (N-CS); Cramped Synchronized – Normal (CS – N).

The most represented was the N-N trajectory (n=128), whereas the trajectories including CS were the less observed (PR-CS: n=5; CS-CS: n=4). Fifty infants showed a PR-PR trajectory; N-PR and PR-N trajectories included 12 and 17 infants, respectively. Infants showing N-N trajectory have fidgety movements at three months of CA in the majority of cases (92%). On the contrary, infants showing either a CS-CS or a PR-CS trajectory did not have fidgety movements in any case. Moreover, infants showing either a N-PR or a PR-PR trajectory appear to show fidgety movements only in half cases (50-52%). The N-N group presented less neonatal morbidities and had the shortest hospital stay.

Our results indicate the importance of evaluating GMs trajectories before term CA. Findings of N-N trajectories help clinicians in reassuring parents on normal neurodevelopment of their infants at three months of CA. CS-CS and PR-CS trajectories indicate the need for an early rehabilitation treatment. N-PR and PR-PR trajectories indicate the need for closer follow up in order to avoid delay in programming potential intervention programs.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 481

**TITLE:** EFFECTS OF HELIOX NON-INVASIVE NAVA VENTILATION ON RESPIRATORY FUNCTION OF PREMATURE INFANTS.

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**CONTENT:**

Use of helium-oxygen mixture (heliox) as a breathing gas can be advantageous due to its unique physical properties such as low density and high CO2 diffusion coefficient. In newborns with various pulmonary pathologies conventional ventilation with heliox has been associated with improvement in oxygenation and selected respiratory parameters. Use of heliox might enhance the effectiveness of non-invasive positive pressure ventilation (NIV) however the knowledge regarding effects of such therapy in neonates is limited. Application of neurally adjusted ventilatory assist (NAVA) allows the synchronization of NIV in premature infants and assessment of the diaphragmatic electrical activity (EaDI).

23 neonates ≤32 weeks gestational age (GA) were enrolled in the study. Patients were eligible for inclusion when on NIV with FiO2>0.25 in the first 72 hours of life (n=12) or ready to extubate after 72 hours of life (n=11). Newborns were ventilated with NIV-NAVA at baseline. Heliox was introduced for 3 hours, followed by 3 hours of air-oxygen, NAVA level was kept constant. Recorded parameters included heart rate (HR), oxygen saturation (SpO2) and cerebral tissue oxygenation (StO2). Selected ventilation parameters as well as electrical activity of the diaphragm (EaDI mean, minimum and maximum) were also acquired. Blood gas analysis was performed in each period of the study. Statistical analysis was completed with ANOVA Friedman’s test and repeated-measures ANOVA.

Mean GA was 29 weeks and mean birth weight was 1396 g. Patients’ clinical condition was stable during the study, HR, SpO2 and blood gas parameters were in the normal range. StO2 and selected respiratory parameters did not differ significantly between the study periods. A trend towards decreased respiratory rate after 60 minutes of heliox (53 vs 47 breaths per minute) did not reach the statistical significance. After 15 minutes of heliox EaDI mean was significantly lower than at baseline (3.4 vs 4.8 μV, p =0.0003). All EaDI measures (min, max and mean) decreased significantly 60 minutes after heliox introduction compared to the baseline (EaDI min 1.3 vs 2.5 μV, p=0.02; EaDI max 5.2 vs 8 μV, p=0.0015; EaDI mean 2.9 vs 4.8 μV, p=0.0003). EaDI mean and max were also lower after 180 minutes of heliox than at baseline (EaDI mean 3.2 vs 4.8 μV, p=0.0003 and EaDI max 5.6 vs 8 μV, p=0.0015).

To our knowledge this is the first report of heliox NIV-NAVA application in the newborn. It seems a safe ventilation mode that is well tolerated by premature infants. Significant decrease in the EaDI suggests that the diaphragmatic workload was reduced during the therapy. Further studies are needed to investigate whether the use of heliox NIV-NAVA might shorten the time of ventilatory support and the risk of its failure.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**
COI: None declared
ID: 482

TITLE: PLACENTAL HISTOLOGICAL FEATURES AND NEONATAL OUTCOME IN VERY LOW GESTATIONAL AGE INFANTS

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CONTENT:

Chorioamnionitis is closely related to premature birth and prematurity is associated with an elevated risk for neonatal morbidities and mortality. Evidence from the literature is conflicting in relation to the association between various placental lesions and severe neonatal conditions. Some studies found that chorioamnionitis or malperfusion are risk factors for bronchopulmonary dysplasia (BPD), neonatal sepsis, intrauterine growth restriction (IUGR), necrotizing enterocolitis (NEC) or retinopathy of prematurity (ROP) while others do not or even are protective for some of these morbidities. Our objective was to evaluate the relationship between plenta histology and neonatal morbidities.

A retrospective cohort of preterm infants with gestational age between 24 and 28 weeks gestational age (GA) born from January 2014 to June 2018 was carried out. Placenta histology, newborn clinical characteristics, morbidities and mortality during hospitalization were recorded. Amsterdam placental workshop consensus criteria were used for classifying placental lesions classification. For each particular morbidity were only included those patients not discharged from hospital at postnatal age when diagnosis was possible to define: mortality at any moment, early onset sepsis in all patients, NEC and late onset sepsis in those who stayed more than 72 hs, ROP and BPD only those who were alive at 36 weeks postmenstrual age. Kruskal-Wallis and Chi-square tests were used as appropriate.

Placenta histology and clinical records were obtained from 178 of 210 (85%) infants born between 24 and 28 weeks GA during the studied period. Mean body birthweight of the whole population was 928 g (SD 239), GA 26.4 weeks (SD 1.5), male gender 57%, multiple gestations 23.6%, IUGR 8.3% and mortality 34%. Placenta lesions and their relation with clinical characteristics, morbidities and mortality are shown in the table. We found statistical association between combining maternal and fetal inflammatory response with early onset sepsis (OR 3.91 CI 1.17-13.07, p=0.026) but this association was protective for BPD (OR 0.28 CI 0.08-0.98, p=0.035). Placenta malperfusion was associated with intrauterine growth restriction (OR 3.39 CI 1.05-10.94, p=0.049).

In this population of very premature infants the prevalence of chorioamnionitis was 50% and 62% of them had maternal and fetal inflammation. The combination of both lesions was associated with early onset sepsis but was protective for BPD. Malperfusion was associated with IUGR. Infant mortality was not associated with any placental lesion.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 484

TITLE: Can hemodynamic instability during NEC evolution interfere with outcomes?

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CONTENT:

The role of intestinal perfusion in the pathogenesis and evolution of Necrotizing Enterocolitis (NEC) is not well established. The treatment with hypothermia in the NEC has been proposed based on the hypothesis of its protective action of intestinal perfusion avoiding ischemia and/or necrosis. However, there are no studies showing the association between possible changes in intestinal perfusion during the NEC and the course of the disease. The aim of this study is to evaluate whether the presence of hemodynamic shock signs after the diagnosis of NEC is associated with the type of outcome of the disease.

This is a retrospective cohort study of patients diagnosed with NEC from 2010 to 2018 at a tertiary hospital. Patients weighing less than 1500 grams with a diagnosis of NEC, based on radiological findings (grade IIB or III Bell's stage), were selected. Patients with malformations were excluded. The patients were divided into two groups: those who underwent laparotomy and the other who required only clinical treatment, and then compared the presence of hemodynamic instability (heart rate greater than 160 bpm maintained during disease progression and/or mean arterial pressure less than gestational age) during NEC evolution, after diagnosis.

Among 1,196 newborns hospitalized between 2010 to 2018, 68 had NEC diagnosis, but 3 presented malformations and were excluded. Then, 65 (5.4%) patients with NEC were selected and of these, 28 (43%) patients required surgical intervention. Among the patients with enterocolitis, 39 (60%) had signs of hemodynamic instability, 28.2% of patients with hemodynamic instability required surgery. 65% of neonates who remained stable hemodynamically required surgery (figure 1). The relative risk for hemodynamic instability and surgical necessity was 0.42 (95% CI 0.19-0.94).

This study showed that hemodynamic changes after the diagnosis of NEC may be associated with more favorable evolution of the disease. More studies are needed to evaluate the influence of hemodynamic status and the role of intestinal perfusion in the evolution of NEC.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
Intrauterine growth restriction (IUGR) is the term used to describe a fetus that has not reached its growth potential because of a combination of fetal, placental or maternal factors. The most common maternal factor is thrombophilia, which is an abnormality of blood coagulation, which correlates with a hypercoagulable state. The definition of IUGR is an estimated weight via ultrasound below the 10th percentile for gestational age in the second half of pregnancy. Complications of IUGR include perinatal complications such as asphyxia, meconium aspiration, low resistance to infection, hypoglycemia, stillbirth, neonatal death, neonatal morbidity and abnormal neurodevelopmental outcome. Inherited maternal thrombophilia as a cause of IUGR, is the cause of decreased placental transfer of nutrient, including oxygen, resulting in reduced fetal body weight. The most important risk factor for a pregnant women experiencing pregnancy-related venous thrombosis is prior personal history of venous thromboembolism.

Low-risk inherited thrombophilias include the following mutations heterozygous factor V Leiden, heterozygous prothrombin G20210A mutation, protein S deficiency, protein C deficiency. High-risk inherited thrombophilias include the following homozygous factor V Leiden, homozygous prothrombin G20210A mutation, compound heterozygous factor V Leiden with prothrombin mutation, antithrombin deficiency.

There are three types of IUGR: asymmetrical IUGR, symmetrical IUGR and mixed IUGR, based on various clinical and anthropometric features. In asymmetrical IUGR the embryo or fetus has grown normally for the first two trimesters but encounters difficulties in the third trimester. Symmetrical IUGR is often known as global growth restriction and indicates that the fetus has developed slowly throughout the entire duration of the pregnancy, in this case the fetus is more likely to have permanent cerebral sequelae.

The aim of this study is to analyse the relationship between maternal thrombophilic modifications and intrauterine growth restriction, in order to establish prophylactic interventions which can be made in patients considered to be part of a high-risk group for fetal and perinatal bad outcome.

A case-control study was conducted in Bucharest Emergency University Hospital for a period of 1 year between 2015 and 2016. Patients were included in RO19.10 project “Improved healthcare for high-risk pregnancy, premature birth, and hematological diseases”. The selected cases (n = 100) were pregnant women with singleton pregnancies ranging from 30 weeks to 40 weeks, 50 were diagnosed with intrauterine growth restriction and thrombophilia and 50 patients represented the control group who had normal growth fetuses. Laboratory samples included protein C, protein S, antithrombin III, homocysteine and lupus anticoagulant. Genetic analysis collected during the study included mutations of factor V, gene MTHFR, mutation of factor XIII, polymorphism mutation of PAI 4G/5G and EPCR gene mutations.

The incidence of hereditary thrombophilia was 54% (n=27) for MTHFR C677T heterozygous in IUGR group and 36% (n=18) in control group.

The highest incidence of thrombophilia had the mutation of the protein S deficiency 62% (n=31) as well as the pattern Factor V Leiden heterozygous mutation 52% (n=26) in the IUGR group.

A total of 75 patients came from urban areas, 25 from rural areas.

The mean age of patients included in our study was 30 years.

A total of 50 patients included in the study and diagnosed with thrombophilia had not any pregnancy lost, 21 said they had lost a pregnancy, 11 patients lost 2 pregnancies, and 5 patients reported loss of 3 or more pregnancies.

Also in IUGR group 30 pregnant women were diagnosed with high risk thrombophilia and received thromboprophylactic treatment with LMWH - Enoxaparin, 40 mg once daily, and 20 women were diagnosed with low risk thrombophilia.
This study highlighted that inherited thrombophilia in the case of intrauterine growth restriction plays an important role, in which case MTHFR mutations and protein C deficiency are most often involved.
IUGR is a major problem for both obstetrician and neonatologist, by associating increased morbidity and mortality among preterm newborns.
Also routine screening for thrombophilic modifications is not recommended.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 490

**TITLE:** APPLICATIONS OF THE HIGH FLOW THERAPY IN NON-TERTIARY NEONATAL CENTERS IN POLAND — A PRELIMINARY REPORT FROM A NATIONAL „WOSP HFNC REGISTRY”

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**CONTENT:**

High flow nasal cannula therapy (HFNC) has become increasingly popular method of ventilatory support in the newborn. It has been shown to be non-inferior to nCPA post-extubation. Reports regarding effectiveness of HFNC as a primary ventilatory mode for premature infants are inconsistent. However, most studies have been carried out in tertiary neonatal intensive care units. Currently HFNC seems to be a modality of ventilatory support that is the easiest to use in neonates, especially for staff from non-tertiary centers. The Great Orchestra of Christmas Charity (WOSP) fund has donated >100 HFNC devices for non-tertiary neonatal care centers in Poland.

Patient data of 361 neonates (61% of males) treated with HFNC was acquired using a web-based electronic „WOSP HFNC Registry” from 50 units that received equipment from the charity fund. Analyzed variables included demographic and perinatal data, causes of respiratory failure, parameters and length of high flow therapy, its effectiveness and complications. All patients were treated using the same device (Vapotherm Precision Flow).

Patients’ mean gestational age was 37 weeks (standard deviation (SD) 3.3 weeks) and mean birth weight was 3047g (SD 854g). Mean Apgar scores 1’=8, 5’=9 (SD 2). 63% of patients were born by cesarean section. Most common indications for HFNC included respiratory distress syndrome, pneumonia and transient tachypnea of the newborn. Median time of HFNC initiation was 2 hours, median time of therapy 18 hours. Mean initial flow was 5.4 (SD 1.2), mean maximum flow was 5.6 (SD 1.2) and mean terminal flow was 5.0 (SD 1.4). Median initial FiO2 was 0.3, median terminal FiO2 was 0.21. 62% of neonates were weaned from HFNC, 30% were effectively stabilized using HFNC until their ambulance transfer to a higher level of care unit. Only 3 newborns who failed HFNC required intubation and mechanical ventilation, other were managed using nCPAP or NIPPV. Pneumothorax was reported in 3 cases.

Preliminary analysis of the registry data suggests that HFNC used in non-tertiary centers can be an effective and safe therapy. However, in contrast to previous studies reported population comprised mainly term and late-preterm infants. Considering relatively short median time of therapy and set flows it seems that significant proportion of patients had relatively mild course of respiratory distress.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** none declared
ID: 492

TITLE: SKIN-TO-SKIN CONTACT – WHAT IS THE OPTIMAL DURATION FOR PREMATURE INFANTS?

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CONTENT:

More than 1 in 10 infants born prematurely, that affects families worldwide. With the latest advanced perinatal and neonatal technologies the number of premature infants is rapidly increased. However, despite the positive results of survival, morbidity and complications associated with preterm birth are growing. Many studies report about skin-to-skin contact (SSC) as an effective therapy to maintain physiological stability, decrease severe illness, relieve pain and improve neurological development in preterm infants. But evidence is still lacking about the SSC duration in preterm babies. Thus, the purpose of the study was to investigate the effectiveness of SSC depending on its duration.

The study involved 63 premature infants with gestational age (GA) less than 32 weeks. All infants had a skin-to-skin contact with their mother or father.

According to the GA neonates were divided into two groups – group with GA less than 29 weeks included 26 infants (41.3%) and group with GA 29-32 weeks – 37 infants (58.7%). According to the duration of SSC infants in each group were divided into subgroups – subgroup I (SSC was more than 3 hours a day) included 10 and 15 infants respectively; and subgroup II (SSC was less than 3 hours a day) – 16 and 22 infants.

“STATISTICA 13.0. FOR WINDOWS” was used for computations. Qualitative parameters were analysed by use of 2×2 contingency table and Fisher’s exact test, Odds Ratio and 95% confidence intervals. Significance was assumed at p<0.05.

Infants with GA less than 29 weeks of subgroup I had lower incidence of nosocomial infection comparing with subgroup II (30% vs 75.0%, OR = 7.00; 95% CI: 1.20-40.83; p=0.043). The percentage of infants who were breastfed at the moment of discharge was higher in subgroup I compared to subgroup II (70.0% vs 25.0%, OR = 7.00; 95% CI: 1.20-40.83; p=0.043).

The percentage of infants with GA 29-32 weeks of subgroup I who were breastfed at the moment of discharge was higher compared to subgroup II (86.7% vs 40.9%, OR = 9.39; 95% CI: 1.69-52.13; p=0.016).

No significant differences in the bronchopulmonary dysplasia, necrotizing enterocolitis and cholestasis incidences, the duration of parenteral nutrition and daily weight gain were found between studied groups (p>0.05).

Prolonged SSC has a positive impact on the preterm baby’s health preventing the nosocomial infections and promoting breastfeeding. Considering the positive effects of skin-to-skin care for very preterm infants, this type of care should be promoted in all clinics of developed and developing countries and should be regular and so lasting per day as possible according to parents’ opportunities.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared
ID: 493

**TITLE:** THE EFFECT OF A DOUBLE-LAYER POLYETHYLENE SUIT AND CONTINUOUS SKIN TEMPERATURE MONITORING ON ADMISSION TEMPERATURE OF PRETERM INFANTS.

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**CONTENT:**

The Resuscitation Council (UK) Guidelines 2015 recommend the use of plastic wrapping of the head and body in combination with a heat source during the stabilisation of infants born less than 32 weeks gestation in order to maintain their body temperature between 36.5°C and 37.5°C. Much focus has been placed on the prevention of hypothermia in this patient group as this is well known to be associated with an increase in morbidity and mortality however both hypo- and hyperthermia are potentially harmful.

We replaced the use of food grade plastic bags with a sterile double-layer polyethylene suit covering the body and head for thermal control of preterm infants from September 2016. We examined Badgernet data to identify inborn infants admitted to our NICU at Southmead Hospital less than 33 weeks gestation prior to, and following the introduction of the suit. The first epoch data includes infants born between January 2015 and June 2016; the second epoch data was collected for infants born between January 2017 and June 2018. Following this initial data collection, continuous skin temperature monitoring during stabilisation was implemented for all infants less than 34 weeks gestation in February 2019. We collected data on reliability of measurements and the effect on admission temperature.

We identified 166 and 169 infants during the first and second epoch respectively. We observed an increase in our mean admission temperature from 36.61°C to 36.99°C following the introduction of the suit. Although we found a reduced proportion of babies to have a low admission temperature during the second epoch (42.77% vs. 19.53%), we found a higher proportion of babies with a high admission temperature during this time period (10.84% vs. 26.6% respectively). Following the introduction of continuous skin temperature monitoring during stabilisation, 19 infants have been admitted. The mean admission temperature was 36.75°C. 15.7% had a low admission temperature and 5.2% had a high admission temperature. Continuous skin temperature monitoring correlated well (within 0.2°C) with formal admission temperature. Data collection is ongoing.

Our results show that the use of a double-layer polyethylene suit is effective at raising the admission temperature of preterm infants. Although this reduced the risk of hypothermia, it increased the risk of hyperthermia in our clinical setting. Admission temperature can be further optimised through skin temperature monitoring at delivery allowing the intensity of any external heat source to be adjusted.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Table showing percentage of infants with admission temperature within range for each epoch of the study.
COI: None declared
ID: 496

TITLE: GENTAMICIN TROUGH LEVELS IN PATIENTS WITH HYPOXIC ISCHAEMIC ENCEPHALOPATHY RECEIVING THERAPEUTIC HYPOTHERMIA

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CONTENT:

National Institute for Health and Clinical Excellence (NICE) guidance recommends benzylpenicillin and gentamicin as first line antibiotics for early onset sepsis in neonates. Gentamicin is generally well tolerated but can cause renal and ototoxicity. Babies with hypoxic ischaemic encephalopathy (HIE) are particularly vulnerable to toxicity due to potential poor clearance. Trough gentamicin levels before second dose are routinely measured before administering second dose.

We aimed to review all cases of HIE treated with therapeutic hypothermia within our tertiary neonatal service to determine the incidence of high trough gentamicin levels and their correlation with peak creatinine levels.

Retrospective review of neonatal database to identify all patients that received therapeutic hypothermia over a 24 month period (January 2017 – December 2018) within Nottingham University Hospitals neonatal units.

We reviewed individual patient notes, discharge summaries and laboratory databases of babies receiving therapeutic hypothermia (TH) to collect information about clinical details, renal function, sepsis work-up and trough gentamicin levels.

Assumptions made:-

a) Gentamicin prescribed at correct dose
b) Gentamicin levels taken immediately prior to time 2nd dose due

63 patients identified; 5/63 died. 3 patients although qualified for TH, did not have a final diagnosis of HIE (encephalopathy – not HIE, subdural haemorrhage and stroke). 60 patients included for analysis.

59/60 babies that had HIE and received therapeutic hypothermia were above 36 weeks’ gestation; all babies >2kg in weight. Minimum peak creatinine level 69 with associated high trough gentamicin level.

25 (41.7%) patients receiving therapeutic hypothermia had high trough levels.

Table 1 contains additional information about the grades of HIE, patients with creatinine >/= 75, evidence of neonatal sepsis and high gentamicin levels

High (41.7%) proportion of babies with HIE receiving TH had high trough levels indicating susceptibility to toxicity. We need to consider alternative antibiotic choice for babies with HIE who qualify for TH.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1. Characteristics of patients with HIE that received TH

COI: None declared
ID: 506

TITLE: Impact of home breast milk fortifier on exclusive breast feeding rates in babies born ≤35 weeks gestation at birth

AUTHORS: Caroline King 1, Stephanie Tagani 2

AFFILIATIONS: Imperial College Healthcare NHS Trust London

CONTENT:

With improving support more preterm babies are discharged breast feeding. However, this can be difficult to sustain when babies are sent home up to 4-5 weeks before their due date when immature oral feeding patterns persist combined with a high expected growth rate. One method to help sustain both growth and breast feeding is the continuation of breast milk fortifier (BMF) post discharge.

In a tertiary neonatal unit, a service evaluation was carried out to look at breast feeding rates at the first outpatient appointment following introduction of the principle of home BMF. The practice occurred during the years 2009 to 2016 in babies where the dietitian was available to assess need. As a result, not all eligible babies were given home BMF. Data was collected for all babies born ≤35 weeks who were eligible for follow up locally. Parents were instructed to give the BMF at half the dose the baby was on as an inpatient in a small concentrate made up with expressed breast milk at intervals during the day. Babies were weighed weekly and followed up by a dietitian to advise on continued BMF dosing.

See table for population demographics and breast feeding outcomes. Babies discharged on BMF had between 1-6 sachets per day with an average of 3.5, all but 3 babies had stopped BMF at follow up. The percentage of mothers who were exclusively breastfeeding at follow up was significantly higher in the home BMF group.

Continuing BMF post discharge in babies born ≤35 weeks may help protect breast feeding. A randomised controlled trial is needed to confirm this. Biochemical indices of protein nutrition should be collected to assess whether BMF is the most appropriate supplement. Head circumference and length assessment would also be useful to determine if symmetrical growth is achieved.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=581030c465afa357f13de75b92d55458-MjAxOS0wNSM1Y2UyNjY2YzdhNTZh

IMAGE / TAB CAPTION: Babies discharged exclusively breast feeding with or without home BMF - Effect on exclusive breast feeding at follow up

COI: None declared
ID: 508

TITLE: AVOIDING TERM ADMISSIONS INTO THE NEONATAL UNIT (WHEN ASSOCIATED WITH HYPOTHERMIA): A SINGLE TRUST 1 YEAR REVIEW OF ADMISSIONS WITH REFERENCE TO NATIONAL ATAIN PROGRAMME

AUTHORS: Rachel Walsh 1; Nora Imolya 2; Dee Evans 3; Kumar Swamy 4

AFFILIATIONS: 1. Neonatal Unit, Queens Medical Centre, Nottingham, UK,
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CONTENT:

Between 2011 and 2014 the rate of live term births in the UK showed a declining trend. Over a similar time period, neonatal care days for the same population increased. The importance of early bonding between mother and baby is widely recognised. The national ATAIN programme reviewed term admissions across the UK, concluding that over 20% were potentially avoidable. This review concerns two level 3 neonatal units within the same city over a 1 year period. In particular, we present those babies with a temperature less than 36.5 degrees Celsius at admission. This group of babies is a cohort in which admission could be prevented with targeted measures.

The Badgernet database was used to identify all babies admitted over a 1 year period between 1/4/17 and 31/3/18. All babies were over 37 weeks completed gestation. There were no other filters. The admission details of each baby was reviewed by a team of 4 reviewers. Sources of information were; Badger admission and discharge summaries, electronic inpatient notes and online blood results databases. Data was compiled in spreadsheet form by all 4 reviewers and analysed using Microsoft Excel by 1 analyser. Babies admitted to the neonatal unit and as well as those attending for a septic screen were included in the analysis.

882 babies were identified. This accounts for approximately 4.5% of the live term birth rate locally and is comparable to national figures. 44% were admitted to the neonatal unit while 56% attended for a septic screen only. The predominant admission categories were; Respiratory (37%), Hypoglycaemia (14%), Jaundice (3%) and Neurological (1%). After excluding those therapeutically cooled, 198 (22%) were found to be hypothermic. This was most notable in babies admitted with respiratory symptoms and hypoglycaemia (15% of each group). This cohort was reviewed with regards to birth weight, time of admission and month of admission. None of these factors was shown to impact upon rates of hypothermia. There was a normal distribution of weights between 1760g and 4525g. The time and month of admission mirrored that of the group as a whole.

A large proportion of admissions to the neonatal unit are hypothermic. Although not the primary cause of admission, this contributes to the overall burden of morbidity and is preventable. Our data suggests that environmental factors do not contribute significantly and that universal measures to improve thermoregulation are required. This trust has commenced an initiative to improve thermoregulation across maternity and neonatal care.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
The effect of sex on preterm innate and adaptive immunity

Preterm male neonates are at higher risk of sepsis and have poorer outcomes following sepsis episodes than females. Sex differences in innate and adaptive immunity may account for some of the differences in sepsis outcomes which are seen clinically. Our aim was to study sex difference in innate and adaptive immunity between term and preterm infants and examine the immunomodulatory effect of estrogen and progesterone treatment.

Whole blood samples were obtained from 13 preterm infants (4 female, 9 male) and 20 healthy term infants (10 males and 10 females). Granulocytes, monocytes and lymphocyte subsets were enumerated by flow cytometry based on light scattering properties and cell surface markers. Whole blood was treated with endotoxin (LPS; 10ng/mL), 17-β estradiol (E2; 10-8M) and progesterone (10-8 M), alone and in combination. Granulocyte and Monocyte activation was quantified by analysis of CD11b and Toll-like receptor (TLR)-2 expression.

Lymphocyte percentages were similar between preterm and term infants of both sexes. Preterm infants had robust immune responses following LPS stimulation. Preterm female granulocytes and monocytes had lower CD11b expression following LPS stimulation compared to term controls (p<0.05). Hormone treatments did not significantly alter immune cell activity or TLR2 expression.

CD11b was significantly decreased in preterm females compared to term controls. Lymphocyte populations were similar in preterm and term infants of both sexes. These results suggest a sex difference in innate immune function but do not completely account for the difference in clinical outcome between the sexes.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 513
TITLE: WOULD GROWTH RESTRICTED INFANTS BE A SUITABLE POPULATION FOR LESS INVASIVE SURFACTANT ADMINISTRATION (LISA)?
AUTHORS: Benjamin Holter 1
Sadaf Bhayat 1
Christina Kortsalioudaki 1
Giles Kendall 1
AFFILIATIONS: 1 Neonatal Unit, University College Hospital London, London, United Kingdom

CONTENT:

LISA has been shown to improve the combined outcome of death/BPD in all infants born at less than 32 weeks gestation. Babies receiving surfactant who require ventilation beyond 24 hours are unlikely to benefit from the LISA approach. In preterm infants with intra-uterine growth restriction surfactant production may be altered, indicating that they may derive additional benefit from exogenous surfactant. To date the role of LISA in the subgroup of preterm babies with growth restriction has not been demonstrated. The aim of this study is to determine if preterm infants with IUGR require longer initial ventilation (>24 hours) suggesting that LISA may be unsuitable.

We performed a retrospective, case-control study. Records of inborn preterm infants (23+0 and 31+6) admitted to UCLH between 2017 and 2018 were reviewed. Birth-weight <10th centile was classified as IUGR. Demographics, location of intubation, and time to extubation were recorded for both IUGR and non-IUGR neonates. Results were analysed by unpaired t-test and two-tailed Fisher’s exact test as appropriate.

Between 2017 and 2018 there were 149 admissions meeting criteria, 34 (22.8%) were IUGR. There was no significant difference between IUGR and the need for intubation on labour-ward (LW) (79% IUGR vs 85% p=0.425). Amongst intubated infants, 50% were extubated within 24 hours of life regardless of their growth status (14 (50%) of intubated IUGR infants vs 51 (50%) of non-IUGR (p=1)). Babies with IUGR were born at a significantly later average gestation than normally grown infants (30 vs 26 weeks p<0.05). No other recorded factors were found to be significantly related to the presence of IUGR (table 1).

We found no significant difference in the need for intubation on LW or rate of extubation within 24 hours between IUGR and non-IUGR preterm infant. Our data suggests that LISA is a suitable approach in preterm infants with IUGR. Given the association between IUGR and BPD, LISA in this population could be of benefit and its use warrants further investigation.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=83f252b58a37a55ecb9318e5d9c02579-MjAxOS0wNjY2YzdjMTRI

IMAGE / TAB CAPTION: Table 1. characteristics of growth restricted infants vs normally grown infants.

COI: None declared
ID: 516

TITLE: IS SCREENING FOR CRITICAL CONGENITAL HEART DISEASE USEFUL AT THE FIRST HOUR OF LIFE?

AUTHORS: Elif Keleş1, Fatma Canbeyli2, Esra Önal1, Canan Türkyılmaz1, Semha Tokgöz2, Melda Taş1, Münevver Baş1, Aytaç Kenar1, Başak Kaya Gürsoy1, İbrahim Murat Hıranoğlu1, Ebru Ergenekon1, Esin Koç1

AFFILIATIONS: 1. Neonatology, Department of Pediatrics, Gazi University Faculty of Medicine, Ankara, Turkey
2. Pediatric Cardiology, Department of Pediatrics, Gazi University Faculty of Medicine, Ankara, Turkey

CONTENT:

Congenital heart disease (CHD) is the most common congenital abnormalities in the newborn. Although many neonates with critical CHD (CCHD) are symptomatic and are recognized immediately after birth, some infants are discharged without diagnosis. In infants with CCHD, delay in diagnosis increases morbidity and mortality. The ideal recommended screening time is 24th-48th hour of life. CCHD screening is performed at the 1st and the 24th hours of life with the purpose of decreasing these risks in our study. We aim to determine the time of CCHD screening at the 1st and 24th hours following uneventful delivery in order to reduce the mortality and morbidity caused by early discharge.

Infants born in our university hospital between August 2016 and February 2019 were included in the study. In addition to physical examination, preductal and postductal oxygen saturation and perfusion index were measured at the 1st, 24th and 72th hours post-birth by a new-generation pulse oximeter (Massimo Radical 7). The positive screening was defined as post-ductal oxygen saturation (SpO2) 3% or PI <1.2. Patients who required pediatric cardiology consultation as a result of physical examination and pulse oximetry test were evaluated by echocardiography.

In our study, 18 of 1020 infants were antenatally diagnosed with CCHD (See Table for demographics). One infant without antenatal diagnosis was diagnosed with screening. Sensitivity of the first hour measurement was 94.4%, specificity 94.2%, positive predictive value (PPD) 23.2% and negative predictive value (NPD) 99.9%. The sensitivity of the measurements performed at the 24th hour was 94.4%, specificity 93.4%, NPD 27%, and PPD 99.8%. There was no significant difference between the first hour and 24th hour preductal/postductal saturation measurements; although there was a significant difference between the first hour and 24th hours in the preductal and postductal perfusion index (p<0.001). Perfusion index was increased at 24 hours due to the adaptation of postnatal physiology. Saturation parameters were more reliable for decision making in CCHD.

There have been large numbers of infants who are discharged before the 24th hours of life. 1st hour screening results in early discharge may be useful in diagnosis of CCHD. Studies with larger cohorts are needed to investigate the utility of CCHD screening within the first and 24th hour of life.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
Obtaining ethically appropriate prospective consent for emergency research in the perinatal period is challenging. Under certain circumstances, some governing bodies permit a waiver of prospective consent followed by deferred (retrospective) consent. Deferred consent can increase enrolment of eligible infants, and improve scientific validity by including higher risk populations, such as mothers presenting shortly before preterm birth. Parental acceptability of neonatal deferred consent has not been fully explored, therefore we aimed to evaluate the opinions of parents exposed to deferred consent in neonatal research.

This mixed-methods study consisted of structured interviews with parents who had already been approached for deferred consent for their infants for studies in the delivery room and neonatal intensive care unit at The Royal Women’s Hospital, Melbourne, Australia. Parents were asked about their experience of the consent process, reasons for consenting or declining, their thoughts on whether prospective consent was preferable to deferred consent, and whether they thought they would have given consent for the study if the consent process had been prospective. Descriptive statistics are used and thematic analysis was performed on free-text responses.

One hundred of 190 eligible parents were interviewed; 62/100 had also experienced a prospective consent process: 89% were ‘satisfied’ with the deferred process (vs. 92% satisfaction for prospective consent processes). Nine per cent thought improvements could be made to the deferred process; negative comments related to early postnatal approaches for consent, and a few to a perceived loss of parental rights (Table). Those dissatisfied with a prospective approach were also most concerned with timing. In our sample, 24% felt prospective consent may have been a better option but 51% did not, 25% were unsure. Seventy-seven per cent thought they would have consented if approached prospectively for the same study, 7% said they may have declined, their comments related to a prospective approach under stressful pre-birth conditions being unwelcome as stress could impair decision-making (Table).

Almost 90% of parents of infants enrolled in neonatal trials using deferred consent found it acceptable. Negative comments mostly related to timing, a few to perceived loss of parental rights. Ability to make a considered decision, in less stressful circumstances was key to acceptability. A quarter of our sample would have preferred a prospective approach, but this was unwelcome in the immediate pre-birth setting and risked poor decision-making.
ID: 521

TITLE: EMPIRICAL ANTIBIOTICS IN NON-VENTILATED CASES OF MECONIUM ASPIRATION SYNDROME OF THE NEWBORN

AUTHORS: Sung-Min Kang1
Shin Yun Byun2
Myo-Jing Kim1

AFFILIATIONS: 1 Pediatric Dept., College of medicine, Dong-A university, Pusan, South Korea
2 Pediatric Dept., Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Yangsansi, Gyungnam, South Korea

CONTENT:

Meconium aspiration is assumed to be a risk factor for bacterial infection, and meconium aspiration syndrome (MAS) patients are commonly treated with empiric antibiotics in clinical settings. However, little is known about the effectiveness of this treatment. We compared the short-term clinical outcomes associated with empirical antibiotic treatment in non-ventilated infants with MAS.

A retrospective study was conducted on infants admitted to the neonatal intensive care unit with MAS not requiring ventilation from March 2008 to September 2016. The study infants were divided into two groups based on antibiotic treatment and their clinical outcomes were compared. The incidence of sepsis during the hospitalization period, as well as the incidence of delayed sepsis up to three months was evaluated. The effect of empirical antibiotic use on clinical outcomes was also evaluated. The complications were compared between the two groups.

A total of 109 infants were evaluated; of these, 61 (56.0%) received and 48 (44.0%) did not receive antibiotics. The empirical antibiotics group showed significantly higher mean respiratory rates, C-reactive protein levels, and positive rates, and also had a significantly longer hospitalization period. In terms of clinical outcomes, there were no differences in sepsis rates or duration of respiratory support. There were also no differences in complications.

The empirical use of antibiotics did not affect the clinical outcomes in non-ventilated infants with MAS. The role of empirical antibiotics in these infants may need to be reevaluated.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 525
TITLE: THE APPLICATION OF DRIED BLOOD SPOTS FOR THE ASSESSMENT OF MATERNAL AND NEONATAL VITAMIN D STATUS
AUTHORS: Hsin-Chung Huang 1; Chien-Yi Chen 2; Po-Nien Tsao 3; Hung-Chieh Chou 4; Ting-An Yen 5; Wuh-Liang Hwu 6; Yin-Hsiu Chien 7
AFFILIATIONS: 1 Department of Pediatrics, Taipei City Hospital, Heping FuYou Branch, Taipei, Taiwan
2-7 Department of Pediatrics, National Taiwan University Children Hospital, Taipei, Taiwan

CONTENT:

The health impact of vitamin D deficiency is especially important during pregnancy and infancy, but the epidemiological data is lacking in Taiwan. The difficulty in obtaining adequate blood sample is the major resistance in determining neonatal vitamin D status. The purpose of this study is to develop a novel screening test by dried blood spots (DBS) and the accuracy is compared with the standard serum test in infants and their mothers.

This is a cross-sectional study of the infants who is under 1 year of age and their mother from June 2017 to June 2018. After informed consent was signed, around 2.5 cc blood was collected from artery or vein. The blood sample was first to fill five DBS in a card, and then serum was collected from the rest blood sample after appropriate centrifuged. DBS were analyzed with LC/MS/MS assay, and the serum 25OHD levels (ng/ml) was measured by LIAISON® (DiaSorin, Inc, Stillwater, MN, USA).

Totally 129 DBS samples were available for analysis and compared to serum sample, 37 from newborn, 41 from infants and 51 from mothers. 25OHD concentrations in DBS and serum were highly correlated (Pearson r=0.8117, 95% CI 0.7408 to 0.8647, P < 0.0001). In the 45 deficient cases (serum 25OHD level 12 ng/ml, but only 1 had DBS level >20ng/ml. In the 83 inadequate cases (serum 25OHD level 20 ng/ml, but only 1 had DBS level >30ng/ml.

Using DBS to measure 25OHD level is a valid and practical method for screening vitamin D deficiency. Further larger study is warranted.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 530

TITLE: CAN WE REDUCE NEONATAL ADMISSIONS DUE TO JAUNDICE?

AUTHORS: Sonal Datir 1, Gopa Sarkar 1

AFFILIATIONS: 1 Neonatal unit, Stoke Mandeville Hospital, Aylesbury, United Kingdom

CONTENT:

Neonatal hyperbilirubinemia is a common cause for neonatal admission in term and preterm infants. These infants are primarily managed on postnatal wards for phototherapy, thus avoiding separation of mother and baby. However, they require admission to neonatal unit due to jaundice above the exchange level, rapidly increasing bilirubin levels, pathological jaundice or sepsis. Failure to initiate and establish adequate breastfeeding can play an important role in development of severe jaundice.

The aim of this project was to evaluate the infants admitted to neonatal unit with jaundice including the feeding practices; and identify areas of improvement to reduce admissions.

This was a retrospective observational project which included infants admitted to neonatal unit at a District Hospital with a primary diagnosis of jaundice from January 1, 2017 to December 2018. The cohort included late preterm infants (≥ 35 weeks) and term infants who were either admitted from postnatal ward or home because of jaundice. Data was collected using proforma, medical records and blood results on computer system.

A total of 519 infants were admitted of which 12%(60) infants were admitted due to jaundice. 42% were late preterm and 58% were term infants. The mean birth weight was 2892 grams and 20% were low birth weight. The risk factors for jaundice were identified as male (66%), first born (49%), gestation (37 weeks), prematurity, and breast fed infants (60%). 35% were admitted from home (mean 3.9 days) and 65% from postnatal wards. A three-quarter of admissions were either due to prematurity or poor feeding/ exaggerated jaundice.

60% infants were exclusively breastfed prior to admission which decreased remarkably to 11.6% on discharge; only 32% mothers received lactation support.

55% infants had bilirubin level above exchange line, required a mean of 24 hours (range 6-144 hours) of intensive phototherapy. None required immunoglobulins or exchange transfusion. The mean length of stay was 3 days.

There is a scope to decrease admissions due to jaundice by optimising feeding support and management of jaundice on postnatal wards/ community care in the presence of risk factors. Transitional care setting is vital for the care of preterm infants, thus avoiding mother and baby separation.

Opportunities to support lactation on postnatal ward and neonatal unit are often missed. Effective measures are necessary to promote lactation support.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Number of admissions due to jaundice at various gestations

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 531
TITLE: TYPE 2 IMMUNITY IS A HALLMARK OF MURINE NEONATAL CARDIOPULMONARY DISEASE
AUTHORS: Christine B Bui 1,2; Arvind Sehgal 2,3; James T Pearson 4,5,6; Anton Maksimenko 7; Ina Rudloff 1,2; Steven X Cho 1,2; Kirstin Elgass 8; Morag Young 9; Alex Veldman 1,2; Philip J Berger 1,2; Marcel F Nold 1,2; Claudia A Nold-Petry 1,2.

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3. Monash Newborn, Monash Health, Melbourne, VIC, Australia
4. Department of Cardiac Physiology, National Cerebral and Cardiovascular Center Research Institute, Suita, Japan
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7. Imaging and Medical Beamline, Australian Synchrotron, Melbourne, VIC, Australia
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CONTENT:
Bronchopulmonary dysplasia (BPD) is a chronic inflammatory lung disease that affects extremely preterm infants. Pulmonary hypertension secondary to BPD (BPD-PH) is its gravest complication and contributes to significant morbidity and mortality. Due to the multifactorial nature of BPD and BPD-PH, its pathogenesis remains poorly characterised despite considerable research efforts. We discovered that the type 2 immune response plays a role in the development of BPD and BPD-PH. By using STAT6-KO mice, which have limited type 2 immune responses, we employed a clinically relevant murine model of disease to investigate the underlying immune responses driving BPD and BPD-PH.

At day 14 of gestation, pregnant C57BL/6J (WT) and STAT6-KO dams received an i.p. injection of LPS (150 µg/kg) to induce systemic maternal inflammation. Within 24h of birth, WT and STAT6-KO pups were randomised to either continuous hyperoxia (65% O2) or room air (21% O2) as a control. Pulmonary inflammation was characterised by the abundance of cytokines (IL-1β, IL-6, IL-13, IL-33) and chemokines (eotaxin) in lung lysates on postnatal day 5 (P5) by ELISA. Lung structure was assessed by histology. To assess the effects of inflammation and hyperoxia on the pulmonary vasculature at P28, we used echocardiography to measure pulmonary artery pressure and synchrotron micro-CT imaging to visualise pulmonary vasculature remodelling.

Perinatal exposure to inflammation and hyperoxia caused lung tissue injury in WT pups, characterised by fewer (36% reduction) and enlarged alveoli (29% increase) with reduced surface area-to-volume ratio (18% decrease) compared to WT animals reared in room air. The lung parenchymal structure was protected from injury in STAT6-KO pups. Protein abundance of pro-inflammatory mediators was significantly increased in lung lysates of hyperoxia WT pups at P5 but was prevented in STAT6-KO mice. Furthermore, micro-CT imaging revealed substantial changes in pulmonary vascular morphology in hyperoxia-WT mice at P28, as evidenced by 84% fewer small vessels (4-7µm diameter) and 9-fold more large vessels (30-60µm diameter), which were accompanied by PH (TPV/RVET 0.26 for hyperoxia vs 0.32 for controls by echocardiography). The changes in the pulmonary vasculature were abrogated in STAT6-KO mice.

We observed that a deficiency in the type 2 immune response is protective for the lung parenchymal structure and pulmonary vascular remodelling in a murine model of BPD and BPD-PH. Our findings suggest that type 2 immunity plays a major role in the pathogenesis of BPD and BPD-PH and that targeting type 2 key mediators may have a therapeutic benefit.
COI: None declared
ID: 533
TITLE: PROBABILISTIC GRAPHICAL MODEL IDENTIFIES CLUSTERS OF EEG PATTERNS IN RECORDINGS FROM NEONATES
AUTHORS: Julia Winter 1, Alex Sarishvili 2, Heiko J. Luhmann 3, Eva Mildenerger 1
AFFILIATIONS: 1 Department of Neonatology, University Medical Center of the Johannes Gutenberg University Mainz, Germany
2 Fraunhofer Institute for Industrial Mathematics, Kaiserslautern, Germany
3 Institute of Physiology, University Medical Center of the Johannes Gutenberg University Mainz, Germany

CONTENT:

Brain function monitoring in neonates during their stay in the neonatal intensive care unit (NICU) may be a valuable tool to evaluate brain development and to investigate factors interfering with it.

To simplify the information complexity presented in the EEG signal and in order to visualize clinically relevant features, we present a novel method for objective and automated quantitative EEG analysis. It constructs a complex probabilistic graph (Chow-Liu tree) (inter-channel-frequency-band dependency structure) from a given multi-channel EEG recording, in order to estimate the different generic neonatal brain states.

By applying the Chow-Liu method to the analysis of EEG recordings, all characteristics of the EEG signal and their interdependencies can be displayed in a graphical model.

We tested the analytic algorithm by using retrospective EEG recordings of 28 neonates (postmenstrual age 37 – 44 weeks; 7 preterm). 23 recordings had been interpreted by a pediatric neurologist as normal (5/23 infants had chronic diseases). 5 recordings of infants with neurologic diseases were pathologic.

We computed the distances between trees (sum of tree edits operations, i.e. removing edge and adding edge operations until translation of one tree into another tree). The tree edit operations were weighted by the corresponding estimated mutual information. The trees were embedded into a 3-dimensional Euclidean space.

Using this approach, we were able to identify clusters of physiological and pathophysiological EEG patterns. The algorithm merged the 28 EEG recordings into 6 mathematically optimal clusters (see figure). The method was able to select 4 of the 5 pathologic EEG recordings from the 23 recordings interpreted as normal (red cluster). Regarding the distances of cluster centers, the clusters comprising the majority of normal EEG recordings were close together (blue, magenta, cyan cluster). The group of pathological recordings showed the highest distance to these clusters.

The method identified also other clusters of EEG recordings that apparently had similar structures: we found similarity in EEG recordings of a group of infants with chronic diseases and a preterm infant (black cluster) and the cluster to which the algorithm merged the fifth pathological recording (yellow cluster).

Our method contrasts to all methodological approaches applied so far, as it considers differences / similarities between individual EEG recordings in order to cluster them in a mathematically derived optimal manner. The system works as a self-learning system.

The method may provide a basis for the future development of a non-invasive brain monitoring tool which will be able to differentiate between varieties of complex clinical findings.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=7738575e104583f786b239e3fa50a61c-MjAxOS0wNSM1Y2UyNjY2YzgzNjd
IMAGE / TAB CAPTION: Figure: The distances between Chow-Liu trees embedded into the 3d Euclidean space: identification of 6 clusters

COI: none declared
ID: 539

TITLE: ASSESSMENT OF NEONATAL GROWTH AND WELLBEING FOLLOWING THYROID HORMONE-BASED THERAPY IN A RODENT MODEL OF INTRAUTERINE GROWTH RESTRICTION (IUGR).

AUTHORS: Delphi Kondos-Devic 1; Flora Wong 2; Angela Cumberland 1; Madhavi Khore 1; David Walker 1; Mary Tolcos 1.

AFFILIATIONS: 1Neurodevelopment in Health & Disease Program, School of Health & Biomedical Sciences, RMIT University, Melbourne, Australia.
2 Department of Paediatrics & The Ritchie Centre, Monash Medical Centre, Monash University, Melbourne, Australia.

CONTENT:

We have previously shown that thyroid hormone (TH) transporter - monocarboxylate transporter-8 (MCT8) is decreased in the neonatal IUGR rat brain, perhaps contributing to impaired brain development in IUGR. We also found that administration of the TH analogue, diiodothyropropanoic acid (DITPA), which doesn’t require MCT8 to enter cells, from postnatal day (P) 1-6 promotes myelin recovery by P7. However the preclinical safety profile of DITPA is unknown.

Aims: Here, we determine if DITPA treatment in IUGR rats from P1-13 (equivalent to brain development at 23-40 weeks of gestation in humans) affects neonatal growth and wellbeing.

At day 18 of pregnancy (term = 22 days), rats underwent bilateral uterine vessel ligation (n=29 litters) or sham surgery (n=15 litters) to generate IUGR or control pups. DITPA (0.5mg/100g; i.p.) or saline was administered daily from P1-P13 to IUGR (DITPA n=60; Saline n=57) and control (DITPA, n=42; Saline, n=46) pups. Body weight was measured daily from P1-P14, and brain weight, body composition (via dual-energy x-ray absorptiometry), thyroid function (serum free T3 and T4), serum liver enzymes (alanine transaminase, ALT, alkaline phosphatase, ALP) and cholesterol were assessed at P14.

Body weight was reduced in IUGR pups compared to control at P1 (p<0.0001), P7 (p<0.0001) and P14 (p<0.001). In IUGR pups at P14, there was a reduction in brain weight (p<0.0001), bone content (p<0.0001), bone mass (p<0.001), lean tissue mass (p<0.0001) and fat mass (p<0.001) compared to controls. DITPA did not improve or worsen these effects. In IUGR pups free T4 and ALT were decreased (p<0.01 for both) and ALP was increased (p<0.05) compared to controls. Free T3 and cholesterol were unaffected. In control and IUGR pups, DITPA treatment increased free T3 (p<0.0001), ALT (p<0.01; only in IUGR), and ALP (p<0.05), but reduced free T4 (p<0.0001).

DITPA does not adversely impact neonatal growth or wellbeing following IUGR, despite altering free thyroxine levels and showing hepatic thyromimetic activity.
Aim: To rectify the Retinitis Pigmentosa (Loss of sight) by using CRISPR/Cas9 and Morphogenetic Activator of Nucleic Acids.

Principle:
Retinal pigment epithelium-specific 65 kDa protein, also known as retinoid isomerohydrolase is an enzyme of the vertebrate visual cycle that is encoded in humans by the RPE65 gene. It is expressed in the retinal pigment epithelium and is responsible for the conversion of all-trans-retinyl-ester to 11-cis-retinol during phototransduction. 11-cis-retinol is then used in visual pigment regeneration in photoreceptor cells. RPE65 belongs to the carotenoid oxygenase family of enzymes. It is the sensory transduction of the visual system. It is a process by which light is converted into electrical signals in the rod cells, cone cells and photosensitive ganglion cells of the retina of the eye.

The visual cycle is the biological conversion of a photon into an electrical signal in the retina. This process occurs via G-protein coupled receptors called opsins which contain the chromophore 11-cis-retinal covalently linked to the opsin receptor via Schiff base forming retinylidene protein. When struck by a protein, 11-cis retinal undergoes photoisomerization to all-trans retinal which changes the conformation of the opsin GPCR leading to signal transduction cascades which causes closure of cyclic GMP-gated cation channel and hyperpolarization of the photoreceptor cell.

Isomerization and release from the opsin protein, all-trans retinol is reduced to all-trans retinol and travels back to the retinal pigment epithelium to be “recharged”. It is first esterified by lecithin retinol acyltransferase (LRAT) and then converted to 11-cis retinol by the isomerase activity of RPE65. The isomerase activity of RPE65 has been shown, it is still uncertain whether it also acts as hydrolase. Finally, it is oxidized to 11-cis retinal before travelling back to the rod outer segment where it is again conjugated to an opsin to form new, functional visual pigment (rhodopsin).

The protein encoded by this gene is a component of the Vitamin A visual cycle of the retina which supplies the 11-cis-retinal chromophore of the photoreceptors opsins visual pigments. The protein encoded by this gene has acquired a divergent function that involves the concentrated O-alkyl ester cleavage of its all-trans retinyl ester substrate and all trans to 11-cis double bond isomerization of the retinyl moiety. It is essential enzymatic isomerization step in the synthesis of 11-cis-retinal. Mutations in this gene are associated with early onset severe blinding disorders such as Leber Congenital Gene silencing and editing with CRISPR/Cas9. Guide RNA designated to match the DNA region of interest directs molecular machinery to cut both strands of the targeted DNA. During gene silencing, the cell attempts to repair to broken DNA, but often does so with errors that disrupt the gene-effectively silencing it. For gene editing, a repair template with a specified change in sequence is added to the cell and incorporated into the DNA during the repair process. The targeted DNA is now altered with Morphogenetic Activator of Nucleic Acids to carry out new sequence.

Mutations found in patients with Retinitis Pigmentosa were Arg91Trp (CGG to TGG), Ala132Thr (GCC to ACC), Leu341Ser (TTA to TCA), Glu404 (4bps ins) (CAG to GCTGGAG), and Val452Gly (GTC to CGC).

Methods:
Patients sample is processed invitro by using CRISPR/Cas9 as gene editing for mutated genes later patients received a subretinal injection of Morphogenetic Activator of Nucleic Acids-RPE65 (by taking patients one drop of their own blood) in the poorer-seeing eye, at either of 2 close levels/day, and were followed up for 2 years after treatment.

Significant
Treatment with Morphogenetic Activator of Nucleic Acids RPE65 was not associated with serious adverse events and improvement in 1 or more measures of visual function was observed in 9 of 12 patients. The greatest improvements in visual acuity were observed in younger patients with better baseline visual acuity. Evaluation of more patients and a longer duration of follow-up will be needed to determine the rate of uncommon or rare side effects or safety concerns.

PURPOSE:
To provide an initial assessment of RPE65 in adults and children with retinal degeneration caused by RPE65 mutations. A Central dogma explains DNA is replicated to RNA & library construction with appropriate primers to diagnose the diseased level.

**DESIGN:**
Nonrandomized, clinical trial.

**PARTICIPANTS:**
6 to 79 years of age, with Leber congenital amaurosis (LCA) or severe early-childhood-onset retinal degeneration (SECORD).

**METHODS:**
Patients received a subretinal injection of Morphogenic Activator of Nucleic acids (MANA)- RPE65 (by taking patients one drop of their own blood) in the poorer-seeing eye, at either of 2 dose levels/day, and were followed for 2 years after treatment.

**MAIN OUTCOME MEASURES:**
The primary safety measures were ocular and nonocular adverse events and the same recorded.

**MAIN OUTCOME MEASURES:**
The primary safety measures were ocular and nonocular adverse events. Exploratory efficacy measures included changes in best-corrected visual acuity (BCVA), static perimetry and total visual field hill of vision (VTOT) kinetic perimetry visual field area, and the same responses to quality of life questionnaire.

**STATISTICAL ANALYSIS**
All patients tolerated subretinal injections and there were no treatment-related serious adverse events. Common adverse events were those associated with the surgical procedure with control group includes subconjunctival hemorrhage in 8 patients and ocular hyperemia in 5 patients. In the treated eye, BCVA increased in 5 patients, V30 increased in 6 patients, VTOT increased in 5 patients, and kinetic visual field area improved in 3 patients. One subject showed a decrease in BCVA and 2 patients showed a decrease in kinetic visual field area.

**CONCLUSIONS:**
Treatment with Manacells-RPE65 was not associated with serious adverse events, and improvement in one or more measures of visual function was observed in 9 of 12 patients, recorded. The greatest improvements in visual acuity were observed in younger patients with better baseline visual acuity. Evaluation of more patients and a longer duration of follow-up will be needed to determine the rate of uncommon or rare side effects or safety
Non immune hydrops fetalis (NIHF) in fetuses with cardiac anomalies is associated with high perinatal mortality. Regardless of the etiology of the disease that causes hydrops, fetal myocardial function must be evaluated. Hofstaetter et al. used the cardiovascular profile score (CVPS) to assess myocardial function in fetuses with NIHF, and showed that those who died prenatally or postnatally had lower CVPS values (median 5), than survivors (median 7). The aim of this study was to explore whether the CVPS correlates with fetal outcome in a selected population of patients with NIHF and cardiac anomalies.

In this retrospective study, we included fetuses with NIHF and a cardiac anomaly. The CVPS was calculated using information obtained by fetal echocardiographic examination. Five parameters were evaluated: 1) fetal hydrops, 2) cardiothoracic ratio, 3) pulsed Doppler study of the atrioventricular valves, 4) Doppler flow velocimetry of the umbilical artery and 5) Doppler flow velocimetry of the ductus venosus and umbilical vein. A score of two was attributed to each category for normal findings. In case an abnormality occurred, the CVPS decreased by one or two, depending on the severity of the findings. Perinatal mortality was defined as intrauterine fetal demise or death in the first six months of life. The CVPS was calculated once per fetus. No longitudinal analysis was performed.

Between 2007 and 2018, 90 patients with the diagnosis of NIHF were referred to the Department of Obstetrics and Gynecology of the Johannes Gutenberg University in Mainz. Among them, seventeen revealed a cardiac anomaly. After exclusion of six pregnancies (one termination of pregnancy and five because of incomplete data), eleven cases were left for analysis. Mean gestational age at which the CVPS was calculated was 28±5 weeks. One fetus died in utero (CVPS 5). Of the remaining ten hydropic fetuses, three newborns died in the neonatal period (27.3%) and seven survived after a six months surveillance period (63.6%). Median CVPS of all fetuses was 7. Surviving fetuses showed significantly higher CVPS values (median 8) than fetuses who died (median 5, p-value=0.009).

Although the study was limited to a small number of patients, our results point towards a positive correlation between CVPS and fetal outcome in fetuses with NIHF and cardiac anomalies. We recommend the integration of the CVPS in the surveillance of all hydropic fetuses and to further investigate its use as a prognostic marker.
ID: 553

TITLE: PULMONARY GAS EXCHANGE IMPROVES OVER THE FIRST YEAR IN VERY PRETERM INFANTS

AUTHORS: Y. Jane Choi* 1,2; Benjamin Stoecklin* 1,2,3; Shannon Simpson 4; Naomi Hemy 4; Dorota Doherty 5; J. Jane Pillow 1,2,3

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CONTENT:

Shift of the oxyhaemoglobin saturation (SpO2) vs inspired oxygen pressure (PIO2) curve in relation to the oxyhaemoglobin dissociation curve is the most sensitive marker of pulmonary gas exchange in very preterm infants at 36 weeks' postmenstrual age (PMA). The natural history of pulmonary gas exchange in preterm infants after initial hospital discharge is unknown, especially in infants with bronchopulmonary dysplasia (BPD). We aimed to use shift to assess improvement in pulmonary gas exchange over the first year of life in very preterm infants.

Shift was assessed at 36 and 44 w PMA, and at one year corrected postnatal age (cPNA). Paired measurements were obtained by step-wise adjustment of PIO2 to achieve SpO2 between 85-98 %. Shift values were calculated using customised software. Change in shift over time in preterm infants was examined by generalised linear regression. Shift in term infants was assessed at 44 w PMA to establish a normative data reference.

Estimated mean (95 % CI) shift in infants with BPD decreased significantly from 36 w (13.3 [12.1-14.7] kPa), to 44 w PMA (9.3 [8.4-10.5] kPa) to one year cPNA (6.2 [5.7-6.2] kPa) (all p < 0.001). Similarly, shift decreased in infants without BPD between 36 w (10.9 [10.0-12.0] kPa) and 44 w PMA (7.8 [6.9-8.9] kPa; p < 0.001), and further decreased at one year cPNA (6.9 [6.3-7.5] kPa; p = 0.055). Longitudinally, mean shift was not different between infants with and without BPD. However, cross sectional comparison of median (IQR) shift showed that infants with BPD had higher shift than infants without BPD at 36 w PMA (14.8 [6.5] kPa vs 10.6 [2.6] kPa, p < 0.001) and at 44 w PMA (10.4 [5.0] kPa vs 6.7 [1.8] kPa, p < 0.05), but not at one year cPNA (p = 0.97). Infants with BPD also had higher shift compared to term infants at 44 w PMA (6.6 [1.7] kPa, p < 0.001).

Pulmonary gas exchange improves over the first year of life in very preterm infants, regardless of their BPD status. Cross sectional analysis at 44 w PMA shows persisting deficits in gas exchange in infants with BPD compared to infants without BPD and healthy term infants.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=30973601316d3b9e479f9cc13c99ecc0-MjAxOS0wNSM1Y2UyNjY2YzhINldj

IMAGE / TAB CAPTION: Figure 1. Mean (95 % CI) shift (kPa) decreases over the first year of life in very preterm infants. Dotted line represents median shift in healthy term infants at 44 weeks' postmenstrual age (6.6 kPa).

COI: None declared
ID: 554

TITLE: LONG-TERM HEALTH STATUS AND NEURODEVELOPMENTAL OUTCOME IN MONOAMNIOTIC TWINS

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CONTENT:

Monoamniotic twinning is one of the most lethal conditions in perinatal medicine, mainly due to complications related to cord entanglement. The long-term health status and neurodevelopmental outcome of monoamniotic twins is not known. The objective of this study is therefore to investigate the long-term health status and neurodevelopmental outcome in monoamniotic twins.

All monoamniotic twins born after 2004 in three tertiary medical centres, aged at least 2 years at time of inclusion, were eligible for this study. Perinatal information was gathered from medical records. We assessed the health status and neurodevelopmental outcome using one of the following related questionnaires: the Health Status Classification System for Preschool Children (HSCS-PS) for children between 2 and 5 year of age and the Health Utility Index (HUI) for children aged 5 years and older, both covering almost the same attributes. The outcome of the questionnaires was used to calculate an overall health score based on the HUI3 index.

Fifty-two monoamniotic twin pairs were identified of which 84 (80.8%) children were live born and survived up to time of the study. Of these, four twin-pairs (9.5%) were lost to follow-up. The survey response rate was 80.3% (61/76). The mean health score was 0.95 (±0.10, range 0.51-1.00). The majority of children (38/61, 63.2%) achieved the highest possible score (1.00). 6 respectively 3 children were classified suffering from moderate or severe disabilities (score <0.88 resp. <0.70). No significant differences in average overall health score were found between monoamniotic twins and Dutch control data (p=0.30), however, the average health score might be overestimated due to response shift in parents of monoamniotic twins.

Overall long-term health status and neurodevelopmental outcome in monoamniotic twins appears to be favourable, however, this might be an overestimation due to response shift in parents of monoamniotic twins. Further objective investigation of long-term outcome is needed to confirm this outcome.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=96f4de497fab305d172c40402091b072-MjAxOS0wNSM1Y2UyNjY2YzhlZDY4

IMAGE / TAB CAPTION: Long-term outcome, comparison to reference score
COI: None declared
ID: 556

TITLE: Using a sepsis calculator to reduce antibiotic usage in early onset sepsis - A quality improvement project

AUTHORS: Kwok Sean Mun 1; Binod Rana 1; Ahmed Kamal 1; Lucksini Selvadurai 1

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CONTENT:

Early onset sepsis (EOS) defined as a neonatal infection within 72 hours of birth. Its incidence in the UK is 0.7/1000 live births. NICE UK has published a national guideline to provide recommendations for the management and investigations of infants at risk of EOS. Unfortunately, it has been reported that the guidance has led to greater clinical investigations, lumbar punctures, longer treatment and stay.

Kuzniewicz et al 2016, developed the Kaiser online sepsis calculator based on risk factors and clinical examination which has shown the ability to reduce unnecessary treatment of EOS. The aim of this study was to apply it locally to evaluate its efficacy, thus improving family centred care.

The study cohort included 92 infants who were born over 2 time periods, 1st July - 31st September 2017 and 1st March - 31st May 2018 who were treated for EOS in the postnatal ward. Infants born at <34 weeks gestation and infants requiring significant resuscitation from the labour ward were excluded as they were admitted to the neonatal intensive care unit for ongoing intensive care requiring a higher level of monitoring. Infants in the study cohort while treated and managed as per the NICE national guideline (UK) and the Kaiser sepsis tool was simultaneously applied. Basic demographics, NICE risk factors, clinical examination findings and outcome from the Kaiser sepsis tool were entered into an excel spreadsheet for subsequent evaluation. Data collection is ongoing presently.

The study cohort included 92 infants born at 34 weeks gestation or later: mean [SD] age, 38.3 [2.3] weeks; median age, 39 weeks, male 51, female 41. 92 infants received antibiotics as per NICE guideline and all blood cultures were negative. 11 infants had lumbar punctures performed and all 11 CSF cultures were negative. Average length of stay was 2.6 days. According to the Kaiser online sepsis tool, 61 infants could receive normal newborn care, 8 infants required 24 hours observation on the postnatal ward, 14 infants required blood cultures taken while 9 infants required blood culture samples taken and antibiotics commenced. Therefore using Kaiser online sepsis tool has reduced any intervention and length of stay by 66%. The incidence of culture-confirmed EOS was not statistically different across periods. Further analysis pending ongoing larger data collection.

The Kaiser online sepsis tool would suggest that there is a 66% reduction of all infants screened for EOS, without compromising safety, under the NICE EOS guideline. However given the low incidence of EOS, 0.7/1000 live births, there needs to be careful evaluation of greater numbers as well as ongoing surveillance once the Kaiser online sepsis tool is implemented. Data collection is ongoing and future analysis will contribute to the conclusion.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 558
TITLE: PARENTS AND CAREGIVERS PERCEPTIONS TO THE USE OF LIVE VIDEO RECORDING IN NEONATAL UNITS, A FOCUS GROUP STUDY
AUTHORS: Nadia MAZILLE 1 ; Aude LE BRIS 1; Pauline SIMONOT 2; Solène BLACHE 7; Maude LUHERNE 1; Geraldine GASCOIN 3; Richard HARTE 4; Patrick PLADYS 1,5,6
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CONTENT:

Live video recording is not routine in neonatal units. However, its use is beginning to appear as a tool to assist in diagnosis, monitoring or communication. The modalities of its implementation in neonatal care setting should take into account parents and caregivers perceptions.

The objective was to study the perceptions associated with the use of video and sounds recordings in neonatal clinical practice in order to get information about acceptability, limits and constraints to be addressed.

Nine focus group interviews were conducted in four neonatal units involving 20 caregivers and 19 parents. The transcripts were analysed using the qualitative data analysis software, NVivo10. Data were triangulated using transcripts and field notes and analyzed using inductive, semantic thematic analysis.

Eight major themes emerged from the 4 caregivers focus groups: (i) impacts of video recording on caregivers behaviour (ii) impact of access to images for parents; (iii) forensic dimension; (iv) storage and protection of data; (v) compliance with the stated objectives in the use of data; (vi) value in the best interests of the child; (vii) ways of use (improvement of practices, teaching, research); (viii) technical aspect and feasibility. Five major themes emerged from the 5 parents focus groups: (i) value in the best interests of the child and to improve care; (ii) impact on parents, on their privacy and on potential benefits in case of separation; (iii) informed consent and compliance with the stated objectives in the use of data; (iv) concern about a possible disruptive effect for caregivers; (v) data protection. The forensic and technical aspects were not mentioned by the parents.

Despite differences in their perceptions parents and caregivers perceived video in care as useful and acceptable provided that measures are taken to ensure information, data protection, and to limit potential negative impacts for caregivers. The conditions pointed out by parents and caregivers for an acceptable use of video/sound recordings were not considered significant enough to prevent the use in clinical practice for the benefit of newborns.

COI: None declared
Parents of very preterm (VPT) born infants report more mental health problems compared to parents of infants born at term. While previous research focused more on depression, anxiety symptoms may be more prevalent. Also, research has overlooked fathers. In the Netherlands, families of VPT infants are eligible to receive support from the ToP program, a responsive parenting intervention between discharge home and 12 months corrected age. The ToP program also includes specific intervention strategies targeting parental well-being. The aim of this study was to evaluate maternal and paternal anxiety and depression at discharge and at completion of the ToP intervention and their interrelationship.

In order to monitor parental mental health during the ToP program, mothers and fathers were asked to complete the Hospital Anxiety and Depression Scale (HADS) at the start (T0) and the end (T1) of the program. The HADS cut-off for clinical symptoms is 8 for both the anxiety and depression subscales. Families that participated in the ToP program between 2014 and December 2018 and gave consent to use data for scientific research were included. The level of anxiety and depression symptoms for mothers and fathers at both time points as well as the percentage in the clinical range were compared using t-tests and McNemar tests. Birthweight, gestational age and length of hospital stay (LOS) were also collected and examined as potential predictors.

At T0 (1 month post-term) 1454 mothers and 971 fathers and at T1 855 mothers and 439 fathers of 1234 singletons and 460 multiplets in the ToP program (mean gestational age = 29 3/7 weeks, mean birth weight = 1285 grams) filled in the HADS. Mothers and fathers scored significantly higher at T0 than T1 on anxiety and depression, and with higher rates in the clinical range on T0 (See also Table 1 for parents with complete data on both time points).

Mothers scored significantly higher on anxiety and depression than fathers at T0 and T1 (p < .05). Persistent clinical anxiety (at T0 and T1) occurred in mothers in 6.9% and in fathers in 3.2%, whereas 3.9% of mothers and 1.7% of fathers had persistent clinical depression. LOS was the most important clinical risk factor at T0 for maternal and paternal anxiety and maternal depression, but only paternal anxiety was still associated with LOS at T1.

Reported symptoms of anxiety and depression decrease in mothers and fathers who were supported by the ToP program during the first year after discharge. Mothers reported more symptoms of anxiety and depression than fathers, but rather low symptoms were found for mothers and fathers compared to other studies. This may indicate the importance of early screening and guidance of parental mental health during post-discharge parenting interventions.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Mean scores and percentage above clinical level for parents who completed the HADS at both time points

COI: none declared
ID: 561

TITLE: INVOLVING PREMATURE NEWBORNS’ PARENTS IN REVIEWING A NEONATOLOGY STUDY CONSENT MATERIAL

AUTHORS: Maude LUHERNE 1; Charlotte BOUVARD 2; Guy CARRAULT 3,4; Patrick PLADYS1,3,4,5

AFFILIATIONS: 1 CHU Rennes, Neonatology, France
2 SOS-prema parent association, France
3 Inserm 1099 signal and images analyses, Rennes, France
4 Rennes 1 University, France
5 CIC1414/HUGOPERN/Pedstart, Rennes, France

CONTENT:

Obtaining patient’s informed consent is especially a challenge in neonatal intensive care units (NICU) where parents and infants are frequently exposed to difficult situations. While parents value to be asked for consent and to actively take part to the consent process, written material prove to be little used by parents in deciding whether to consent. Literature shows that written information sheets are valued by parents and clinicians but are often perceived as complex and not adapted to their information needs. Empirical investigations examining parental perspectives on consent material are still lacking.

Our objective was to investigate parents’ review of Institutional Review Board-validated information sheet and consent form of an ongoing study on premature newborns (Digi-NewB) through a qualitative study based on open-ended questionnaire and inductive analysis approach. Digi-NewB is an EU-funded Digi-NewB study (NCT02863978) aiming to develop a decision support system for an early diagnosis of neonatal infection. We studied parents’ own review of the letter of information and consent form previously validated by the Institutional Review Board. We involved voluntary parents members of a French national network representing parents of premature newborns “SOS Prema”. Their comments were classified and categorized. Categories were improved until saturation was reached.

Five categories emerged from the 29 parents who replied to the consultation (115 comments): two on general levels and three on specific levels. 19 parents had comments on the overall comprehensiveness of the document and 14 on form corrections, while 9 parents had specific comments on the decision-making and consent process, 8 parents on the study impact and 7 parents on data management processes. Their comments aimed in particular at improving understanding of the material and its readability, and at anticipating how the consent process and study would impact their and their newborn life at the hospital. Parents tend to value to be informed on data management, treatments and analysis aspects.

Experienced parents involved in the study operated a different review than the ethical board.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 562
TITLE: BREASTFED NEONATES SHOW INCREASED IMMUNE TOLERANCE AGAINST MATERNAL ANTIGENS.
AUTHORS: Hannah Wood; Richard Powell; Andrew Ewer; Paul Moss; Gergely Toldi.
AFFILIATIONS: Neonatal Intensive Care Unit, Birmingham Women’s and Children’s NHS Foundation Trust, Birmingham, UK. Institute of Immunology and Immunotherapy, University of Birmingham, UK.

CONTENT:

During pregnancy, a unique symbiosis must be maintained between the maternal and fetal immune systems to accommodate the fetus. These systems present as immunologically distinct entities to one another and the maternal immune system is known to be suppressed in pregnancy. The neonatal immune response to infection is reduced and significantly contributes to morbidity and mortality worldwide. We hypothesised that immune suppression in pregnancy may be extended to the neonatal immune system in a bidirectional manner.

Our study investigates the interaction and adaptation of the maternal and neonatal immunological systems by analysing T cell responsiveness in the early postnatal period.

20 dyads of mothers and neonates delivered by elective caesarean section at term following an uncomplicated pregnancy were recruited. Maternal peripheral blood samples were taken prior to caesarean section. Cord blood was collected at birth followed by a neonatal peripheral blood sample at three weeks of age. T cells were isolated and mixed lymphocyte reactions (MLRs) were performed over 5 days. MLRs were setup for cord blood responders versus maternal antigens and vice versa, and neonatal responders versus maternal antigens and vice versa. Positive and negative controls were included. Cells were stained for CD3, CD4 and CD8 prior to flow cytometry.

The percentage of proliferating maternal responder cells to cord blood antigens and neonatal antigens show a stable response between birth and 3 weeks for all subsets. Conversely, neonatal responder cells show a decreased response to maternal antigens at 3 weeks in all subsets. This finding is in opposition to our original hypothesis. We therefore considered the influence of feeding on this. Of the 20 neonates, 11 were exclusively breastfed and 4 mixed fed (breastfed with formula top ups). The combined effect in these 15 neonates receiving any breastmilk shows the decreased response in CD3 cells at 3 weeks. However, in the 5 exclusively formula fed there is an increased response at 3 weeks (Figure 1).

Neonates receiving breastmilk show a decreased CD3 response to maternal antigens at 3 weeks of age compared to birth. However, this reduction was not observed in exclusively formula fed neonates. Interestingly, a neonate only needs some breastmilk to show the same response as an exclusively breastfed neonate. This response could be due to on-going antigen load via breastmilk and may reflect persisting immune tolerance towards maternal antigens.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=37b28231c0b2d459d8dbd81d07ab0728-MjAxOS0wNSM1Y2UyNjY2YzkkNWMw

IMAGE / TAB CAPTION: Figure 1 - Mixed lymphocyte reactions showing the response of CD3 cord blood/neonatal responders at birth and 3 weeks of age according to the method of feeding.

COI: None declared
ID: 563

TITLE: WEANING HIGH FLOW NASAL CANNULA THERAPY ON THE NEONATAL UNIT: CLINICAL PREDICTORS OF SUCCESS.

AUTHORS: Rebecca Naples 1
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CONTENT:

High flow nasal cannula therapy (HFNC) is widely used on the neonatal unit, but there is currently no evidence-based strategy for weaning or discontinuing support. A Cochrane review assessing strategies for discontinuation of high flow in preterm infants found no studies to include, and significant variation in practice exists. This study reviewed high flow weaning attempts in a tertiary neonatal unit, aiming to identify clinical factors predictive of successful weaning, to aid decision making and guideline development.

A retrospective analysis of high flow weaning in a tertiary neonatal unit over a one year period from 1st January to 31st December 2018 was performed. All infants without major congenital anomalies were included, and data obtained from their clinical records. Infant demographics, general respiratory management, and details of all changes in HFNC including flow rate, FiO2, CO2 levels and timing of changes were recorded.

Successful weaning was defined as remaining at a lower flow rate for >72 hours, and successful discontinuation defined as remaining off respiratory support for >72 hours.

87 infants received 135 episodes of HFNC, with 522 flow rate decrements: 410 weaning and 112 discontinuation steps. Median gestation was 28+4 (IQR 27-30) and age when starting HFNC 16d (IQR 5-39d). Median HFNC duration was 20d for infants born <28wk and 8d for those 28-32wk.

Successful weaning occurred in 326/370 (88.1%) when FiO2 ≤ 0.35 and 27/40 (67.5%) when FiO2 >0.35. Flow rate changes ranged from 0.5-2l/min, with no correlation between size of change and success. Median failure time for unsuccessful weaning attempts was 31 hours.

Discontinuation of HFNC was successful in 81/100 (81%) when FiO2 <= 0.35. Cessation of HFNC occurred at 1.5-5L/min, with no correlation between flow rate and success.

CO2 was measured prior to weaning in 276/522 (52.8%). Success of weaning was similar in normo- and hypercapnia (88.4% and 89.8% with pCO2 <7 or ≥7kPa respectively).

Weaning and discontinuation of high flow nasal cannula support appears more successful when FiO2 ≤0.35. Although in this cohort flow rate and CO2 did not correlate with success of weaning, this may be important in high risk subgroups such as extremely preterm infants and those with BPD. Ultimately, randomised controlled trials are required to assess optimal high flow weaning strategies.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 564

TITLE: MATERNAL EDUCATION AND LANGUAGE SKILLS AT 2 YEARS CORRECTED AGE IN CHILDREN BORN VERY PRETERM

AUTHORS: Mariane Sentenac 1; Marie-Laure Charkaluk 2; Samantha Johnson 3; Jennifer Zeitlin 1

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CONTENT:

In the general population, children from socioeconomically disadvantaged families face higher risks of developmental language delay (DLD). Less research exists on very preterm (VPT) children and results have been contradictory, which may reflect a lesser impact of socioeconomic factors when perinatal risks for delayed development are high. Our objective was to investigate the association of maternal education, used as a proxy for the socioeconomic context, with DLD at 2 years of age by degree of perinatal risk, in children born VPT in six European countries.

Data come from the area-based Effective Perinatal Intensive Care in Europe (EPICE) cohort of children born <32 weeks’ gestational age (GA) in 2011/2012. Perinatal data were abstracted from medical records and follow-up was conducted using parental questionnaires at 2 years corrected age. Six countries (Belgium, Estonia, France, Italy, Netherlands, UK) used a validated short form MacArthur Developmental Communicative Inventories version; DLD was assessed using 3 outcomes: not yet combining words; and expressive vocabulary <10th percentile and <10 words. We estimated RRs for DLD for maternal education overall and by perinatal risk (low, moderate, high), classified using GA, small for gestational age and severe neonatal morbidities.

Among the 4666 eligible children, 2990 (64%) were followed up. After exclusion of families speaking only other languages at home and children with severe hearing impairment, 2643 VPT children (mean GA 28.8 weeks) assessed at a median 24 months corrected age were included in this study. 25.3% were not combining words, almost 40% were <10th percentile for expressive vocabulary with 10% having < 10 words. Among children with low perinatal risk only, risks of DLD were higher when mothers had less than high school versus tertiary education (RR word combination: 2.2 (95% CI: 1.5; 3.3); RR <10th percentile: 1.6 (95% CI: 1.2; 2.1); RR <10 words: 2.6 (95% CI: 1.3; 5.3) – adjusted for country and age at assessment). Among children with higher perinatal risk (lower GA, SGA and severe morbidities), maternal education was not associated with DLD.

Maternal education was associated with developmental language delay at 2 years of corrected age only among VPT children with low perinatal risk. This finding suggest that social factors interact with perinatal risk; this interaction may explain contradictory findings in previous studies.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 568

TITLE: The Danish Newborn Quality Database: A resource for quality improvement and research.

AUTHORS: *Petersen JP 1, Moelholm B 2, Zachariasen G 3, Garne E 4, Cueto HT 5, Henriksen TB.

AFFILIATIONS: *On behalf of the Danish Newborn Quality Database Steering Committee
1 Pediatric Department, Aarhus University Hospital, Aarhus, Denmark 2 Pediatric Department, Nordsjaellands Hospital, Hilleroed Denmark 3 Pediatric Department, Odense University Hospital, Odense, Denmark 4 Pediatric Department, Lillebaelt Hospital, Kolding, Denmark 5 The Danish Clinical Registries, Aarhus, Denmark

CONTENT:

The newborn period is associated with high mortality and morbidity which is mainly due to preterm birth. Research efforts have improved both mortality and morbidity in preterm newborns. However, knowledge related to pathophysiology and optimal treatment strategies in preterm babies is still incomplete. The Danish Newborn Quality Database (DNQD) aim to monitor and improve the care and quality of treatment for all newborns in Denmark, through specific quality indicators. Further, due to population fullness, access to biological material, antenatal data and complete follow-up, DNQD will provide a unique research resource for improving neonatal care.

Denmark has some 62 000 births per year. Since 2016 DNQD collects data on all newborns in Denmark. DNQD operates within the national framework of the Danish Clinical Registries (RKKP), which ensures access to a skilled team of statisticians, epidemiologists and data-managers. Reporting to DNQD is mandatory due to the affiliation with RKKP. Data from DNQD will be available for researchers through an application process. Further, several validated population based clinical registries exist and it will be possible to combine data from these with data from DNQD. These additional registries include the Danish Quality Database for Births, The Danish Fetal Medicine Database, the Danish Neonatal Screening Biobank and several databases with neurodevelopmental outcomes.

Each year DNQD will report nine indicators of newborn health: 1) perinatal and one-year survival for all newborns stratified by gestational age at birth (GA) 2) re-admission rates 3) survival without major neonatal morbidity (very preterm newborns stratified by GA) 4) rates of breastfeeding at discharge from the NICU 5) skin-to-skin contact within the first six hours after birth 6) core temperature at admission at the NICU 7) normal weight at discharge from the NICU 8) neocomfort score within the first 24 hours of life 9) rates of treatment with antibiotics. From 2020 scores from the Ages and Stages Questionnaire at postmenstrual age 24 months is planned as indicator 10. The indicators are reported for all hospitals, and as compiled by the five Danish regions and at the national level. The first official report is due September 2019 for the year 2018.

DNQD will be the 4th Nordic newborn database reporting population-based outcomes. DNQD will be an important tool for benchmarking quality of care and, combined with other Danish databases, a unique resource for population-based research. We will present DNQD data 2016 to 2018, with a focus on survival and perinatal morbidity. Further, we will introduce the possibilities for research on DNQD data.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None Declared
ID: S76

TITLE: Preventing Hypothermia in Extreme Preterm Newborn Admissions: Continuous infant temperature monitoring in the delivery room enhances a regionally implemented thermoregulation care bundle

AUTHORS: Paul Cawley 1, Lynn Jones 1, Paul Clarke 1, Priya Muthukumar 1

AFFILIATIONS: 1. Neonatal Intensive Care Unit, Norfolk & Norwich University Hospital, UK

CONTENT:

Neonatal hypothermia is associated with increased morbidity & mortality. Maintaining normothermia and preventing cold stress, is an important aspect of early newborn care. In the East of England, a regional First Hour of Care quality improvement project has improved rates of normothermia in extremely preterm infants in our unit. However, a significant proportion remain outside our 36.5-37.5°C target. As part of enhanced monitoring of infant’s delivery room cuddles, we have implemented a continuous infant temperature monitoring Standard Operating Procedure (SOP).

Aim: to assess if our continuous temperature monitoring SOP has improved rates of admission normothermia.

Retrospective audit of inborn infants <28+0 weeks gestation. Historical data provided by the First Hour quality improvement project across 2 audit cycles on our unit between 2014-2017. Contemporary admission temperatures, gestation, birth weight and admission time were from our electronic system for all admissions from 01/01/2019 to 31/03/2019. Continuous data were analysed by a two-tailed Mann-Whitney test & categorical data analysed by the Chi-square test for trend. Data are medians, range (R) or interquartile range (IQR).

For continuous temperature monitoring we affix a skin temperature probe under the infant’s axilla. Our regional thermoregulation care bundle specifies optimal ambient room temperature, use of radiant heater, minimisation of drafts and use hat & plastic bag or hoodie.

Historical Data:

Pre-implementation (2014) n=7, median admission temperature 36.4°C [R 35.5-37.7°C]. August 2015-January 2016 n=11, median admission temperature 36.6°C [R 35.5-38.1°C]. March–August 2017 n=13, median temperature 36.9°C [R 35.8-38.0°C].

Contemporary Data

January-March 2019 n=8, median birth weight 848g, median gestation 26+5 weeks & median admission time 27 minutes. Median admission temperature 37.1°C [IQR 36.6-37.3°C]. Two infants’ admission temperatures were out of normothermia range; one infant 36.4°C and one infant, with gram positive early onset sepsis, 38.8°C. Infants were significantly warmer on admission since starting the continuous temperature monitoring SOP, versus historical data: 37.1 Vs 36.5°C [IQR 36.0-37.0, p=0.04] The figure shows a statistically significant trend of improving admission normothermia, as our audit cycles have progressed.

Within our small data series, we have observed an improving trend in admission normothermia. Continuous temperature monitoring has enhanced improvements from our regional care bundle. For the first time within our audit cycles, no infant was admitted with moderate hypothermia (Temperature<36.0°C). Continuous skin temperature monitoring started in the delivery room has the potential to assure admission normothermia for extremely preterm babies.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Contingency graphic: Percentage of Infants <28+0 Weeks Gestation with Admission Temperature Below, In and Above Target Range
Jan to March 2019 versus First Hour of Care Historical Data – Norfolk & Norwich NICU

COI: None declared
ID: 577

TITLE: THE INSULIN-LIKE GROWTH FACTOR 1 (IGF-1) SYSTEM IN THE PRETERM RABBIT PUP - A CHARACTERIZATION OF THE IGF-1 MRNA EXPRESSION IN LIVER, IGF-1 PROTEIN LEVELS IN SERUM AND BRAIN DISTRIBUTION OF IGF-1 RECEPTORS

AUTHORS: Bo Holmqvist1; Claes Ekström2; Galen Carey3; Xiaoyang Wang4; Ann Hellström5; Norman Barton3; Magnus Gram2; David Ley2

AFFILIATIONS: 1. Imagene IT AB, Lund, Sweden; 2. Department of Pediatrics, Institute for clinical sciences, Lund University 3. Takeda Inc, Boston, USA; 4. Institute of Neuroscience and Physiology, Sahlgrenska Academy, Gothenburg University; 5. Department of Clinical neuroscience, Sahlgrenska Academy, Gothenburg University

CONTENT:
IGF-1 is an essential regulator of fetal growth and brain development. Preterm birth in the human is followed by a rapid decrease in serum levels of IGF-1 and decreased levels of IGF-1 have been associated with development of severe morbidity. A recent clinical trial indicated that supplementation with IGF-1 prevented development of severe intraventricular hemorrhage (IVH) in extremely preterm infants. In order to better understand possible mechanisms involved in IGF-1-induced IVH prevention, we evaluated important aspects of the endogenous IGF-1 system; IGF-1 mRNA expression in the liver and associated serum protein levels and brain IGF-1 receptor (IGFR) distribution in the preterm rabbit.

Rabbit pups were delivered by cesarean section at E29 (preterm) or by vaginal delivery (term = E32), housed in a controlled environment and fed twice daily with bovine colostrum via a gastric tube. Serum concentrations of IGF-1 protein and liver expression of IGF-1 mRNA were determined at 0, 2, 6, 12, 24, 48 and 72 h of age in preterm pups. Paraffin brain sections from perfusion fixed untreated animals (preterm pups at 20 h and term pups at 5-7 h and 96 h) were prepared for immunohistochemistry against IGF1R, by labeling with primary antibodies against IGF1R, and processed for chromogen visualization and density/quantitation analysis with confocal microscopy.

Mean (SD) serum concentrations of IGF-1 decreased from 166 (33) ng/ml at birth (E29) to 28 (9) ng/ml at day 3 (P0). Hepatic expression of IGF-1 mRNA did not vary over time. The IGF1R was widely distributed in multiple brain regions in both preterm and term pups (Fig). The most abundant density of IGF1R was observed in the choroid plexus, the subfornical organ, the meninges, major fiber tracts, the cortex and sub-ependymal germinal zones. The IGF1R, was mainly localized on outer cell membranes, on cell bodies and along nerve fibers. Quantitative analysis of IGF1R immunoreactivity showed similar IGF1R densities in preterm and term pups of corresponding ages. IGF1R density decreased with increasing postnatal age in term pups.

In line with what is observed in the preterm human infant, serum protein levels of IGF-1 in the preterm rabbit pup decrease rapidly following birth. The IGF1R is widely expressed in the brain following birth, with high expressions in regions and structures relevant for vessel rupture in IVH. The preterm rabbit thus presents a well-suited model for characterization and evaluation of mechanisms involved in IGF-1 induced prevention of IVH.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure. Insulin-like growth factor receptor immunoreactivity demonstrated in a sagittal view of a preterm rabbit brain, color-coded for illustration of the wide distribution and its densities (red= high, green= medium and blue= low). Inserted, bottom right

COI: DL and AH hold stock/stock options in Premalux AB, and received consulting fees from Shire. NB and GC are employees of and own stock/stock options in Shire.
ID: 581
TITLE: BENEFITS OF SURFACTANT THERAPY IN PNEUMONIA AND PNEUMOTHORAX IN NEONATES
AUTHORS: Gabriela Zaharie1, Monica Hasmasanu1, Veronica Obada1, Blaga Ligia1, Tudor Drugan2, Alexandru Zaharie3, Melinda Matyas1
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CONTENT:
Surfactant therapy is widely supported by literature in respiratory distress in premature newborns but is less standardized at the late preterm or term newborn with pneumonia and pneumothorax where surfactant may be inhibited. We hypothesized that the use of exogenous surfactant would decrease the risks of complications or death in pneumonia and pneumothorax.

The prospective study was conducted in the Neonatology I Department, Cluj, since January 2014 - January 2019. The case group consisted in 26 cases of newborns BW(birth weight) = 2745±110g and gestational age (GA)= 35±1.5 weeks and 46 cases of a control group with BW= 3320±79 and GA= 36±1.7 weeks. We analyzed the need of resuscitation in the delivery room, Apgar score, type of respiratory support, blood gas parameters, administration time of surfactant and ratio PaO2 / FiO2 before and after administration of surfactant replacement for the case group. We quantified the resuscitation in the delivery room as: 1- routine care, 2- need of positive pressure support, 3- need of intubation.

Statistical analysis was done with SPSS. All participants had informed consent given and signed.

The severity of respiratory distress was similar (table I). The Apgar score was similar in all cases (p=0.41). The resuscitation maneuvers were also similar (p=0.39)(table II). Referring to diagnostic the FiO2 in the delivery room was significantly higher in the group which develop pneumothorax(p=0.005)(table III).

Surfactant was administrated with the newborn intubated. In the case of pneumothorax we applied HFO and for pneumonia for the first time we applied conventional ventilation:SIMV(table III). The administration time for surfactant was 18.5 hours of life, consider both pathologies. The need of oxygen significantly decrease significantly in both studies groups. after surfactant replacement(p=0.001)(table IV).

Ratio PaO2/ FiO2 increased significantly after surfactant administration from 0.85 to1.65(p=0.00) in all the cases. Mortality was not influenced by surfactant administration.

The benefits of surfactant administration are: reduce the duration of respiratory support significantly in pneumonia group, decrease the FiO2, improve oxygenation and increases the ratio PaO2 / FiO2, both in pneumonia and pneumothorax groups. Surfactant was administrated later compared than in RDS, at 18,5h of life. Surfactant administration has no influence on the mortality either in pneumonia or pneumothorax.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 582


AUTHORS: Kenneth Tan 1; Arul Earnest 1; Krishna Gopagondanahalli 1; Angela McCullagh 1; Gill Nixon 1

AFFILIATIONS: 1 Department of Paediatrics, Monash University, Melbourne, Victoria, Australia

CONTENT:

Low-flow supplemental oxygen therapy facilitates discharge of infants with chronic lung disease from the NICU. The primary indication for home oxygen therapy (HOT) is chronic lung disease (CLD), of prematurity. Other neonatal indications for home oxygen therapy include congenital heart disease, pulmonary hypertension or neuromuscular disease. As HOT requires considerable by multiple discipline and investment of clinical resources, there is a need to better understand the prescribing pattern for infants being discharged from the NICUs.

Anonymised demographic and clinical data was obtained from the ANZNN registry which audits outcomes of infants treated in the NICU. The population of admissions from 1995 to 2015 was studied. Analyses (including logistic regression) were performed using Stata I/C 14.2.

Of the 174,722 infants, 5633 (3.2%) were discharged on oxygen therapy. 61% were male. 68% (3857/5633) of these were infants 32 weeks gestation, representing 16% of HOT group; and 763 did not have CLD with other indications for oxygen therapy. Annual rate of HOT was median of 3.2% (2.3 -4.7) with no significant yearly trend. Significant risk factors were growth restriction OR 1.4 (95%CI 1.3-1.5), gestation (weeks) OR 0.9 (95%CI 0.89-0.93), pneumothorax OR 1.4 (95%CI 1.2-1.6), INO use OR 2.1 (95%CI 1.9-2.4) and CLD OR 59 (53-66).

Preterm infants with remain the main group discharged on home oxygen, while late preterm/term infants even without CLD remain an important group. The rate of home oxygen at discharge appears to be stable over the past two decades in the ANZNN.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 588

TITLE: Predictors of chronic lung disease in preterm infants <32 weeks from Australia and New Zealand between 1995 and 2015 - identification of non-linear trends

AUTHORS: Arul Earnest 1; Jed Tan 2; Kenneth Tan 3

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CONTENT:

Health systems change over time may be associated with chronic lung disease of prematurity, and this has not been well studied. Quantifying risk factors would also assist clinicians in identifying the highest risk infants.

Demographic and clinical data were obtained from the ANZNN registry which audits outcomes of infants treated in the NICU in Australia and New Zealand. The study population were infants admitted from 1995 to 2015 with gestational age ≤32 weeks. Multivariate logistic regression and restricted cubic spline models were used, and data analysis performed in Stata V14 (Stata Corp, College Station, Tx, USA). Level of significance was set at 5%.

Of 85,477 infants, 55% were male and 71% singletons, with LSCS as most common mode of delivery (38%). Median birthweight was 1.3 kg (IQR: 0.98-1.6), mean(SD) GA was 29(2.4) weeks. Mean Apgar score at 5-min was 7.9 (SD=1.7). 11,962(17.1%) babies had CLD. In the multivariate analysis, the following factors were significantly and independently associated with CLD: birthweight, GA, 5-min Apgar, IUGR, INO use, NEC, antenatal steroids, twin births, gender, method of birth, surfactant therapy, need for ventilation and year of birth. Female infants had 31% reduction (95% CI: 28%-35%) in odds of CLD as compared to males (p<0.001). There was a dose-response relationship between antenatal administrations of corticosteroids with CLDs, with OR for incomplete 7 days OR=1.5. A gradual decline in the odds ratio of CLD until 2005, when subsequently the odds ratio showed an increase.

We have presented a number of independent risk factors which can be used by clinicians to risk-stratify babies. Cubic spline analysis shows there was a systemic shift in the odds of oxygen therapy from 2005 after risk adjustment, indicating structural changes in the management of infants treated at NICUs over the years.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: S90

TITLE: HEMOSTATIC AND FIBRINOLYTIC PARAMETERS IN PREBUBERTAL CHILDREN BORN PREMATURELY – ASSOCIATIONS WITH CARDIOVASCULAR RISK FACTORS

AUTHORS: Panagiota Markopoulou 1, Michail Mazarakis 2, Aimilia Mantzou 3, Ioannis Papassotiriou 4, Eleni Platokouki 2, Tania Siahanidou 1

AFFILIATIONS: 1 Neonatal Unit of the First Department of Pediatrics, National & Kapodistrian University of Athens, School of Medicine, Athens, Greece, 2 Hemophilia Center and Hemostasis Unit, "Aghia Sophia” Children’s Hospital, Athens, Greece, 3 Choremio Research Laboratory, “Aghia Sophia” Children’s Hospital, Athens, Greece, 4 Department of Clinical Biochemistry, “Aghia Sophia” Children’s Hospital, Athens, Greece

CONTENT:

It still remains a controversial issue whether prematurity consists an independent risk factor for the subsequent development of metabolic syndrome and cardiovascular disease. Components of the metabolic syndrome have been associated with hemostatic abnormalities and impaired fibrinolysis, which may lead to a hypercoagulable condition. It has not been studied, so far, if preterm birth is associated with hemostatic and/or fibrinolytic alterations in later life. The aim of this study was to determine hemostatic and fibrinolytic parameters in prepubertal children born prematurely and to assess possible correlations with cardiovascular risk factors.

The study population consisted of 91 children, 8-13 years old [52 preterm of gestational age 33 (30-34.2) weeks and 39 fullterm, as controls]. Anthropometric measurements (body mass index-BMI, waist/hip circumference-WHR) and arterial blood pressure were assessed. Hematological and biochemical parameters (full blood count, serum glucose, insulin, and lipid levels), as well as plasma concentrations of hemostatic and fibrinolytic parameters [fibrinogen, von Willebrand Factor antigen (vWFAg), factors VIII and IX, proteins C and S, plasminogen, plasminogen activator inhibitor-1 (PAI-1)] were also assessed. For statistical analysis, Student’s t-test and stepwise regression analysis were applied.

In comparison with controls, children born prematurely, of gestational age ≤32 weeks, presented with higher levels of vWFAg and PAI-1 (p=0.03 and p=0.04, respectively). No significant difference of other hemostatic and fibrinolytic parameters assessed was found between preterm and fullterm population. In the total preterm population, fibrinogen correlated significantly with BMI (β=4.01, p=0.02) and insulin levels (β=2.76, p=0.01); vWFAg correlated significantly with gestational age (β=-2.99, p=0.04) and diastolic blood pressure (β=-1.6, p=0.01); factor IX was positively correlated with insulin levels (β=0.96, p=0.03); protein S was positively correlated with WHR (β=95.05, p=0.02); plasminogen was correlated significantly with BMI (β=1.63, p<0.001); PAI-1 levels were correlated significantly with gestational age (β=-0.09, p=0.05), BMI (β=0.11, p=0.03) and glucose levels (β=0.03, p=0.03).

Prepubertal children born prematurely of gestational age ≤32 weeks demonstrate higher vWFAg and PAI-1 levels in comparison with controls, reflecting hypercoagulability and hypofibrinolysis. In the total preterm population, hemostatic and fibrinolytic parameters are independently associated with metabolic syndrome components and cardiovascular risk factors, implicating their role in the progression of metabolic syndrome and cardiovascular disease.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 592

TITLE: Accuracy and Variability of Parenteral Syringes used in Neonatal Patients

AUTHORS: Brian Dela Musoke (1), Kamelia Krysiak (1), Brian Cleary (2), Naomi McCallion (2), Fiona O’Brien (1)

AFFILIATIONS: 1 School of Pharmacy, Royal College of Surgeons in Ireland, Dublin 2, Ireland
2 Rotunda Hospital, Dublin 1, Ireland

CONTENT:

In the Neonatal Intensive Care Unit, where critically ill and premature infants typically require simultaneous administration of multiple medications, medication safety is a key concern for healthcare professionals. Medications are often administered to this cohort via parenteral syringes due to their inability to swallow solid oral medications and available pharmaceutical formulations. Doses may be calculated on a weight basis which may be very low, resulting in the need to measure accurately low volumes of medications via syringe. This current experiment assessed the accuracy of syringes used in drug administration to neonatal patients in the Rotunda Hospital Dublin.

1 mL, 2 mL, 5 mL and 10 mL syringes were tested by 3 users. Methylene blue was made into a 1 mg/mL solution using deionised water and 10% w/v glucose to represent varying solution viscosity. This stock solution was diluted to concentrations of between 2 and 10 mcg/mL and used to generate a standard curve assayed by UV spectrophotometer. Each of the three users drew up 1 mL of the 6 mcg/mL solution in the pre-weighed syringe and weighed the filled syringe. The solution was then expelled into a quartz cuvette, and the now emptied syringe was weighed again. The volume in the cuvette was then made up to 2 mL and analysed in the UV. Weight of fluid delivered, dead space volume and the concentration of methylene blue delivered was calculated.

There was a general trend of accuracy decreasing as syringe size increased (Figure 1). This was especially true with the low viscosity solution, where the 1 mL and 2 mL syringes produced lower % error values and therefore higher accuracy than the 5 mL and 10 mL syringes. The 10 mL syringe was especially inaccurate, with dose accuracy only reaching 87% in terms of concentration delivered, and only reaching 84% for volume fluid delivered. The high viscosity solution produced lower % error values and therefore higher accuracy values than the low viscosity solution, with no significant reduction in terms of concentration delivered, and a reduction to 86% at the lowest viscosity with regards to fluid delivered. The dead space values obtained for each syringe size stayed consistent across both viscosities. Dead space volume increased relative to syringe size, and decreasing accuracy.

The current study has shown that there is potential for significant dosing error when 5 and 10 ml syringes are used; however even with smaller syringes, dosing errors were found. This dosing error was seen to be more pronounced with low viscosity solutions. Dead space volume also increased as syringe accuracy decreased which may have played a role in the lowered accuracy of the larger sized syringes across both solutions.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1: Accuracy% (Concentration) vs Syringe Size

COI: None declared
ID: 595

TITLE: BRAIN-DERIVED NEUROTROPHIC FACTOR (BDNF) SERUM LEVELS IN FULL-TERM NEONATES WITH SEPSIS: PRELIMINARY RESULTS

AUTHORS: Vasiliki Bourika 1; Kalliopi Michalakakou 2; Eugenia Hantzi 2; Ioannis Papassotiriou 2; Tania Siahanidou 1

AFFILIATIONS: 1 Neonatal Unit, First Department of Pediatrics, National and Kapodistrian University of Athens, Medical School, Athens, Greece
2 Department of Clinical Biochemistry, “Aghia Sophia” Children’s Hospital, Athens, Greece

CONTENT:

Neonatal infections may cause severe long-term consequences and have a negative impact on neurodevelopmental outcome. Brain-Derived Neurotrophic Factor (BDNF) acts as a growth factor, supports the survival and differentiation of neurons and promotes synaptogenesis. Circulating BDNF levels are highly correlated with BDNF concentrations in the central nervous system, whereas serum BDNF levels in neonates consist an early marker of aberrant neurodevelopment. As far as we know, circulating BDNF levels have not been determined in neonatal sepsis. The aim of this study was to evaluate serum BDNF levels in septic neonates and to examine associations with CRP, SAA and cytokines serum levels.

The study population consisted of 21 full-term neonates with clinical signs and symptoms of sepsis and 32 neonates, of similar postnatal age and gender distribution to those of septic infants, as controls. All neonates with sepsis underwent blood, CSF and suprapubic urine sampling on admission for analysis and culture; Cultures were positive in 11/21 septic neonates. Besides, blood samples were drawn in all patients during the first 24 hours (acute phase) and at 7th-10th day of hospitalization (recovery), and once in controls, for routine blood tests (FBC, renal and liver function, serum CRP levels), as well as to determine SAA levels by immunonephelometry, serum cytokines (IL-1b, IL-6, TNF-a) using Luminex technology and BDNF levels in serum by ELISA.

Median (25th-75th) percentiles of serum BDNF levels did not differ significantly between patients and controls at the acute phase of infection [10200 (6520-17120) and 15100 (8245-18430) pg/ml respectively, p=0.378] or at recovery [12960 (6740-16360) and 15100 (8245-18430) pg/ml respectively, p=0.284]. In patients, BDNF levels at the acute phase of infection did not differ significantly than levels at recovery (p=0.811). Moreover, BDNF levels did not differ significantly between patients with positive blood/urine and/or CSF cultures [9800 (6520-15240) pg/ml] and those with negative cultures [11930 (7435-18665) pg/ml] (p=0.705). No correlation was found between BDNF and CRP, SAA, IL-1b, IL-6, or TNF-a levels.

According to these preliminary results, no alterations were recorded in serum BDNF levels in septic full-term neonates. Whether circulating BDNF levels may be impacted by neonatal sepsis in preterm infants remains to be evaluated.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None Declared
ID: 599

TITLE: TIMELINE OF RESPIRATORY FUNCTION CHANGES FOLLOWING ADMINISTRATION OF SYSTEMIC POSTNATAL CORTICOSTEROIDS IN EXTREMELY PRETERM INFANTS

AUTHORS: Ourania Kaltsogianni 1, Theodore Dassio 2, Ann Hickey 3, Ravindra Bhat 4, Anne Greenough 5

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CONTENT:

Systemic postnatal corticosteroids represent a common clinical intervention aiming to prevent or treat bronchopulmonary dysplasia in mechanically ventilated prematurely-born infants. Knowledge of the timeline of respiratory function changes following their administration could help define the optimal timing for extubation and would enable clinicians to assess response to treatment.

Our study aimed to describe the timeline of respiratory function changes before, during and after the administration of systemic corticosteroids, their effect on oxygen diffusion and ventilation efficiency and explore demographic parameters that can determine the magnitude of response to treatment.

Retrospective cohort study of ventilated preterm infants that received a nine-day course of dexamethasone at a tertiary neonatal unit in ten years. The response to corticosteroids was defined as the difference between the FiO2 before starting steroids and lowest value of FiO2 during the course. We calculated the transcutaneous saturation to fraction of inspired oxygen (FiO2) ratio (SFR) to characterize oxygen diffusion and the ventilation efficiency index (VEI) to describe the efficiency of ventilation before, during and after the steroid course. Using two paired values of FiO2 and SpO2 for each infant, we calculated the ventilation perfusion ratio (VA/Q), the right shift of the oxyhaemoglobin dissociation curve and the percentage of right-to-left shunt for three time endpoints.

Seventy (38 male) infants with a median (IQR) gestational age of 25.0 (24.3-26.0) weeks and a birth weight of 0.70 (0.63-0.82) kg were studied. The median (IQR) FiO2 dropped from 0.69 (0.57-0.81) before steroids to a minimum of 0.41 (0.35-0.53) 9 days after steroids. The median (IQR) SFR increased from 1.42 (1.19-1.72) before steroids to a maximum of 2.35 (1.87-2.83) at nine days after starting the course. The VA/Q before the course was 0.14 (0.11-0.18) and significantly lower than at 72 hours after starting treatment [0.22 (0.15-0.29), p<0.001]. The VEI increased from 0.06 (0.04-0.08) before steroids to a maximum of 0.10 (0.07-0.13) at 48 hours after starting steroids. The median (IQR) right-to-left shunt decreased from 10 (7-14) % before steroids to 7 (4-12) % 72 hours after their commencement (p=0.033). GA was significantly related to the response to steroids (rho=0.283, p=0.019).

Administration of systemic corticosteroids is associated with significant improvement in oxygen diffusion that lasts for the whole duration of the course. This improvement is characterized by an increase in the ventilation/ perfusion ratio and a decrease in intrapulmonary shunt. Less mature premature infants have a smaller response to corticosteroids compared to their more mature counterparts and exhibit a smaller decrease in oxygen requirement.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
TITLE: LOW SERUM LEVELS OF PDGF AND BDNF AT POSTNATAL DAY 1 ARE ASSOCIATED WITH DEVELOPMENT OF IVH IN EXTREMELY PRETERM INFANTS

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CONTENT:

Extremely preterm infants are at considerable risk of impaired brain maturation as well as developing the vascular-related brain injury intraventricular hemorrhage (IVH), which is associated with brain sequelae and lifelong effects on neurodevelopment. Preterm birth is also linked to alterations in hormonal axis and growth factor systems with major roles in neuro- and angiogenesis and ultimately in organ development. Multiple studies have identified early brain-targeted effects of growth factors but the association to IVH is not clear. The aim of this study was therefore to investigate the association between early serum levels of growth factors and the subsequent development of IVH.

Clinical variables were collected prospectively from a cohort consisting of 90 infants < 28 gestational weeks at birth. Blood samples were retrieved at postnatal day 1 and serum levels of brain derived neurotrophic factor (BDNF), platelet derived growth factor (PDGF), vascular endothelial factor (VEGF), Insulin-like growth factor-1 (IGF-1) and erythropoietin (EPO) were analyzed. Cerebral ultrasound was performed during the first week of life as well as on clinical indication. Univariate correlation was performed, where p < 0.2 was considered level of inclusion in logistic multivariate analysis. Matching of infants was performed by the variables Gestational age (GA) at birth, Gender, APGAR 5, Mortality, and Birth weight in descending order.

In total, 12 infants developed IVH grade III-IV (severe IVH) and 26 infants developed IVH grade I-II. Growth factor serum levels were available in 85 infants. Serum levels of PDGF and BDNF were significantly lower at postnatal day 1 in infants developing severe IVH compared to infants without IVH (p = 0.032 and p = 0.047), Figure 1. When adjusting for GA, serum levels remained lower for PDGF (p = 0.035). When matching individuals, serum levels of PDGF were significantly lower at postnatal day 1 (p = 0.030). When comparing infants developing IVH grade I-IV with the rest of the cohort, levels of BDNF were lower in infants with IVH (p = 0.008), also when adjusting for GA (p = 0.029). No significant differences were observed in serum levels of VEGF, EPO, and IGF-1.

This study shows that low levels of PDGF and BDNF early after birth are associated with the development of IVH. Both PDGF and BDNF are involved in angiogenesis through the recruitment of perivascular cells, promotion of endothelial cell survival and the induction of neoangiogenesis. These findings will be further investigated in a larger multicentre study with the aim to locate a potential predictive biomarker for IVH.
Figure 1, Serum levels of PDGF (ng/L) and BDNF (ng/L) on postnatal day 1 are lower in extremely preterm infants developing severe IVH. Serum levels of PDGF (A) and BDNF (B) were lower postnatal day 1 in infants developing severe IVH in a cohort consisting.

COI: None declared
ID: 603

**TITLE:** IMPROVED OUTCOMES FROM FEEDING WITH DONOR PRETERM MILK

**AUTHORS:** Gialeli Giannoula 1; Kapetanaki Anastasia 1; Dritsakou Kalliopi 1; Ioannoy Ioanna 1; Siachanidou Tania 2; Liosis George 1

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**CONTENT:**

Recent studies highlight the unique contribution of human milk to the dramatic survival increase of the VLBW infants. Unfortunately, during the first days of life, only a small percentage of mothers who gave birth prematurely can effectively support their preterm newborns with their own milk, which has very high amounts of nutrients. When mother’s own milk is insufficient neonatologists use donor human milk. However, the use of this type of human milk for preterms has many limitations as it contains insufficient amount of nutrients especially proteins and calories.

Aim: is to identify the importance of feeding preterm infants with donor human milk from preterm mothers DMPM

18 VLBW infants treated with DMPM along with their mother’s own raw milk (group A) compared to 42 VLBW ones treated with donor milk from full-term mothers in combination with their mother’s own raw milk (group B). In both groups, as infants received human milk>100 ml/Kg/d, the milk was fortified with targeted fortification. There were not significant differences between the two groups in respect to Birth Weight, Birth Height, Head Circumference as well as Crib Score.

Group A infants suffered from significant less episodes of sepsis compared to group B (p=0.037) and fewer episodes of feeding intolerance, but these differences were not statistical significant. Group A infants remained less days in ventilation and needed fewer days with oxygen requirements but these differences were statistical significant, only for the days in ventilation (p=0.0430). DMPM treated infants regained earlier their birth weight, and reached sooner full enteral feeding, however, these differences did not achieve the level of significance. Moreover, DMPM treated infants were presented with better somatometric characteristics at discharge but these differences were statistically significant only for body weight (p=0.038). Probably due to the fact that all the infants of the study were treated with human milk a very small percentage (3.4%) of the infants studied suffered NEC and ROP.

If postnatal growth failure is to be avoided, neonatologists must pay close attention to the increased needs of nutrients, especially proteins, the first vulnerable days of life. The provision of DHM from premature mothers may be the solution for VLBW infants until the mother can support her newborn with her own milk.

The study is being continued so as to prove the importance of donor preterm human milk to support VLBW infants.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ABSTRACT BOOK

POSTER WALK

ID: 605
TITLE: ABNORMAL GUT TRANSIT ASSESSED BY X-RAY CONTRAST IMAGING IN NECROTIZING ENTEROCOLITIS
AUTHORS: Jing Sun1; Wenchao Chen2; Susanne S. Kappel1,3,; Per T. Sangild1,3,; Lise Aunsholt1,3
AFFILIATIONS: 1 Comparative Pediatrics and Nutrition, Department of Veterinary and Animal Sciences, University of Copenhagen, Denmark; 2 Department of Neonatology, The First Affiliated Hospital of Jinan University, Guangzhou, Guangdong, China; 3 Department of Neonatology, Rigshospitalet, Denmark.

CONTENT:

Immature gut motility may be a risk factor for necrotizing enterocolitis (NEC) in preterm infants. However, it is not known whether gut dysmotility is the cause or the consequence of NEC progression and how motility may be disturbed in various gut regions. Food transit pattern in preterm infants beyond the stomach and duodenum is rarely studied. Using preterm pigs as a model for infants, we hypothesized that disturbed intestinal motility precedes NEC progression.

Seventy-three preterm pigs were fed increasing amounts of enteral milk diets for 5 d to induce signs of NEC. On day 4, serial abdominal x-ray imaging was performed to evaluate NEC symptoms and food transit time after oral provision of a contrast solution. Radiological signs of NEC (ileus, pneumatosis, pneumoperitoneum, intestinal collapse), the stomach and small intestinal emptying time (StEmpty, SiEmpty), times for the contrast solution reaching the cecum (ToCecum) and passing from cecum to rectum (CecumToRectum), were recorded. On d 5, gastric residual volume was recorded following euthanasia and severity of NEC lesions in intestine and colon was scored (1-2, healthy; 3-6 increasing severity to necrosis).

There was no radiological signs of NEC during X-ray examination. Piglets with NEC lesions in the small intestine (siNEC), with or without colon lesions, showed delayed StEmpty, ToCecum and CecumToRectum time (all p<0.05) relative to piglets without NEC (noNEC) or having NEC only in colon (coNEC). coNEC did not affect StEmpty, ToCecum and CecumToRectum times but prolonged the SiEmpty time (p<0.05). A tendency to delayed StEmpty, SiEmpty, and first passage of meconium were found in pigs with NEC compared to noNEC pigs (p=0.06, p=0.02, p=0.1, respectively). Regardless of NEC, StEmpty time was correlated to ToCecum time (r=0.66). Increased gastric residual volume was observed in both siNEC and coNEC pigs (p<0.05) and values were correlated to NEC severity score (p<0.001).

Early progression of NEC lesions, especially in the small intestine, is associated with a delay in food transit time across most gut regions in preterm pigs. Prolonged food transit time may be an early predictor of NEC onset in preterm infants.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Representative images of abdominal x-ray indicating contrast retained in the stomach (left), reaching to the cecum (middle), and contrast in the colon and rectum (right, a). Time for contrast solution reaching to the cecum (ToCecum, b) and emptied from sm

COI: None declared
ID: 608
TITLE: IMPLEMENTATION OF THE KAISER PERMANENTE SEPSIS RISK CALCULATOR (KP-SRC) IN A TERTIARY NICU IN THE UK: A PILOT STUDY
AUTHORS: Sunitha Vimalesvaran 1
Audrienne Sammut 2
Jogesh Kapadia 3
Sakina Ali 4
Bharat Vakharia 5
AFFILIATIONS: Neonatal Unit, Luton & Dunstable University Hospital NHS Foundation Trust, UK

CONTENT:

Current UK guidelines on the management of early-onset sepsis (EOS) lead to significant investigations and overtreatment of well neonates at risk of sepsis. This has the potential for antibiotic resistance, mother-baby separation and substantial healthcare costs. The KP-SRC provides a Bayesian predictive model that estimates individual sepsis risk based on maternal risk factors and neonatal clinical examination, without reliance on inflammatory markers. Data on clinical application of this calculator within a UK context is limited. We evaluated the use of KP-SRC and established the safety of this risk calculator in our centre.

The primary aim of our single-centre cohort study was to determine the difference in the number of infants ≥34 weeks’ gestation commenced on antibiotics for suspected EOS, using NICE guidelines compared to KP-SRC. Secondary aim was to ensure KP-SRC accurately identified infants who were subsequently treated with a prolonged course of antibiotics for clinical concerns of sepsis.

In Phase 1 (Sep 2018-Dec 2018), we retrospectively collected data on infants with maternal suspected sepsis as a sole risk factor. In Phase 2 (Mar 2019-Apr 2019), inclusion criteria extended to include all infants with suspected EOS and we collected data prospectively. KP-SRC scores were calculated and compared with actual antibiotic use and inflammatory markers. Scores were kept blinded to avoid clinical bias.

There were 1314 eligible infants in Phase 1 and 795 infants in Phase 2. Of these, 70 (53/1000 live births) and 82 (103/1000 live births) respectively, were treated with antibiotics according to NICE guidelines. None of the 152 babies had positive blood cultures. Based on KP-SRC, only 9 babies (0.7%) in Phase 1 would have required empiric antibiotics (relative reduction 87.5%). KP-SRC appropriately categorised the one baby who had >7 days antibiotics into the group requiring empiric antibiotics (Fig 1). In Phase 2, only 7 babies (0.9%) would have required empiric antibiotics (relative reduction 91.4%). KP-SRC appropriately categorised the one baby who had >7 days antibiotics into the group requiring blood cultures and regular observations (Fig 1).

As Table 1 denotes, high KP-SRC scores correlated well with clinically unwell babies, but poorly correlated with C-reactive protein values.

This study demonstrated the potential to safely and significantly reduce the number of infants receiving antibiotics for suspected EOS, using KP-SRC as a clinically-based decision support tool. These results are consistent with similar published studies worldwide. Our study has initiated a larger, prospective multicentre study across 17 neonatal units within our region, to further validate the applicability of this calculator.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1 showing good correlation between KP-SRC recommendations with clinical examination*, but poor correlation with high CRP values**
Figure 1 showing KP-SRC recommendations accurately identified neonates who subsequently required prolonged course of an

COI: None declared
ID: 609
TITLE: SHORT-TERM OUTCOME OF NEONATES BASED ON THE NEONATAL RESUSCITATION AND ADAPTATION SCORE
AUTHORS: Andreea Avasiloaiiei 1,2, Mihaela Moscalu 1, Anca Bivoleanu 2, Gabriela Zonda 1,2, Mădălina Grădinaru-Popa 2, Maria Stamatin 2
AFFILIATIONS: 1 - Grigore T. Popa University of Medicine and Pharmacy, Iasi, Romania
2 - Cuza-Voda Clinical Hospital of Obstetrics and Gynecology, Iasi, Romania

CONTENT:

The Neonatal Resuscitation and Adaptation Score (NRAS) has been recently proposed as a more reliable alternative for the initial evaluation of neonates, compared to the Apgar score. The aim of our study was to compare the predictibility of the two scores concerning the need for admission to the Neonatal Intensive Care Unit (NICU).

We performed a prospective study on 368 randomly chosen infants, born in the Cuza-Voda Clinical Hospital of Obstetrics and Gynecology over three months (21 January-20 April 2019). We assessed the following parameters: mode of birth, gestational age, birth weight, Apgar scores and NRAS at 1 and 5 minutes, and short-term outcome, measured as admission to the NICU, the high-dependency unit or the rooming-in unit.

The infants were delivered through Cesarean section in 69.84%, had a mean birth weight of 3220 grams (500-5380 g) and a mean gestational age of 38 weeks (23-42 w). The Apgar score had median values of 9 at 1 and 5 minutes and the NRAS had median values of 10 at 10 and 5 minutes. 8.97% were admitted to the NICU, 8.15% to the high-dependency unit and 82.88% to the rooming-in unit. Neither the Apgar score and the NRAS was found to be correlated with the mode of birth. While the Apgar score at 5 minutes correlates best with gestational age (r=0.4843, P<0.01), the NRAS at 5 minutes was the best predictor for admission to the NICU (AUC=0.87), compared to the NRAS at 1 minute (AUC=0.862), the Apgar score at 1 minute (AUC=0.846) and at 5 minutes (AUC=0.858).

The Neonatal Resuscitation and Adaptation Score seems a better predictor for admission to the Neonatal Intensive Care Unit, compared to the Apgar score, but in terms of gestational age and mode of birth, the difference between the two scores is not significant.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ABSTRACT BOOK
POSTER WALK

ID: 612

TITLE: ANTIBIOTIC EXPOSURE IN PATIENTS OF NEONATAL INTENSIVE CARE UNITS IN FRANCE

AUTHORS: Séverine Martin-Mons 1,2,3; Béatrice Gouyon 2,3; Elodie Garnier 2; Silvia Iacobelli 2; Simon Lorrain 1,2; Jean-Bernard Gouyon 1,2

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CONTENT:

In France, antibiotics protocols vary widely from one neonatal intensive care unit (NICU) to another (S. Leroux 2014), which is consistent with findings in other countries. This led to a multicenter and retrospective analysis of electronic prescriptions prospectively collected as part of a neonatal prescription benchmarking program (B-PEN).

The study focuses on antibiotic prescriptions in 25 NICUs (23 level 3) that use the same prescription software powered by a common reference formulary adaptable to local prescription protocols. All prescription data were collected in 2017 and were deidentified before export to a common data warehouse (regulatory compliance). The study only includes newborns admitted in the first 28 days of life.

A - Overall population
- 12,212 neonates
- Distribution by gestational age:
  4.0 % at 22-26 wks; 13.8% at 27-31 wks; 18.4% at, 32-34 wks, 15.0% at 35-36 wks; 48.9% at ≥ 37 wks.
- Antibiotic exposure rate: 45.5% (95% CI: 44.6-46.4).
  of which 74.0% on D0-D1, 12.6% on D2-D6, 13.4% after D6
- Antibiotics on D0-D1: aminoglycosides (97.0%), cefotaxime (57.3%), other β-lactams (63.2%), glycopeptides (1.2%), carbapenems (0.3%), another antibiotic (1.6%).
- Simultaneously given antibiotics on D0-D1: one: 2.5%; two: 75.4%; three: 22.1%.

B - Very preterm neonates (GA < 32 wks)
- 2168 neonates
- Overall exposure rate: 77.2% (95% CI: 75.4-79.0). of which 75.9% on D0-D1.
- Antibiotics on D0-D1: aminoglycosides (97.7%), cefotaxime (84.0%), other β-lactam (42.1%), a glycopeptide (1.3%), a carbapenem (0.7%), another antibiotic (0.9%).

The variability of exposure according to NICUs is confirmed. Compared with other GAs, very preterm infants (GA <32 wks) are overexposed to antibiotics, particularly cephalosporins 3G (cefotaxime). Simultaneous administration of 3 antibiotics was observed in more than 1 in 5 children while this practice is not recommended.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared.
ID: 615  
TITLE: ERYTHROPOIETIN (EPO), IRON AND TRANSFERRIN STATUS IN PREMATURE BABIES BORN FROM MOTHERS WITH ANEMIA  
AUTHORS: Nargiz Mammadova 1; Safikhan Hasanov 2; Pustie Orujova 1; Afag Akhundova 1; Nurangiz Hajieva 1  
AFFILIATIONS: 1 2nd Children Disease Department, 2 1st Children Disease Department, Baku, Azerbaijan  

CONTENT:  
As known, anemia in pregnant women and cumulative impacts of several factors lead to the prematurity and the development of pathological processes in newborns. On the background of the rapid development of the fetus, the lack of basic plastic matters is characterized by the morphofunctional inability that as a result, causes metabolic disturbance and the decrease of the synthesis of iron and enzymes. The purpose of this research was to study the hematological parameters of preterm babies born from mothers who suffered from anemia during pregnancy.  

84 preterm infants were investigated and levels of EPO, Fe and transferrin were compared in 3 groups. 1st control group includes 30 infants, 2nd group - 36 non-asphyxiated infants with anemia, and 3d group - 18 asphyxiated infants born with anemia. Levels of EPO, Fe and transferrin were checked in babies at 1st and 7th days of their life. The statistical processing of the results was done in Microsoft Windows 7 SPSS 20 package.  

The difference of erythropoietin in group 2 was statistically significant compared to other groups at the 1st day of life. The level of Fe was lower in the 3rd group compared to the other groups (p < 0.001). The level of transferrin was also high in the 3rd group, but was not statistically significant. Moreover, on 5-7 days of life we can see that EPO increased in groups 1 and 2 (p < 0.001), Fe levels increased only in the 1st group (p < 0.05). The results of the 1st day are shown in Table 1 and the results of 5-7 days of life are shown in Graph 1.  

According to the findings, an increase in EPO levels in children born with asphyxia from anemic mothers reflects the stimulation of erythropoiesis. Due to the lack of iron deposits in this cohort of babies compared to babies in the same gestational age, but without anemia in mothers, prescription of iron supplements early on is preferable.  

IMAGE / TAB:  
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IMAGE / TAB CAPTION: Table 1. EPO, Transferrin and iron levels in premature infants on 1st day of life  
Graph 1. Iron and EPO levels on 5-7 days of life in premature babies born from mothers with anemia  

COI: None declared
ID: 618
TITLE: TEMPERATURE IN PRETERM INFANTS UNDERGOING PROCEDURES IN THE NEONATAL INTENSIVE CARE UNIT
AUTHORS: Dr. Valerie Tsang,1 Dr. Nicoleta Barbu,1 Ms. Linda Smiles,1 Dr. Lisa K McCarthy1,2
AFFILIATIONS: 1 The National Maternity Hospital, Holles St, Dublin 2, Ireland.
2 School of Medicine & Medical Science, University College Dublin, Ireland.

CONTENT:

Abnormal temperature in preterm infants after birth is associated with increased mortality and morbidity. Caregivers therefore aim to maintain normal body temperature (36.5 - 37.5°C) in newborn infants in the delivery room (DR) and on admission to the neonatal intensive care unit (NICU). The aim of this study is to monitor temperature in newborn preterm infants undergoing invasive procedures in the NICU.

This prospective study was carried out between November 2018 and April 2019 at the National Maternity Hospital, Dublin. Infants < 32 weeks’ gestation or a birth weight < 2000 g undergoing invasive procedures (intubation +/- surfactant, central line insertion, thoracocentesis or lumbar puncture) in the NICU within the first 7 days of life were included. For each individual procedure infants core (rectal) temperature was measured at the start and end of the procedure. Infant demographics, admission temperature, procedure type, warming adjuncts, mode of ventilation etc. were also recorded.

Data from 46 procedures performed in 29 eligible infants were included for analysis (see Results table). Almost half (46%) procedures were carried out in the first 12 hours of life. Mean axillary temperature on admission to the NICU was in the normal range 36.7 (0.5)°C; 12 (41%) infants had abnormal admission temperature. Mean core temperature just prior to procedure start was 36.3 (0.7)°C, this fell further to 36.1 (0.8)°C by procedure end. In 32 (70%) cases, infants had a core temperature outside of the normal range by procedure end, predominantly due to hypothermia (30 [65%]).

Abnormal temperature, particularly hypothermia, is common in preterm newborn infants in our NICU. Infants undergoing invasive procedures in the NICU are at additional risk of temperature instability and hypothermia. Further studies are required to improve thermoregulatory care in small, preterm newborns during their NICU course.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Results Table: Patient demographics, procedure characteristics and temperature at various time points.

COI: None declared
ID: 623

**TITLE:** THE STATUS OF SERUM 25(OH)D LEVELS IN NEWBORN INFANTS AND THEIR MOTHER IN TAIWAN

**AUTHORS:** SHIH HSIN WANG 1; DING-AN YAN 2; CHIEN-YI CHEN 3; HONG-JIE ZHOU 4; PO-NIEN TSAO 5

**AFFILIATIONS:** 1 Paediatric Dept., Far Eastern Memorial Hospital, New Taipei City, Taiwan
2-5 Department of Pediatrics, National Taiwan University Children Hospital, Taipei, Taiwan

**CONTENT:**

Vitamin D is now recognized not only for its importance in bone health but also for other health benefits, including reducing the risk of immune diseases, cancer, cardiovascular disease, and adverse pregnancy outcome. The health impact of vitamin D deficiency is especially important during infancy, which rickets and osteomalacia will develop. In Taiwan, the epidemiological data about the incidence of vitamin D deficiency in newborn and their mother is lacking, which limit the development of our own policy in vitamin D supplementation. The purpose of this study is to investigate blood vitamin D level in the newborn infants and their mother.

The mother who delivered term infants in National Taiwan University Children Hospital are invited to the study. After informed consent is signed, around 2.5 cc blood is collected from the mother and her infants within 3 days after delivery. Total circulating 25(OH)D levels (ng/ml) are measured in serum sample by LIAISON® (DiaSorin, Inc, Stillwater, MN, USA).

Totally 37 newborn infants and 33 mothers are included. In the newborn groups, the mean 25(OH)D level of newborn group is 16.7±9.2 ng/mL, 15 of 37 infants (40.6%) have 25(OH)D level below 12 ng/mL. Only 11 of them (29.7%) have adequate 25(OH)D level (above 20ng/mL). In their mother group, the mean level of their mother is 18.8±10.3 ng/mL, and 8 of 33 mothers (27.6%) have 25(OH)D level below 12 ng/mL. There are 11 mothers (27.6%) have adequate have 25(OH)D level. There is correlation of the levels between newborn and their mother (Pearson correlation 0.529, p=0.0016)

The preliminary data showed that most of the newborn infants and their mothers may not have adequate serum 25(OH)D level after delivery in northern Taiwan. Further larger follow-up study is warranted.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared.
ID: 624

TITLE: PLASMA B-TYPE NATRIURETIC PEPTIDE LEVELS: ASSOCIATED WITH ONLY HEMODYNAMICALLY SIGNIFICANT PATENT DUCTUS ARTERIOSUS, NOT PERINATAL FACTOR IN INFANTS WITH RESPIRATORY DISTRESS

AUTHORS: Jaewook Ha 1; Heekwon Son 2; Mi-ji Lee 3; Eui Kyung Choi 4; Jinwha Choi 5; Jeonghee Shin 6; Byung Min Choi 7

AFFILIATIONS: Paediatric Dept., Korea University ANSAN Hospital, Ansan, Gyeonggi-do, Republic of Korea

CONTENT:

Plasma B-type natriuretic peptide (BNP) levels were used as a biomarker for the prediction and diagnosis of hemodynamically significant patent ductus arteriosus (HS-PDA) in preterm infants. Various perinatal factors are suspicious to affect the plasma BNP levels after birth, but these associations have not been clarified in the literature. The aim of study is to evaluate the association of the perinatal factors and hospital outcomes with early plasma BNP levels in infants with respiratory distress.

Plasma BNP levels on 24/48 hours after birth were measured in 153 infants with respiratory distress, with mean gestational age (GA) of 32.0 weeks and birth weight of 1,924 g. The effects of perinatal factors and hospital outcomes on the plasma BNP levels were analyzed statistically.

In univariate analysis, plasma BNP levels on 24 hours after birth were significantly correlated with birth weight, respiratory distress syndrome (RDS), and HS-PDA and those on 48 hours after birth were significantly correlated with GA, birth weight, out-born delivery, Cesarean section, Apgar score at 1/5 minute, RDS, HS-PDA, and bronchopulmonary dysplasia. However, in multivariable analysis, there is no significant perinatal factor affecting on plasma BNPs on both 24/48 hours after birth. HS-PDA is the only hospital outcome affected by plasma BNP levels on both 24/48 hours after birth (p <0.0001, respectively).

Perinatal factors of infants with respiratory distress do not affect plasma BNP levels after birth. Among the hospital outcomes, HS-PDA is the single most significant factor associated with plasma BNP levels after birth. Thus, early plasma BNP levels could be used as an appropriate predictive biomarker for HS-PDA in infants with respiratory distress.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared
ID: 628

TITLE: MACRONUTRIENT CONTENTS OF COLOSTRUM: DOES NATIONALITY HAVE AN EFFECT?

AUTHORS: Esra Beser Ozmen 1, Esin Okman 1, Fatma Nur Sari 1, Evrim Alyamac Dizdar 1, Cuneyt Tayman 1, Serife Suna Oguz 1

AFFILIATIONS: 1 Neonatal Intensive Care Unit, Zekai Tahir Burak Women’s Health Education and Research Hospital, University of Health Sciences in Ankara, Turkey

CONTENT:

Breastmilk (BM) is considered the ideal and natural way of feeding for all infants. Although the previous studies evaluated the factors influencing the content of BM, data concerning the effect of nationality on macronutrient contents of BM is rather inadequate. Therefore; we aimed to compare the macronutrient and energy contents of colostrum samples of Turkish and Syrian mothers and emphasize the significance of nationality on breast milk composition.

The study was conducted at Zekai Tahir Burak Women’s Health Education and Research Hospital. Colostrum samples from term lactating mothers were obtained within the first 48 hours of lactation. Milk protein, fat, carbohydrate (CHO) and energy levels were measured by using a mid-infrared human milk analyzer. Demographic characteristics of the mothers and the infants were recorded.

Colostrum samples of 180 term lactating mothers (Turkish: 96, Syrian: 84) were obtained during the study period. Median gestational age (38 vs. 38 weeks; p>0.05), birth weight (3123 vs. 3115 g; p>0.05) of the infants were similar in Turkish and Syrian groups. There were no significant differences between the groups in terms of body mass index of the mothers, mode of delivery and infant gender. However, Syrian mothers gained less weight during pregnancy compared to Turkish mothers (p=0.029).

The median protein, fat, CHO and energy levels of colostrum samples were respectively, 3.3 g/dl, 2.7 g/dl, 4.9 g/dl, 66 kcal/dl in Turkish mothers whereas, 2.6g/dl, 2.3g/dl, 5.1 g/dl, 58 kcal/dl in Syrian mothers (Table 1). Protein, fat and energy levels of colostrum samples were found to be significantly higher in Turkish mothers compared to Syrian mothers (p=0.001, p=0.017, p<0.001, respectively).

Nationality and insufficient nutrition during pregnancy might affect the macronutrient contents of colostrum of term lactating mothers. Milk composition plays a crucial role in infant growth. So, further research evaluating the association between the milk composition and infant growth in different populations is warrantly needed.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 634
TITLE: PHYSIOLOGICAL-BASED CORD CLAMPING FOR INFANTS WITH CONGENITAL DIAPHRAGMATIC HERNIA: PinC TRIAL STUDY PROTOCOL
AFFILIATIONS: 1Department of Paediatrics (division of Neonatology), 2Paediatric Surgery and 3Obstetrics and Gynaecology, Erasmus MC – Sophia Children’s Hospital, Rotterdam, The Netherlands
4Department of Paediatrics (division of Neonatology), Leiden University Medical Centre – Willem-Alexander Children’s Hospital, Leiden, The Netherlands
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CONTENT:

One of the main determinants for postnatal survival in congenital diaphragmatic hernia (CDH) is persistent pulmonary hypertension of the newborn (PPHN). An experimental study using a CDH lamb model demonstrated that cord clamping prior to lung aeration leads to exposure of lung vessels to high pulmonary arterial pressures, which initiates vascular remodeling. This was avoided when the cord was clamped after lung aeration had been established. In this clinical trial we aim to investigate whether implementation of physiological-based cord clamping (PBCC), i.e. lung aeration prior to cord clamping, reduces the occurrence of PPHN in infants with CDH.

We will perform a multicentre, non-blinded, randomized controlled trial in neonates with isolated CDH. Patients will be randomized between immediate cord clamping and PBCC, stratified by predicted lung size (antenatal ultrasound) and treatment centre. Inclusion criteria are isolated left-sided CDH and gestational age at delivery >35wks, in the absence of associated structural or genetic abnormalities diagnosed before birth. For performing PBCC a new purpose-designed resuscitation module, the Concord (Concord Neonatal, Leiden, the Netherlands), will be used. After cord clamping further postnatal management will be according to consensus based guidelines. The primary outcome is PPHN diagnosed 12-24 hrs after birth and this will be assessed by transthoracic echocardiography.

We consider a reduction of the occurrence of PPHN by one third as clinically significant. To detect such a difference, and based on a background incidence of 69.7% (CDH registry, 2007-2014, 3367 patients), a sample size was calculated of at least 130 infants (65 in each group) (power 80%, α = 0.05). Secondary outcomes include neonatal (survival at discharge, ECMO use, number of ventilator days, NICU days) as well as maternal outcomes, specifically the occurrence of postpartum hemorrhage (estimated blood loss >1000ml).

PBCC integrated in resuscitation/stabilisation of infants with CDH has the potential to improve outcome and could lead to a significant change of practice in postnatal management of this challenging disease.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 639

TITLE: THE USE OF SODIUM GLYCEROPHOSPHATE IN NEONATAL PARENTERAL NUTRITION SOLUTIONS TO OPTIMIZE THE CALCIUM AND PHOSPHATE INTAKE IN PRETERM INFANTS

AUTHORS: Chi-Man Kuok 1; Hsueh-Ju Wang 2; Ya-Ting Hsieh 2; Ling-Yu Liu 2; Li-Juan Shen 2; Shu-Chiao Lin 2; Chien-Yi Chen 3

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CONTENT:

Preterm infants require higher intake of calcium and phosphate to facilitate adequate bone growth, but requirement is seldom met in parenteral solution because of the limit solubility of calcium and phosphate. The purpose of this study was to compare the solubility of organic and inorganic phosphate with calcium gluconate in neonatal parenteral nutrition (PN) solutions for clinical use.

PN solutions were compounded by calcium gluconate at 35 mEq/L with potassium phosphate (KPO4) or sodium glycercophosphate (NaGP) at 25 mmol/L. The other component included 1% amino acid and 10% dextrose. The compatibility of each solution was evaluated by visual inspection and Light Obscuration Particle Count Test using United States Pharmacopeia 788 standards after mixture. The preparation complies with the test if the average number of particles present does not exceed 25 per mL equal to or greater than 10 μm and does not exceed 3 per mL equal to or greater than 25 μm. To simulate the clinical condition, solution was also evaluated in NaGP group after storing at room temperature for 24 hours or at 4°C for 48 hours prior to analysis.

There is no visual deposition in the PN solution using NaGP in any of the concentration and at any stored condition. The average number of particles equal to or greater than 10 μm per ml in NaGP group is 5.2±2.1 just after mixture, 3.1±2.7 after 24 hours and 1.7±1.4 after 48 hours. In the contrast, obvious deposit was noted in KPO4 group just after mixture, and the average number of particles is 7793.5±1309.8 per mL. The particle count exceeds the limit significantly.

The compatibility of NaGP and calcium gluconate is well in PN solution. Use of NaGP in neonatal PN eliminate the concern of calcium and phosphorus precipitation and increased the supply to preterm infants to meet their requirement for growth.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 643

TITLE: EVALUATING MATERNAL CONFIDENCE IN PARENTING PRETERM INFANTS USING CLINICAL INTERVIEW FOR PARENTS OF HIGH-RISK INFANTS

AUTHORS: Anastasia Karkani 1; Sylvia Gancheva 1; Georgia Karavana 1; Martha Theodoraki 1

AFFILIATIONS: 1 General Hospital of Nikaia Agios Panteleimon

CONTENT:

The aim of this paper is:
A) to examine how the unique circumstances of the premature birth alternate the perception of the maternal self-confidence.

b) to compare parental confidence in parents of infants born preterm and at term. Maternal parenting ability can predict long-term outcome of mother-infant relationship and neuro and behavioral development of at-risk infants NICU. Mother’s belief in her effectiveness in performing and managing a variety of tasks in the parenting role is the key to self-efficacy theory and interventions targeted at restoring maternal confidence, including improved modified interaction between mother and infant, have claimed variable positive results.

This study is a part of a larger longitudinal study conducted in a Greek public Hospital among mothers with term and preterm infants. Participants were 25 mothers who have gave birth prematurely >37 weeks and their infants were hospitalized in our NICU. The control group was recruited from the same hospital in the maternity ward with 25 mothers of full-term infants.

The Clinical Interview for Parents of high-risk infants (CLIP) is a semi-structured interview exploring mothers’ experiences of the pregnancy, delivery, hospitalization period, thoughts and feelings about the infant, and impending discharge. In this presentation we analyze the forth parameter of CLIP concerning maternal competence. Descriptive statistics for al study are reported and were analyzed with thematic analysis.

Our results were in accordance with current literature that reports equal or even higher quality of mother – infant confidence in preterm dyads, compared with full term dyads. These findings emphasize the complexity of early parental experience and perceptions, regarding their competence. A special coding scheme was developed for this study to analyze the mother’s narrative content. Three major responses elicit from the NICU group 76% of mothers feel confident enough 16% were moderately confident and just 8% were not confident at all. Mothers of maternity group exhibit much different representation for their self-confidence as parents. 48% reported to be not at all confident while just 52% report to be confident enough.

It seems that readiness for motherhood it can be structured during hospitalization in NICU. The condition of preterm birth may not have only adverse outcome, mothers can be equally or even more confident as full-term mothers trough the experience of hospitalization. Designed interventions by the NICU team seem to improve the mother – infant relationship.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: none declared
ID: 644

TITLE: THE ASSOCIATION OF EARLY ANTIBIOTIC TREATMENT ON THE INCIDENCE OF LATE ONSET INFECTION

AUTHORS: Paraskevi Papadogeorgou1, Kalliopi Dritsakou2, Ourania Panagopoulou1, Anastasia Kapetanaki1, Giorgos Liosis1

AFFILIATIONS: 1 Neonatal Intensive Care Unit, “Elena Venizelou” Maternity Hospital, Athens, Greece
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CONTENT:

The majority of very low birth weight infants are treated with empirical antibiotics, usually ampicillin and gentamicin, immediately after birth based on risk factors and non specific clinical signs. This policy, however, leads to gut dysbiosis and immune system dysregulation, possibly resulting in increased morbidity and mortality. Antibiotic stewardship programs are commonly used in NICU’s in order to ascertain appropriate antibiotic use and reduce the duration of treatment. The objective of this study was to identify the association between antibiotic exposure during the first days of life and the incidence of late onset sepsis.

This is a retrospective study including 63 neonates with birth weight (BW) <1500 gr, hospitalized in the G.M.H. “Elena Venizelou” NICU between July 2017 and December 2018. The mean gestational age was 29.01 weeks and the mean BW was 1091.5 gr. The study group included 58 neonates (92%) who received early antibiotic treatment and 5 neonates (8%) who received no antibiotics at all in the first 72 hours of life. The antibiotic administration was empiric and there was no culture confirmed infection. The treated cases were retrospectively analyzed to check the appropriateness of therapy in regards to the indications and the duration of treatment according to latest guidelines that recommend strict antibiotic use and prompt cessation of therapy when infection is ruled out.

Survival rate of the studied infants was 96.8%. Nearly half of the neonates (49.2%) presented with at least one episode of late onset infection. The vast majority were exposed to early empiric antibiotic treatment - 93.5% versus 6.5% of neonates who received no antibiotics. Neonates who were exposed to antibiotics were 15.9 times more prone to late onset infection (OR 15.9; p<0.001). Moreover, antibiotic treated infants had 13.2 times greater possibility to have more than one episode of late onset infection (OR 13.2; p<0.001). Antibiotic administration was in accordance to new stewardship guidelines in 26 out of 63 neonates (41.3%). Statistical analysis revealed that the implementation of these recent recommendations did not have a significant effect on the infection incidence rate (p=0.613) nor the number of infection episodes (p=0.757).

Antibiotic administration was a statistically significant risk factor for the onset of at least one episode of late onset sepsis. No notable effect was observed after controlling for the appropriateness and duration of therapy according to new stewardship policy. This may indicate the need for revised antibiotic initiation guidelines in NICU’s since the negative impact of early antibiotic use is evident.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 645

TITLE: LATE-ONSET SEPSIS RATES BEFORE AND AFTER INTRODUCING ROUTINE PROPHYLACTIC LACTOBACILLUS AND BIFIDOBACTERIA PROBIOTICS: 10-YEAR REVIEW

AUTHORS: Radu Clapuci 1, Jacqueline Jones 1, Claire Robertson 1,2, Claire Stuart 3, George Savva 4, Lindsay Hall 2, Paul Clarke 1,5

AFFILIATIONS: 1. Neonatal Unit, Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK
2. Gut Microbes and Health, Quadram Institute Bioscience, Norwich, UK
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5. Norwich Medical School, University of East Anglia, Norwich, UK

CONTENT:

Meta-analyses show that giving routine probiotics reduces necrotising enterocolitis (NEC) in preterm infants. The impact of probiotics on late-onset sepsis (LOS) is less clear. Our aim was to compare rates of LOS in 5-year epochs before and after implementation of routine daily multi-strain probiotics administration to high-risk neonates.

Single centre retrospective observational study over a 10-year period. On 1/1/13 our NICU introduced daily prophylactic multi-strain probiotics (Lactobacillus and Bifidobacterium) to prevent NEC in high-risk preterm neonates. Babies eligible for probiotics in the 5-year epoch 1/1/13 to 31/12/17 were those <32 weeks' gestation, and/or preterm and 72 h after birth. Repeat growth within 7 days was considered the same episode.

Cohorts in pre- (n=469) and routine (N=513) probiotics epochs shared similar baseline characteristics. Rates of sepsis and the responsible organisms are also presented in the Table. Significantly fewer babies had one or more episodes of LOS in the routine probiotics epoch compared with the earlier epoch, 59/513 (11.5%) versus 106/469 (22.6%), p<0.0001, Chi-square test. Significantly fewer episodes of coagulase-negative staphylococcal infections occurred in the routine-probiotics epoch (47/513 (9.2%) versus 87/469 (18.6%), p<0.0001, Chi-square test. No case of a probiotic-organism bacterial sepsis was observed in either epoch.

Routine use of multi-species Lactobacillus and Bifidobacterium combination probiotics appears safe. Administration of Lactobacillus and Bifidobacterium probiotics has been associated with a halving of LOS rate in our centre. As observational data, these results could also reflect other improvements in care during the study period. Probiotics may help prevent LOS in high-risk preterm neonates but a large RCT is needed to address this question.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table. Baseline data and incidence of sepsis in the pre- versus routine- probiotics epochs.

COI: None declared.
ID: 646

TITLE: Prevention of Significant Hypothermia (POSH) in preterm infants ≤32 weeks gestation.

AUTHORS: Dr Nicola McMullan 1; Lucy Bradley 2; Cora Hiatt 3; Dr Sarah Ellis 4

AFFILIATIONS: University Hospital Coventry, United Kingdom

CONTENT:

Effective care in the delivery room is crucial for ensuring good neonatal outcomes of preterm babies. Hypothermia during stabilisation is associated with increased neonatal mortality and morbidity, including an increased risk of necrotising enterocolitis, intraventricular haemorrhage, respiratory distress syndrome and hypoglycaemia. We recorded a high rate of hypothermia on admission in preterm babies ≤32 weeks gestation on our level three neonatal unit. We aimed to improve admission temperatures in this group through the implementation of a thermoregulation bundle, POSH (prevention of significant hypothermia) in preterm infants.

This quality improvement project started in December 2018. Pre-intervention data was collected retrospectively for the preceding 3-month period. Changes implemented included the delegation of a team member at resuscitation to manage thermoregulation, and the routine use of polythene bags, hats and nesting. Other guidance included recording temperature prior to transfer, and the use of an exothermic mattress if <37°C. Delivery room temperatures were monitored, and ventilation covers in theatre placed to reduce draughts. No-entry signs were placed on doors to prevent inappropriate interruptions during stabilisation. Neonatal staff were educated through posters, newsletters, and huddles. Data during the implementation process was collected prospectively between December 2018 and April 2019.

Pre-intervention analysis showed that in the 3 months prior to implementation 44 babies ≤32 weeks gestation were delivered. Of these babies, 20.45% had an admission temperature below 36.5°C. Since introduction of the bundle, between December 2018 and April 2019, 51 babies ≤32 weeks have been delivered. Birth gestation ranged between 23+5-32+0 weeks (mean 29+6), with a mean birth weight of 1039g (490-2160g), and 5 minute Apgar of 8 (4-10). 66.67% of babies were born via caesarean section. Over this period, the incidence of hypothermia has reduced from 20.45% to 3.92%. The lowest admission temperature was 36.3°C. There has been an increase in rates of hyperthermia >37.5°C from 11.36% to 21.57% (5.8% above 38°C). Overall 74.5% of babies had a temperature within the recommended range of 36.5-37.5°C. This is above the national NNAP (National Neonatal Audit Programme) average of 64% in 2017.

This thermoregulation bundle has resulted in improvements in admission temperatures of preterm infants since December 2018. Increasing awareness and staff education has had a significant positive impact on reducing hypothermia in preterm babies ≤32 weeks admitted to the neonatal unit. The next step of our project is to address the increase in hyperthermia, particularly over 38°C that has been noted since the bundle was implemented.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 648

**TITLE:** NECROTIZING ENTEROCOLITIS: EVALUATION OF THE ROLE OF HUMAN BONE MARROW-DERIVED MESENCHYMAL STROMAL CELLS (hBM-MSCs) IN A NOVEL NEONATAL MOUSE MODEL OF NEC

**AUTHORS:** Livia Provitera 1; Genny Raffaeli 1; Ilaria Amodeo 1; Silvia Gulden 1; Gabriele Zuanetti 1; Valeria Cortesi 1; Stefania Crippa 3; Cristina Arribas 5; Marco Maggioni 6; Graziella Alfonsi 7; Stefano Gatti 8; Felipe Garrido 5; Maria Ester Bernardo 3-4;

**AFFILIATIONS:** 1. IRCCS Fondazione Ca’ Granda Ospedale Maggiore Policlinico, Neonatal Intensive Care Unit, Milan, Italy. 2. University of Milan, Department of Clinical Sciences and Community Health, Milan, Italy. 3. San Raffaele Telethon Institute for Gene Therapy (TIGET), IRCCS San Raffaele Scientific Institute, Milan, Italy. 4. Pediatric Immunohematology and Bone Marrow Transplantation Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy. 5. Newborn Intensive Care Unit, Department of Pediatrics Clinica Universidad de Navarra, Madrid, Spain. 6. IRCCS Fondazione Ca’ Granda Ospedale Maggiore Policlinico, Department of Pathology, Milan, Italy. 7. "Lino Rossi" Research Center for the study and prevention of unexpected perinatal death and SIDS; Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy. 8. IRCCS Fondazione Ca’Granda Ospedale Maggiore Policlinico, Center for Preclinical Research, Milan, Italy.

**CONTENT:**

Necrotizing enterocolitis (NEC) is among the leading causes of morbidity and mortality in preterm infants: it affects 10% of very low birth weight infants (VLBW) and carries a 40% mortality rate. Survivors are faced with lifelong complications, including adverse neurodevelopmental outcomes. NEC is defined as a devastating inflammatory process resulting in gut necrosis, whose multifactorial pathogenesis is still unveiled. Despite decades of research efforts, this disease still remains a challenge to treat.

The aim of this study is to investigate the effect of hBM-MSCs on NEC using a neonatal mouse model of necrotizing enterocolitis, due to their very well described anti-inflammatory properties.

NEC was induced in 3-day old C57BL/6 mouse pups through maternal separation, gavage feeding of infant formula, hypoxia followed by cold stress and oral lipopolysaccharide (LPS). Mice were allocated into 4 groups. The control group remained with their mother and breastfed ad libitum. Experimental groups, subjected to experimental NEC, were randomized to receive either no treatment (NEC group) or an intraperitoneal (IP) injection of PBS (NEC + PBS group) or hBM-MSCs (NEC + hBM-MSCs). After 72 hours from NEC induction (PND6) or earlier in case of premature death, mice were sacrificed. Incidence of NEC was evaluated microscopically. A score of 2 or higher indicated presence of NEC, with 3 or higher indicating severe NEC.

Animals exposed to NEC that were either untreated or received PBS alone had a NEC incidence of 80% and 81% (p=0.0002 and p<0.0001 respectively, compared to breastfed pups). Pups exposed to NEC + hBM-MSCs showed a NEC incidence of 63.6% (p=0.0078 compared to breastfed pups). Despite there were no significant differences in the NEC incidence between the 3 groups exposed to NEC, hBM-MSCs seemed to reduce NEC severity (NEC + hBM-MSCs treated pups had a Grade 3 incidence of 30.3%, while NEC alone or NEC + PBS pups had a Grade 3 incidence of 45% or 40.5%, respectively).

Our neonatal mouse NEC model was adequate to induce the disease. hBM-MSCs reduced the incidence and the severity of NEC in our model. Further experiments are needed to better characterize the molecular basis of the mechanism of action of hBM-MSCs on NEC.

**IMAGE / TAB:**
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IMAGE / TAB CAPTION: Figure 1. Effect of hBM-MSCs on the incidence and severity of NEC. Incidence and severity of NEC (Grades 2, 3 or 4 injury). The number of animals used to derive the data shown in the picture are as follows: Breastfed (n=14), NEC (n=20), NEC + PBS (n=37),

COI: None declared
ID: 649

TITLE: MEDICATION PRESCRIPTION IN 29 NICUs OVER A 2-YEAR PERIOD

AUTHORS: Jean-Bernard Gouyon 1,2; Severine Martin-Mons 1,3; Béatrice Gouyon 3; Elodie Garnier 1; Simon Lorrain 1,2; Anaëlle Pignolet 1; Evelyne Jacqz-Aigrain 4; Silvia Iacobelli 1,2

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3 Société LogigremF, Saint-Pierre, La Réunion
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CONTENT:

Patients in neonatal intensive care units (NICUs) have the highest rate of off-label and unlicensed medication prescription compared to other hospitalized patients. This study aims to identify precisely the International Nonproprietary Names (INNs) of medications prescribed to patients in NICUs with special focus on exposure in the most immature preterm infants and on INNs pharmaceutical substances given without any approval by the Summaries of Product Characteristics (SmPC) for the first month of life.

The research is an observational cohort study with retrospective analysis of medications prescribed in 29 Level 3 French NICUs (11 academic) over a 2-year period (2017-2018). Medications were prescribed with the same Computerized Prescriber Ordering Entry/Clinical Decision System. All prescriptions data were deidentified before storage in a common data warehouse.

The primary objective of the study is to determine the current medication exposure rate of patients. Secondary objectives included assessment of medication exposure in preterm infants and rate of medication prescription not approved by the Summaries of Product Characteristics (SmPC).

The study population included 27,382 neonates. Two hundred and sixty one different medication INNs were prescribed. Twelve INNs (including paracetamol) were prescribed to at least 10% of the patients, 55 to less than 10% but at least 1%, and 194 to less than 1%. The lowest the gestational ages (GA) were exposed to the highest medications number (18 at GA < 27 wks vs 3 at GA > 34 wks). According to the French SmPCs, 69.2% of the 351 combinations of medication INNs and routes of administration, were not allowed in the neonatal period. Ninety five percent of preterm infants with GA below 32 weeks were administered at least one not-allowed medication.

Neonates remain therapeutic orphans. Consequences of polypharmacy should be rapidly assessed particularly in the most immature infants.

IMAGE / TAB: 

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COI: None declared
ID: 655
TITLE: CORRELATION OF SERUM CYTOKINES TO NEUROIMAGING IN NEONATAL ENCEPHALOPATHY
AUTHORS: M O’Dea1-6,8 T Hurley 1-3,6-8, L Kelly1,6,8, T Strickland6,8, A Byrne9, EJ Molloy1-9
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Rotunda Hospital, Dublin, Ireland
National Maternity Hospital, Holles St, Dublin, Ireland
National Children’s Research Centre, Ireland
National Children’s Hospital Foundation, Dublin, Ireland
National Children's Research Centre, Ireland
Clinical Research Development Ireland, Dublin, Ireland
Department of Paediatric and Child Health, Trinity College Dublin, Ireland
Our Ladies Children’s Hospital, Crumlin

CONTENT:
Neonatal Encephalopathy (NE) describes central nervous system dysfunction in the earliest days of life in a term neonate. Inflammation is implicated in NE, it is known to have beneficial effects in recovery post-brain injury – however, when chronically dysregulated, it may lead to poorer outcome. We evaluated whether the inflammatory phenotype is predictive of abnormal neuro-imaging in NE, as an early serum biomarker before the MRI brain may be helpful to predict outcome.

Infants with NE Sarnat Grade II/III (n=25) undergoing therapeutic hypothermia were recruited. Serial serum samples were taken on days 1-4 of life. Multi-plex ELISA was performed on Interferon gamma (IFN-γ), Interleukin-1beta(IL1-ß), Interleukin-1alpha(IL-1α), Interleukin-2 (IL-2), Interleukin-6 (IL-6), Interleukin-8 (IL-8) Granulocyte-macrophage colony stimulating factor(GM-CSF) tumour necrosis factor alpha(TNF- α), tumour necrosis factor beta (TNF β), Interleukin18 (IL-18), Vascular endothelial growth factor (VEGF), Interleukin 10 (IL-10), Interleukin-1 Receptor antagonist (IL-1RA), and Erythropoietin (EPO). MRI results were independently scored by a Paediatric Radiologist blinded to clinical outcome with the Barkovich scoring system. Cytokine results were correlated to Barkovich score.

11 patients had abnormal neuroimaging in this cohort. IL-1α, IL-2, IL-6, IL-10, IL-18, IL-8, IL-1RA, IFN- γ, EPO, GMCSF, TNF- α, TNF-β levels did not differentiate between normal and abnormal neuroimaging. Higher IL-1β predicted an abnormal Barkovich score. Diagnostic accuracy of the test measured by the area under the ROC curve (AUC) was 0.81 (95% CI .69 to .93). The optimal cut-off value of 1.06pg/ml of IL-1beta had 100% sensitivity & 68% specificity for diagnosing abnormal MRI brain.

Early raised serum IL-1β is predictive of abnormal neuroimaging. IL-1β is known to be a pro-inflammatory cytokine that can produce injury to white matter in the developing brain. IL-1β shows promise for an early serum biomarker and a potential immunomodulatory target in NE.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: nil
ID: 659

TITLE: EXTREME PRETERM PREMATURE RUPTURE OF MEMBRANES: NEONATAL AND LONG-TERM OUTCOMES

AUTHORS: Bénédicte Van Grambezen 1; Catheline Hocq 2; Olivier Danhaive 3

AFFILIATIONS: Neonatal Intensive Care Unit
University Hospital Saint-Luc
Bruxelles
Belgium

CONTENT:

Extreme preterm premature rupture of membranes (PPROM) is a rare pregnancy complication leading frequently to spontaneous miscarriage or extremely premature birth, with a mortality up to 70%, in part due to elective pregnancy termination. Little is known about long-term developmental outcomes of these patients. Our aim is to compare developmental outcome of surviving 16-24-week PPROM newborns with age-matched, unaffected infants.

Retrospective single-center study (period 2006-2018) comparing 2 groups. Group 1 (n=42): preterm infants with PPROM occurring 14 days between PPROM and delivery and oligohydramnios (amniotic fluid index < 5). Group 2 (n=42): sex- and gestational age-matched (±7 days) infants without PPROM. Data on mortality, intraventricular hemorrhage grade >2 (IVH), severe pulmonary hypertension (defined as inhaled nitric oxide treatment, iNO) and bronchopulmonary dysplasia (defined as respiratory support at 28 days, BPD) were collected as indicators of neonatal course severity. Developmental outcomes were assessed at 1, 2, 3 and 5 years by clinical examination and formal testing adapted to the infants’ age.

All babies received full antenatal corticosteroids course. Mean gestational age at birth was 29 ± 2 and 29 ± 2 weeks (mean ± SD, gp1 and gp2, p=0.96). Gp1 PPROM latency was 52.8 ± 24 days. Mean birthweight was 1301 ± 439 and 1110 ± 387 g (p=0.08). Gp1 mortality rate was 14.3% (gp2 included only survivors). IVH rates were 1/42 and 0/42. iNO rates were 25/42 (60%) vs. 0% (p<0.001). BPD rates were 26/35 (74%) vs. 16/35 (46%) (p< 0.02). Results of Bayley testing were normal at 1 and 2 years for both groups (table 1). At 3 years, 10 PPROM children and 6 control children had a normal development and a delay was observed for respectively 3 and 2 children. At 5 years, although follow-up rate had decreased to 20%, outcomes were similar in both groups except for language evaluation: 5 children in the PPROM group had a delay vs. 2 in the controls (p<0.05).

Despite a more severe neonatal course, long-term outcomes appear to be similar in both groups for most items except language. Although this study has size and design limitations, our results support conservative and optimized pre- and postnatal care to these high-risk patients. Future, appropriately sized studies with a longer follow-up are warranted in order to confirm these preliminary results.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 662  
TITLE: SEPSIS-INDUCED CHANGES IN CEREBROSPINAL FLUID PROTEINS AFFECT THE DEVELOPING HIPPOCAMPUS  
AUTHORS: Jing Sun 1; Allan Stensballe 2; Chris van den Akker 3; Pingping Jiang 4; Per Torp Sangild 1; Stanislava Pankratova 1,5  
AFFILIATIONS: 1 Section of Comparative Pediatrics and Nutrition, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; 2 Department of Health Science and Technology, Aalborg University, Denmark; 3 Department of Pediatrics, AMC, University of Amsterdam, The Netherlands; 4 School of Public Health, Sun Yat-Sen University, Guangzhou, China; 5 Laboratory of Neural Plasticity, Department of Neuroscience, University of Copenhagen, Denmark  

CONTENT:  
Preterm infants are susceptible to sepsis, which in turn may lead to neurodevelopmental disorders. How systemic infection affects brain development and functions is poorly understood, and good biomarkers for early diagnosis and treatment for sepsis-induced brain injury are lacking. We hypothesized that systemic infection alters protein composition of cerebrospinal fluid (CSF), and that infection-exposed CSF directly affects hippocampal development. First, we characterized CSF proteome changes in septic preterm infants. We then investigated how CSF from systemically infected preterm pigs, as a model for preterm infants, affects the immature porcine hippocampus in ex vivo cultures.

Proteins in CSF from very preterm infants (<32 weeks gestation), diagnosed as sepsis (SEP, n=19, culture-proven) or sepsis-free (CON, n=10, suspected sepsis, but not confirmed) were profiled by mass spectrometry (MS)-based proteomics. Many SEP infants developed cerebral abnormalities later. In addition, CSF was collected from 5 d-old preterm piglets with or without bacteremia (CON, BAC), defined as positive bacterial culture in both bone marrow and liver. These CSF samples, reflecting mild exposure to systemic infection, were added into culture media of hippocampal slices obtained from healthy newborn preterm pigs (90% gestation, caesarean section). Following 4 h of in vitro culture, the CSF, hippocampal tissue and culture media were then collected for proteomic analysis.

The SEP infants (high risk of later cerebral abnormalities) showed a distinct CSF proteome profile compared with CON infants. The differentially expressed proteins (DEPs) included upregulation of acute immune response proteins (HP, C1QB, C9, CD14) and down-regulation of neuritogenesis and cell differentiation proteins (FN1, MEGF8, COL5A1, Fig 1). BAC pigs showed upregulation of CSF proteins related to neuroinflammation. Immature pig hippocampal slices responded differently to CSF from BAC and CON pigs, with 126 and 508 DEPs in hippocampal tissue and secretome, respectively. Proteins related to mitochondrial function (NDUF), neural migration (TUBB4A, MINP), neuron projection guidance and synaptogenesis were changed. Four proteins (APLP1, COL5A1, PCOLCE, SEZ6L) were down-regulated in both CSF from SEP infants and proteins secreted from hippocampal slice exposed to infected CSF.

Sepsis markedly affects CSF protein composition and neural circuits in developing hippocampus. The proteomics-identified DEPs may serve as potential targets to prevent later neurodevelopmental disorders in sepsis survivors. Using preterm pigs as a model for preterm infants, ex vivo hippocampal slice cultures can be used as a novel experimental tool to investigate multi-cellular responses to changes in CSF after infection.

IMAGE / TAB:  
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IMAGE / TAB CAPTION: Fig 1. MA plot showing overview of differentially-expressed proteins in CSF from septic and control preterm infants. Each dot represents an identified protein with average protein expression level at x-axis and log 2 fold change of sepsis versus control a
COI: None declared
ID: 665  
TITLE: IGF-1 AND INSULIN LEVEL IN PREMATURE NEWBORNS ON DIFFERENT TYPES OF FEEDING.  
AUTHORS: Anna Dorofeeva, M.D. 1; Antonina Chubarova, M.D., Ph.d., professor 2;  
AFFILIATIONS: 1 Russian National Research Medical University named after N. I. Pirogov, Moscow, Russia  
2 N.F. Filatov Children’s City Hospital of Moscow Healthcare Ministry, Moscow, Russia  
CONTENT:  
Insulin-Like Growth Factor-1 (IGF-1) is a mediator of growth hormone. It determines growth hormone somatotropic effect in body tissue.  
IGF-1 and insulin level were studied in 63 preterm neonates (28 to 36 weeks of gestation at birth) at 40 weeks of postconceptional age. Patients were divided into groups according to types of feeding: breast-fed (BF, n=45) and formulared feeding (FF, n=18).  
The IGF-1 in the BF was 34.51±17.14 ng/ml, in the FF group - 32.57±25.89 ng/ml (normal range in both groups according to the WHO: 10-159 ng/ml). The level of insulin in BF – 2.95±2.54 mU/ml and 1.94±1.94 mU/ml in FF respectively, that can be taken as low (WHO normal range is 3-15 mU/ml). BMI in breast-fed children – 11.45±1.32, in formulared feeding 11.60±1.91.  
The body composition was also determined by plethysmographiya (using plethysmograph Pea Pod) at post-conceptual age of 40 weeks gestational age. Using plethysmograph during the research allows to determine the percentage of fatt mass (FM) in body tissue. The FM according to Pea Pod were 9.88±4.02% in BF and 10.43±4.11% in FF group. Z-scores in those groups were 0.22±0.63 and 0,06±0,97 respectively, significant differences in body composition in these groups were not observed (p>0.05).  
In this study there was no significant difference in the body composition in premature newborn depending on type of feeding. Neonates accumulate fat mass regardless of the type of feeding. The level of IGF-1 corresponds to that according to WHO. The level of insulin in group on formulared feeding lower than corresponding WHO range, in BF group the level of insulin does not differ from the age normal range.  

IMAGE / TAB:  
IMAGE / TAB CAPTION:  
COI: None declared
ID: 668
TITLE: TRANSIENT RENAL MEDULLARY HYPERECHOGENICITY IN THE FIRST DAYS OF LIFE: CLINICAL AND ULTRASONOGRAPHIC FOLLOW
AUTHORS: Melda Taş1, İbrahim Murat Hırfanoğlu1, İsmail Akdulum2, Öznur Boyunaga2, Münevver Baş1, Elif Keleş1, Aytaç Kenar1, Başak Gürsoy1, Esra Eray Onal1, Canan Türkyılmaz1, Ebru Ergenekon1, Esin Koç1
AFFILIATIONS: 1 Department of Pediatrics, Division of Neonatology, Gazi University Hospital, Ankara, Turkey.
2 Department of Radiology, Gazi University Hospital, Ankara, Turkey.

CONTENT:
Renal medullary hyperechogenicity is usually reported in newborns with transient renal failure, severe perinatal kidney damage, renal malformation and nephrocalcinosis. However, there are studies show that it can be transient without any biochemical abnormality and can show spontaneous recovery without any intervention. In our study; We have presented eight cases showing that medullary hyperechogenicity detected in early-term Renal USG in the neonatal period is not a serious condition and may not require any special treatment and can usually resolve spontaneously.

Eight patients who had medullary hyperechogenicity in renal ultrasonography between January 2016-December 2018 were included in Gazi University Neonatal Unit. The demographic characteristics, birth weight and week, type of delivery, prenatal history, APGAR score and hospitalization were evaluated. Blood pressure and anuria were recorded in all patients. The highest serum creatinine and uric acid values were used. In urine, spot urine protein, urine Ca/Cr ratio, ratio of tubular phosphorus reabsorption to GFR were investigated. Finally, the patients' renal ultrasounds and spontaneous recovery rate at one week later were evaluated.

One of our patients had a history of Vasa Previa in the antenatal history and she was hospitalized with the diagnosis of HIE and get hypothermia treatment. Three patients were admitted to the service due to the high level of bilirubin levels. Two patients were diagnosed with TTN and one patient was admitted to the intensive care unit with the diagnosis of hypoglycemia. Although creatinine and uric acid levels were slightly high in the biochemistry of seven patients, there was no increase in creatinine levels in premature infant. All patients had normal blood pressure and none of them had anuria. USGs of all patients were performed in the first week of their life. Seven of the cases had bilateral medulla involvement. Values returned to normal in 72-96 hours in all patients with an increase in creatinine and and uric acid levels. Also, echogenicity improved in 7-10th day.

Although there was a transient increase in serum creatinine levels with medullary hyperechogenicity in our case series, dehydration was not detected in any of our cases. All patients completely become normal biochemical and ultrasonographically. Renal medullary hyperechogenicity may be observed as a temporary condition that can be improved without a specific treatment under follow-up.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 672
TITLE: ASSESSMENT OF COAGULATION DISORDERS IN CRITICALLY ILL NEONATES: THROMBOELASTOMETRY OR CONVENTIONAL COAGULATION TESTS? THE EXPERIENCE OF AN NICU.
AUTHORS: Rozeta Sokou, Aikaterini Konstantinidi, Stavroula Parastatidou, George Ioakeimidis, Katerina Lampropoulou, Maria Lampridou, Konstantinos Adamopoulos.
AFFILIATIONS: NICU, Nikaia General Hospital “Agios Panteleimon”, Piraeus, Greece

CONTENT:

Coagulation disorders in critically ill neonates as well as transfusions of blood products correlate with increased morbidity and mortality. It seems that conventional coagulation tests are not reliable in detecting platelet or fibrinolysis derangements and also present limitations in predicting bleeding events and guiding transfusion therapy. On the contrary, evaluation of hemostatic disorders using viscoelastic methods allows for rapid detection of coagulopathy and goal-directed therapy. The aim of the study was to assess the diagnostic accuracy of both thromboelastometry and the conventional coagulation tests in evaluating hemostatic disorders in critically ill neonates.

We recorded laboratory tests conducted in order to assess coagulation status in 5 hospitalized neonates in our NICU, with clinical presentation of bleeding events.

Conventional coagulation tests (aPTT, PT, INR, fibrinogen) were within normal limits in 3 neonates and non-diagnostic in the remaining 2 neonates. In contrast, simultaneously performed thromboelastometry timely detected a coagulation disorder in all these neonates, and identified its cause; deficiency of platelets or coagulation factors, or reduced fibrinogen functionality. Thus, thromboelastometry guided our therapeutic approach. In 1 neonate, hemorrhage was attributed to maternal administration of high dose low molecular weight heparin. In another neonate, while conventional tests improved following a therapeutic intervention, thromboelastometry detected aggravation which was corroborated by clinical deterioration of the patient.

Conventional coagulation tests seem to be inferior in the diagnosis and management of hemorrhagic conditions. The cases reported here correspond with our previous experience of thromboelastometry use in NICU, confirming this method to be diagnostic, effective and practical. Accordingly, thromboelastometry appears to establish its role as a crucial diagnostic tool and a guide to transfusion therapy in neonates.
ID: 674
TITLE: RECOMMENDATIONS FOR PREVENTION AND INVESTIGATION OF SUDDEN UNEXPECTED POSTNATAL COLLAPSE (SUPC) IN INFANTS IN THE FIRST WEEK OF LIFE
AUTHORS: Laura Ilardi 1; Irene Picciolli 2; Simona Perniciaro 3; Concetta Buggè 4; Paolo Tagliabue 5; Stefano Martinelli 1
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CONTENT:

SUPC defines term or near-term infants over 35 wks who are well at birth, with a normal 5 min Apgar score and deemed well for routine care, who collapse unexpectedly within 7 days of birth, in a state of cardiorespiratory extremis that requires resuscitation with intermittent positive-pressure ventilation and who either dies or requires intensive care. Incidence is underestimated and etiology is not well understood but risk factors have been identified. The aim of our work was to provide a practical and easy-to-use guide to educate clinicians in order to prevent SUPC and to help the management and the diagnostic process following an event, both in case of infant’s survival or exitus.

The SUPC Workgroup has met periodically since April 2016. We reviewed the international scientific literature in order to apply evidence into our Italian birth centers. Firstly we focused on SUPC prevention, clearly defining risk factors and assuming that standardized procedures have to be promptly available. Then we dealt with SUPC event management, using case reports experience, British Guidelines and Italian Sudden Infant Death Syndrome (SIDS) and Unexpected Fetal Death laws as main references. We involved a multidisciplinary team of experts to define the investigations that need to be carried out in order to guide clinicians in the complex diagnostic pathway.

We defined roles and responsibilities for all health professionals involved in newborn and mother care and we promoted a widespread education of parents and clinicians. Two observational checklists were created: 1) early skin to skin (SSC) newborn evaluation, every 15 min for the first 2 hours (neonatal position, breathing, reactivity, skin color and temperature) 2) rooming-in surveillance, 2 evaluations between 3rd and 12th hours and then every 6 hours (infant’s wellbeing and parent’s continuing education). Then we created an anamnestic datasheet to use in case of SUPC, detailing full parental medical history, obstetric and newborn records and circumstances of event. We designed two different quick reference tables to use in case of infant’s survival or exitus. We listed laboratory tests on different biological samples, procedures and histopathological assessment.

A pocket vademecum has been printed and distributed to Italian neonatologists. The aim of the recommendations is to standardize the strategies of prevention of SUPC in all Italian birth centers and provide a tool for quick consultation for the management of an event that could hesitate dramatically in serious neurological outcomes or death. Complying with the recommendations would also help the medical staff in cases of medical-legal disputes.
COI: I was a speaker at a Master class on the LISA technique organized by Chiesi (2017)
ID: 676

TITLE: MOLECULAR GENETIC ASPECT OF TANATOGENESIS IN A PREMATURE NEWBORN WITH SEVERE RESPIRATORY DISTRESS SYNDROME

AUTHORS: M. Artsiusheuskaya1 A. Mikhalenka2, O. Malysheva2, G. Shishko1, A. Sukharava1, G. Kulakova3, N. Sitnik3, A. Kilchevsky2.

AFFILIATIONS: 1 Belarusian Medical Academy of Post-Graduate Education, Minsk, Belarus
2 Institute of Genetics and Cytology of NASB, Minsk, Belarus
3 Clinical Maternity Hospital of Minsk region, Minsk, Belarus

CONTENT:

The preterm birth rate was about 4% of infants born in Belarus in 2018 year. The risk of death in the neonatal period in premature infants is 20 times higher than in full-term newborns. Therefore, reducing infant mortality is one of the most important tasks of neonatology. Molecular genetic predictors determining the severity of the progression of the disease are currently under discussion.

The preterm male baby C. was born at 28–29 weeks gestation from the second pregnancy complicated by intrauterine growth restriction. The obstetric history showed that the first pregnancy ended with a fetus death at 20–21 weeks gestation. The baby C. was b

The described variants require further study and confirmation of their pathogenicity. It is also required to carry out genetic testing and clinical examination of the parents of the proband for further prenatal diagnosis.

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IMAGE / TAB CAPTION: 

COI: None declared
ID: 677
TITLE: THE IMPACT OF TRANSPORTATION ON NEWBORNS MORBIDITY IN OUR NEONATAL INTENSIVE CARE UNIT, DURING 2016.
AUTHORS: Aikaterini Konstantinidi, Rozeta Sokou, Evaggelia Tavoulari, George Katsaras, Konstantinos Adamopoulos, Katerina Lampropoulou, Stelios Sotirakos, Polytimi Panagiotounakou.
AFFILIATIONS: NICU, Nikaia General Hospital “Agios Panteleimon”, Piraeus, Greece

CONTENT:

A lot of studies have dealt with the factors potentially affecting the morbidity of sick neonates but only few of them have focused on the transportation conditions, and their potential detrimental impact on the newborn short-outcome. Indeed, vibrations, noise, travelling mode, duration of travel as well as the skills of the transport team to monitor and assess patients, and give appropriate measures of resuscitation when needed, may contribute to the unsteadiness of the transported newborns, and determine their final evolvement. We aimed to assess the impact of transportation on the morbidity of newborns transferred to our Neonatal Intensive Care Unit (NICU).

229 newborns hospitalized in our NICU within one calendar year (2016) were included in the study. The newborns were grouped according to 1) their birth location (A: inborn, B: outborn), and 2) their birth weight (2500 grams). The body temperature on admission, and morbidity factors such as hypoglycemia, hypoxia-perinatal stress, Acute Respiratory Distress Syndrome (ARDS), Intraventricular Hemorrhage (IVH), bronchopulmonary dysplasia (BPD), moderately increased echogenicity in brain ultrasound after the 14th day of life, retinopathy of prematurity (ROP), sepsis, duration of oxygen therapy, and hospital stay were recorded in all study neonates. Electronic patient records were used for the retrospective collection of data.

The relative risk for every individual morbidity factor was calculated. The population of outborn neonates (n= 136) had greater risk of suffering from ARDS (11,9%), air leak syndrome (105%), IVH (11,1%) και BPD (83%) when compared with inborn neonates (n= 93).

Adequate neonatal transport is a key component of care of the sick newborns who require referral to tertiary care center as it affects the neonatal morbidity. Despite advances in technology and education, the antenatal transport (when possible) represents the favored transportation mode for newborns, since the mother utero still remains the optimal transport incubator.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 678

TITLE: UMBILICAL ARTERIAL CATHETER AND ENTERAL FEEDING IN VERY LOW BIRTH WEIGHT (VLBW) NEONATES.

AUTHORS: Rozeta Sokou1, Aikaterini Konstantinidi1, George Ioakeimidis1, Katerina Lampropoulou1, George Patsouras1, Evaggelia Tavoulari1, Panagiotis Chatzimihelakis1, Antonios Gounaris2.

AFFILIATIONS: 1. NICU, Nikaia General Hospital “Agios Panteleimon”, Piraeus, Greece 2. NICU, University Hospital of Larisa, Greece

CONTENT:

The safety of initiating enteral feeding or increasing milk volume while a umbilical artery catheter is still in place is a controversial issue in many neonatal intensive care units. These concerns are primarily related to a fear of precipitating gastrointestinal tract complications and especially necrotizing enterocolitis. The aim of this retrospective study was to investigate: 1) whether the presence of a umbilical arterial catheter (UAC) increased the incidence of gastrointestinal tract complications in enterally fed VLBW neonates, and 2) the correlation of the UAC indwelling time, and the rate of increase of the feeding volume with these complications.

During a period of 4 years, 174 neonates hospitalized in our NICU with BW <1500g were studied, and divided into 3 groups according to 1) the presence or absence of UAC in situ 2) the amount of administered milk at the time of UAC removal. Group A: 100 neonates [mean BW 1110 g (SD 226) and mean GA 29wks (SD 2.3)] without UAC in situ. Group B: 41 neonates [mean BW 1175 g (SD 263) and mean GA 29wks (SD 2.1)] with UAC in situ and enteral feeding with a milk volume covering 5% to 50% of daily fluid requirements. Group C: 33 neonates [mean BW 1130 grams (SD 258) and mean GA 28wks (SD 2.3)] with UAC in situ and milk volume of 50% to 100% of their daily fluid requirements. 9 neonates at the time of UAC removal were in full enteral feeding.

There were no differences in the demographic characteristics of the 3 groups, BW (p = 0.409) and GA (p = 0.458). There was no correlation between the presence of UAC in situ and the occurrence of NEC among the 3 groups (p = 0.664). In groups B and C, the average duration of UAC presence was 9 and 12 days (p = 0.017) and the mean daily increase rate of enteral feeding volume was 15ml / kg and 18ml / kg (p = 0.002) respectively. The incidence of NEC was 1 neonate in each group (p = 0.878). The incidence of mild gastrointestinal complications (increased gastric residuals, emesis, abdominal distension) for which no feeding discontinuation was necessary, was 10 newborns in group B and 7 neonates in group C (p = 0.750).

In our study, UAC presence in VLBW infants did not increase the risk for NEC. Additionally, it did not act as an inhibitory factor of either feeding initiation or the achievement of full enteral feeding. The incidence of gastrointestinal complications does not seem to correlate with the duration of UAC presence when enteral feeding is progressively increased at a safe volume rate.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 679

**TITLE:** EPIDEMIOLOGY OF COAGULASE NEGATIVE STAPHYLOCOCCAL (CONS) INFECTIONS, ITS RESISTANCE PATTERN AND INCIDENCE OF CATHETER ASSOCIATED BLOOD STREAM INFECTION (CABSI) OVER 10 YEARS IN A NON-SURGICAL NEONATAL INTENSIVE CARE UNIT (NICU)

**AUTHORS:** Shiranthi Jayasekara 1; Andrea Cardoso Pinto 2; David Lim 3; Ghada Ramadan 4; Santosh Pattnayak 5

**AFFILIATIONS:** Oliver Fisher Neonatal Unit, Medway Maritime Hospital, Gillingham, Kent, UK

**CONTENT:**

Neonatal infection is a significant cause of mortality and morbidity especially in preterm and low birth weight (LBW) infants. Culture-proven sepsis before and after 48 hours of life are termed as early (EONS) and late onset neonatal sepsis (LONS). LONS is associated with prolonged hospitalisation and poor neurodevelopmental outcome. CONS are responsible for LONS and CABSI.

We contribute our culture-proven sepsis data to the Neonatal Infection Surveillance Network (neonIN) database in UK with other 30 neonatal units.

The aim of this study is to find out the incidence of CONS and its resistance pattern, rate of CABSI in this non-surgical NICU.

This is a retrospective analysis of prospectively collected data for the period Jan 2009 - Dec 2018 on all culture-proven sepsis from blood, CSF and aseptically collected urine samples from the neonIN database. Number of live births, neonatal admissions, and number of babies born < 28 weeks, weighing <1,000 grams, total catheter days, blood culture positive with central line in situ, and CABSI rates were collected from the Badgernet database.

The effect of different interventions like Matching Michigan in 2011, change of skin preparation following Antiseptic RCT for insertion of catheters (ARCTIC) trial in 2016 and the NICU Quality Improvement central line care bundle in 2017 on CABSI rates were studied. The resistance pattern of different CONS organisms was also studied over last decade.

Total numbers of live births and neonatal admissions were 49532 and 9927 respectively over last 10 years. Babies <28 weeks and weighing < 1,000 grams were 6% and 5.3% of all admissions. 403 episodes of neonatal infections were reported (119 non-CONS + 284 CONS). 46 and 238 CONS episodes were reported as EONS and LONS respectively.

The incidence of neonatal infections was 2.4/1,000 live births and 11.98/1,000 admissions, if CONS were excluded. CONS infection rates were 5.9/1,000 live births and 28.6/1,000 admissions.

The sensitivity pattern of all CONS, mainly St. capitis, St. epidermidis, St. haemolyticus were studied. The overall sensitivity of teicoplanin fell from 100% in 2009 to 47% in 2018, while vancomycin sensitivity remained at 100% for all CONS infections.

Total catheter days ranged between 1,303 and 1,811 per year, CABSI rate between 4.6 to 22.3/1000 catheter days. (Fig 1)

Non-Coagulase negative infection rate is comparable to other UK neonatal units; however CONS infection rate is higher, particularly in early onset sepsis. Implementation of stringent infection control policies, NICU quality improvement central line care bundle have demonstrated decrease in CONS infection and CABSI rates. Teicoplanin sensitivity has progressively declined over last decade and Vancomycin remained sensitive to all types of CONS.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Catheter associated blood stream infection (CABSI) rates from 2009-2018

**COI:** None declared
ID: 680

TITLE: First Hour of Care: A Regional Quality Improvement Initiative

AUTHORS: Paul Cawley 1, Ian Long 2, Claire O'Mara 2, Mark Dyke 1

AFFILIATIONS: 1. Neonatal Intensive Care Unit, Norfolk & Norwich University Hospital, UK
2. East of England Neonatal ODN, hosted at Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

CONTENT:

Management of unwell neonates in the first hour after birth has far reaching consequences beyond the immediate neonatal period. Recommendations for early newborn care are increasingly substantiated with grade A & B studies. The East of England Neonatal Network consists of 17 neonatal units, including 3 tertiary Neonatal Intensive Care Centres. The regional birth rate is >70,000 per annum. By standardising early newborn care to evidence-based standards across an entire region, there is potential for improvement in a significant number of infants. With units working closely together and sharing expertise, our network provides an ideal vehicle for positive service improvement.

From 2014 to 2018 our network has undertaken 3 quality improvement cycles, with the aim of improving 4 related care bundles: Antenatal, Thermoregulation, Respiratory and Fluids & Medications. This project has been centrally led, with creation of a working group & designated local champions, to identify primary goals & drivers. Design: Plan-Do-Study-Act. Key quality measures were audited on a unit level, from pre-implementation to 2 post-implementation cycles. We developed electronic spreadsheets with data validation & easy-to-use interface to optimise data collection.

Principal interventions included: Regional education days, production of a universal admission care booklet and development of a quick reference manual, accessible in print & electronic form.

Analysis: 2 sided Chi-Square.

n=1,480. 100% response all units. Range 23+0 to 42+2 weeks gestation & birth weight 380-5460g. Our admission booklet was used to guide care in 82%.

In extremely preterm infants: Antenatal corticosteroid use increased [75 to 95%, p=0.001], magnesium sulphate use increased [24 to 54%, p=0.001]. Adherence to thermoregulatory measures improved [Plastic Bag use 86 to 99%, p<0.0001; Hat use 64 to 95%, p<0.0001]. Use of delivery room Positive-End Expiratory Pressure improved [47 to 78%, p<0.0001], & optimal first dose surfactant improved [47 to 75%, p=0.01]. The proportion of infants not intubated or intubated for surfactant instillation only increased [2% to 26%, p=0.001]. Documented parental involvement in delivery room increased [45% to 88%, p<0.0001], as did the proportion of infants receiving antibiotics [58 to 67%, p=0.55] & fluids [67 to 85%, p=0.018] within 1 hour. (See figure)

Mechanisms unique to the network model have streamlined dissemination of practice, guideline development & in-depth audit. Strong drivers for change & enthusiastic staff facilitated rapid uptake. Our project has achieved modest but sustained/progressive improvements, potentially benefitting thousands of infants. We recognise significant ongoing improvement is still required: we now plan targeted intervention to these key areas, with re-audit.

IMAGE / TAB:
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COI: None declared
Kangaroo care is recognised as an important part of family centred developmental care in the neonatal environment (NICE, 2010). Benefits have been widely researched and include reduction in mortality and improvements in cognitive and neurobehavioural outcomes (Akbari, 2018). Many quality frameworks in developmental care recommend families are supported to carry out kangaroo care regularly (Bliss, 2015). Despite this, rates of kangaroo care on our neonatal unit were found to be between 0 - 33%. Using a quality improvement model (QI) our aim was to increase participation of families in kangaroo care by 20% within 6 months.

A PDSA framework was used in order to structure an improvement plan and implement change. A developmental care multidisciplinary group was set up to propose drivers and change ideas. PDSA cycles completed were:

1. Developmental working group and ‘Coffee, cake and chat’ – Parent led mornings.
2. Education & empowerment cycle – Teaching on nursing study days, educational MDT grand rounds and kangaroo care champions.
3. Trial of a reclining chair to improve comfort for parents.

Rates of kangaroo care were recorded on a set day 2-3 times a month between December 2018 and March 2019. Data collected included gestational age of infant, location e.g ITU and other medical procedures occurring. Process changes were monitored using statistical process control charts.

All infants on the neonatal unit were included in the analysis unless deemed clinically unstable to have kangaroo care. Run chart shows percentage of kangaroo care carried out over 4 months. Following PDSA cycle 1, KC carried out increased from 10% to 40%. Further increased to 75% in the second PDSA cycle, however it did drop to 23%. Following 3rd PDSA cycle, percentages remained stable between 50-64%. Overall the median percentage of KC increased from 40% to 50% i.e. 25% increase from initial median. More of the infants on ITU (57%) or HDU (54%) participated in KC care compared to SCBU (37%). Infants in incubators participated in KC more than infants in cots (74% vs 24%). Feedback from parents informally through the parent groups was positive towards carrying out kangaroo care.

Utilising multidisciplinary working and structured quality improvement framework to plan and drive strategies for change; we have shown an improvement in delivering kangaroo care in our neonatal unit. Our next target is to ensure sustainability. Engagement with parents and staff is important in understanding barriers to kangaroo care and a survey is being carried out to understand this further.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Kangaroo care QI driver diagram demonstrating change ideas and run chart of PDSA implementation.

**COI:** None declared
RESV Awareness: A National Poll of Parents & Health Care Providers

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Content:

Respiratory Syncytial Virus (RSV) remains the most prevalent cause of acute lower respiratory tract illness in infants and young children. RSV often resembles the flu or common cold, which is why parents often dismiss the symptoms as a mild illness. While most children are able to fight off RSV on their own, infants, especially those born prematurely, and children with weak immune systems or underdeveloped lungs may get very sick. For these high risk children, RSV can lead to hospitalization, lifelong health complications like asthma, even death. RSV is the leading cause of hospitalization in children younger than one and the most common cause of bronchiolitis and pneumonia.

Two national online surveys were conducted in September of 2018. One survey was conducted September 11-19, 2018, among 600 parents of children three years old and under including 60 first-time expectant parents. Parents ranged in age from 18 to over 45; 47% were male, 53% were female. The second survey was conducted September 12-25, 2018 among 175 specialty health care providers including neonatologists (16%), pediatric pulmonologists (29%), neonatal intensive care unit nurses (18%), neonatal nurse practitioners (15%) and respiratory therapists (22%). Both surveys sought to gain information about participants’ awareness of and concern about RSV. Additional questions were asked to gauge participants’ confidence in monitoring and preventing RSV.

Only 18% of parents said they know “a lot” about RSV; 70% of providers agreed that parents of their patients have low awareness of RSV, but they actively monitor for it. Nearly all providers indicating they are vigilant about monitoring for symptoms during RSV season (98%) and 78% believe required reporting of new cases should be reinstated. Just 22% of parents consider themselves “very well prepared” to prevent RSV, but when presented with the possibility of an RSV vaccine, 83% said they would “probably” or “definitely” take it if they were pregnant. After hearing statistics about RSV, parents said they were “more concerned” about their child contracting it (65%) and were likely to ask their doctor about RSV (67%). Providers discern an even greater risk, reporting RSV is the “most serious and dangerous” illness for children under 4 (77%) and for premature babies (96%).

These surveys confirm that RSV can be a serious, demonstrated threat to infants and young children. Responses indicate parents are largely unaware and feel unequipped to protect their children, but educating parents about prophylactic measures can lead them to protect their children. Health care providers overwhelmingly acknowledge the importance of robust RSV surveillance and believe policy mandating it should be reinstated.
COI: None declared
ID: 691  
**TITLE:** NON IMMUNE HYDROPS FETALIS: FETAL OUTCOME IN A SINGLE CENTER  
**AUTHORS:** Heiko Milera 1; Anja Fruth 2; Christine Lindner 3; Stephanie Essmann 4; Antje Jahn 5; Mareike Selig 6; Jennifer Winter 7; Christoph Kampmann 8; Julia Winter 9; Eva Mildenberger 10; Catharina Whybra 11  
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**CONTENT:**

Nonimmune hydrops fetalis (NIHF) is defined as the presence of ≥ 2 abnormal fetal fluid collections in the absence of red cell alloimmunization. NIHF is a nonspecific symptom and the end-stage of a wide variety of disorders. The condition reveals a high morbidity and mortality in spite of advances in prenatal diagnostic techniques, early detection, and individualized management. Nevertheless, in a high number of cases the underlying etiology remains unexplained.

The underlying etiology and factors associated with mortality of 90 patients with NIHF treated in our centre from January 2007 to December 2018, were retrospectively assessed. The etiologic classification of NIHF was based on criteria previously reported in a systematic review using 13 classification groups.

All 90 patients were subclassified into one of the diagnostic categories: cardiovascular (10%), hematologic (2%), chromosomal (39%), syndromic (12%), lymphatic dysplasia (3%), inborn errors of metabolism (7%), infections (3%), thoracic (3%), urinary tract malformations (0%), extra thoracic tumors (0%), twin-to-twin transfusion syndrome (0%), gastrointestinal (3%) and idiopathic (17%). The largest etiological group was the group of chromosomal abnormalities comprising 35/90 cases. 34 cases were caused by aneuploidy and 1 case by triploidy. Mortality rate of fetuses with NIHF due to aneuploidy at gestational ages below 18 weeks was 100%. Within the group of idiopathic NIHF, prenatal ultrasound and echocardiography was performed in all 15 cases. Additionally, fetal karyotyping was carried out in 10 cases. Diagnostic testing for metabolic diseases was accomplished in only 4 cases.

NIHF diagnosed early in gestation is due to aneuploidy in most cases and is associated with poor outcome. In the future, new techniques in genetic analysis will be needed to reduce the high rate of unexplained cases of NIHF and to improve counselling. A standardized multicenter prospective trial can hopefully ameliorate diagnosing the causes of idiopathic NIHF in the future.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 693

TITLE: THE ROLE OF PLACENTAL AUTOPHAGY IN PRETERM MORBIDITIES: A PROSPECTIVE COHORT STUDY

AUTHORS: Burak Deliloglu 1; Funda Tuzun 1; Anıl Aysal Agalar 2; Erdener Ozer 2; Merve Cengiz 1; Nuray Duman 1; Hasan Ozkan 1

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CONTENT:

Autophagy is an intercellular lysosomal degradation process. This process contributes to basal cellular and tissue homeostasis, as well as developmental regulation in higher organisms. Conditions like hypoxia, starving, infection, free oxygen radicals trigger autophagosome activity. The importance of autophagy has been shown in pathogenesis of certain morbidities in immature animal models. The aim of this study is to determine the relationship between placental autophagy activity and morbidities in extremely preterm infants.

In this prospective cohort study infants between 24-29 gestational weeks were evaluated. Maternal and neonatal data were collected. Placental histologic evaluation was performed by two blinded pathologists. Placental findings categorized as vasculopathy and/or intrauterine inflammation. As an autophagy marker, placental LC3 immunohistochemical staining was scored semi-quantitatively from 0 to 2. Intraventricular hemorrhage, periventricular leukomalacia, culture proven late onset neonatal sepsis, necrotizing enterocolitis, retinopathy of prematurity and bronchopulmonary dysplasia were listed as neonatal morbidities.

Totally, 59 preterm infants and placentas were eligible for the study. The mean gestational age and mean birth weight were 27.0 ± 1.5 weeks and 953 ± 257 grams respectively. Placental histology results were: n=34 (58%) vascular pathology, n=7 (12%) chorioamnionitis and n=16 (27%) coexistence of vasculopathy and inflammation. Anti- LC3 staining was found in 42 (73%) placentas, 7 (12%) of them showed intense staining (immunohistochemical score 2). Increased placental autophagy activity was found to be increased in all evaluated preterm morbidities, particularly, severity of placental autophagy seems to be an important predictor of any preterm morbidity or mortality.

This is the first study to investigate the relationship between placental autophagy and preterm morbidities. Our preliminary study shows a clear trend towards increased placental autophagy activity in preterm infants with morbidity or mortality in extremely immature babies. This study indicated that placental autophagy may be a promising biomarker for predicting preterm morbidities and it may contribute to new treatment options in the future.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 696

**TITLE:** Effectiveness and tolerability of LISA (Less Invasive Surfactant Administration) in a tertiary NICU

**AUTHORS:** Javeria Z. Ahmed
Harsha Gowda

**AFFILIATIONS:** Neonates,
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United Kingdom

**CONTENT:**

LISA (Less Invasive Surfactant Administration) is a method using a thin catheter as an alternative to an endotracheal tube for surfactant administration in spontaneously breathing preterm infants with respiratory distress syndrome receiving non-invasive ventilator support. A recent comparison of 7 ventilation strategies for preterm (including CPAP alone, INSURE, LISA, NIPPV, nebulized surfactant administration, surfactant administration via laryngeal mask airway and mechanical ventilation) showed that the use of LISA was associated with the lowest rate of death or BPD at 36 weeks’ postmenstrual age. We aimed to assess the effectiveness and tolerability after successful implementation of LISA

Prospective observational audit over a period of 11 months from June 2018 to April 2019. The surfactant dose used for LISA was 200mg/kg. Pre-medications used prior to LISA were Atropine and Fentanyl. In a few cases, instead of pre-medications sucrose was used and infant was swaddled. LISAcath was used for surfactant administration. Video laryngoscope was used for most of the cases. Infants were on continuous monitoring for heart rate and saturations during and after the procedure.

LISA failure is defined as need for intubation and ventilation within 48 hours after LISA.

Total of 18 LISA were done during the study period. Median gestational age was 30+6 weeks (27+6 to 37+3). Mean Birth weight was 1.48 kg (0.635 kg - 3.8 kg). Median age for LISA was 14.6 hours (1 hour - 31 hours). 15 infants were on high flow and 3 were on CPAP before LISA. FiO2 ranged from 30% to 70% pre-LISA which came down to 21% to 35% post LISA. Pre-medications atropine and fentanyl were used in 66.6% of infants and sucrose & swaddling was used in 11%. LISA failure was in 11% (2/18) needing intubation and ventilation with further dose of surfactant. 22.2% had desaturations and 5.5% had brady cardia (heart rate less than 80/min). One infant had apnoea. 16.6% have Chronic Lung Disease (oxygen requirement at 36 weeks post menstrual age).

LISA is well tolerated in preterm infants. Even though numbers are small in our audit only 11% had LISA failure needing intubation. Our neonatal staff is now familiar with the LISA procedure, so this encourages them to do the LISA in more extreme preterm infants. We are aiming to take LISA to the delivery suite in future.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 698

**TITLE:** HISTOPATHOLOGIC AND GENETIC FINDINGS IN NEONATES WITH VARIOUS CLINICAL COURSE OF ALVEOLAR-CAPILLARY DYSPLASIA - CASE REPORT

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**CONTENT:**

Alveolar-capillary dysplasia (ACD) is a rare condition among neonates who presented with severe pulmonary hypertension. A short asymptomatic period is usually observed before the onset of the disease. Respiratory failure and death are reported in all the described patients up to date. As the pulmonary capillary bed is affected available therapies are ineffective. The diagnostic process of ACD is based on histopathological examination of lung samples and genetic testing, especially focused on underlying FOXF1 gene defects. To our best knowledge, we report the first patients in Poland with diagnosis confirmed by both histopathological examination and genetic testing.

CASE 1. A neonate (2920g) prenatally diagnosed with polyhydramnios, omphalocele, hydronephrosis was born by C-section in 39 week GA. Apgar scores 1’-9, 5’-10. In the 12th hour of life the patient desaturated - noninvasive oxygen therapy was applied (FiO2=0

Despite the same histopathological findings and genetic abnormalities patients differed in clinical presentation of ACD, response to treatment and extra-pulmonary manifestations. Potentially, surgery and ceasing of prostaglandin E1 infusion might have triggered the onset of ACD. Both genetic testing and histopathological examination occur to be necessary for the diagnosing and decisions making process regarding the management of infants with ACD.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 699
TITLE: THINK MAGNESIUM: CONCERTED MULTIDISCIPLINARY IMPROVEMENT INITIATIVE TO INCREASE ANTENTANAL MAGNESIUM UPTAKE IN < 30 WEEK PRETERM BIRTHS
AUTHORS: Sankara Narayanan 1; Devasri Mitra 2 Nanda Shetty 3; Hamdi Abdulle 4 Anastasia Katana 5
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2, 3, 4: Department of Obstetrics and Gynaecology, Watford General Hospital, United Kingdom

CONTENT:

There is compelling evidence that magnesium sulfate (MgSO4) given antenatally in threatened preterm labour is neuroprotective and reduces risk of cerebral palsy in offspring. Numbers needed to treat are lower (46:1) < 30 weeks. National Neonatal Audit Programme (NNAP) in the UK monitors compliance to antenatal magnesium uptake in births < 30 weeks. Our centre was a negative outlier (16 % vs 43 % national average) for this audit measure in the 2016. Our aim was to improve MgSO4 compliance from 16 % to at least 50 % over a 1-year period beginning January 2017 and then to sustain those improvements by multidisciplinary collaborative work.

A multidisciplinary team comprising of neonatologists, obstetricians and midwives formed the improvement team. This team process mapped a preterm mother’s journey within the service to understand barriers and enablers to timely MgSO4 administration. Driver diagram (Figure 1) was developed to conceptualise overall aim, primary & secondary drivers which in turn informed change ideas. Change ideas (MgSO4 awareness sessions, clear guideline, preterm labour proforma, Think Mg posters, ward level champion facilitated rounds, daily safety huddles, monthly display of compliance figures) were tested in iterative PDSA cycles. Number of preterm births <30 weeks between a non-compliant episode was plotted on a g chart (Figure 1), this allowed a visual display of performance over time.

In 2016, out of 20 eligible preterm mothers only 3(15%) received antenatal MgSO4. With improvement efforts and monitoring via PDSA cycles and g charts we saw a steady increase in MgSO4 uptake. In 2017 10 out of 18(56%) and in 2018, 14 out of 18(77%) received antenatal MgSO4 within the 24-hour period prior to delivery. Opportunities between events ‘g’ chart tracked number of < 30-week births between an MgSO4 non-compliant births and there was reduction in non compliant episodes. Unfortunately, we had a run of quick deliveries with short arrival to delivery intervals in late 2018, with drop in our compliance. Further analysis of these cases highlighted certain delays in triage which were addressed. Overall, in a 3-year period MgSO4 compliance rose from 16% to 77%. We also involved service users by providing a parental information leaflet and dissemination of newsletter.

Antenatal magnesium sulfate is an inexpensive intervention that reduces risk of cerebral palsy in preterm births. Using a well-structured quality improvement plan, we were able to understand the barriers to MgSO4 use and systematically introduce changes that resulted in improved compliance. Collaborative working between multidisciplinary staff across specialties was key to our success and we hope to further scale up and sustain the improvement.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=affd58d5e918866ec3936dbbe6ab9ab-MjAxOS0wNSM1Y2UyNyJ2Myc2MyOGF2

IMAGE / TAB CAPTION: Figure 1: g chart showing reduction in mgso4 non-compliance over time

COI: none declared
Seizures are common in the neonatal period occurring in 1-3/1000 neonates. Genetic epilepsies are disorders in which seizures are a core symptom, resulting directly from a known or presumed genetic mutation. Genetic epilepsies may present in the neonatal period and distinguishing them from the large number of seizures resulting from acute brain insults (i.e. HIE, stroke, CNS infections) has important implications for treatment and prognosis. We aim to describe the prevalence and presentation of neonatal-onset epilepsies due to genetic mutations in a cohort of neonates monitored with video-EEG per ACGME recommendations.

All neonates and infants monitored in a single level IV Intensive Care Nursery over a 4.5-year study period (05/2014-12/2018) were screened for inclusion. The video-EEG and medical records of neonates with documented seizures were reviewed. Etiology was determined to be genetic based on clinical, EEG, MRI and laboratory testing. Genetic testing was undertaken at the clinician’s discretion, with the constraint of insurance reimbursement. One patient was diagnosed in the P3EGS (Program in Prenatal and Pediatric Genomic Sequencing) study which offers whole exome sequencing (WES) to underrepresented and minority patients.

Over the study period, 494 neonates were monitored with video-EEG and 106 had seizures (21%). Eleven neonates (10%) were diagnosed with neonatal-onset genetic epilepsy. For 7 infants, the genetic mutation was found (KCNQ2:4; KCNQ3: 1; PRRT2:1; BRAT1:1), while for the remaining 4, 2 had a negative exome, 1 had a negative infantile epilepsy panel and 1 declined testing. MRI was performed in 7 and unrevealing. For the remaining 4 (3 of whom had a confirmed KCNQ2/3 pathogenic variant), MRI was not deemed necessary for the diagnosis. Seizure semiology was focal tonic in neonates with epilepsy associated with mutations in KCNQ2, KCNQ3, and PRRT2 genes, and myoclonic in the patient with BRAT1 mutation. Among the neonates with presumed genetic etiology, one had inconsistent semiology, one had focal tonic seizures, one had unilateral alternating focal clonic seizures, and one had ictal apnea.

In this large cohort of neonates with EEG-proven seizures a substantial minority (10%) were diagnosed with neonatal-onset epilepsy due to a known or presumed genetic variant. 70% of neonates who underwent genetic testing had a causal variant for their disease, confirming that genetic testing is key in neonates with seizures that are not clearly explained by an acute etiology.
ID: 701
TITLE: A GIRL WITH TRIPLOIDY SURVIVES THE FIRST MONTHS; A CASE REPORT
AUTHORS: Mechthild Hubert
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CONTENT:

Triploidy is a chromosomal disorder that may account for more than 10 percent of all miscarriages or early intrauterine deaths. Most often the disorder is suspected during antenatal ultrasound scan as there are some common signs such as intrauterine growth restriction, conspicuous facial profile or cleft palate. The disorder can then be confirmed by amniocentesis and often the pregnancy will be terminated as the child is seen as not viable. 1 in about 50,000 live-born babies will be diagnosed with Triploidy. Most die within a very short period due to associated malformations such as lung hypoplasia with consecutive pulmonary hypertension. Longer survival is usually associated with mosaicism.

L. was born at 32+6 weeks gestation weighing 915g. Antenatal ultrasound scans had shown a severe intrauterine growth restriction with anhydramnios. Invasive diagnostic procedures were not wanted. Therefore delivery by caesarean section was scheduled when

While it is easy to find information on Triploidy as a reason for miscarriages and early intrauterine death, parents and professionals do not find information on surviving patients easily. This case report aims to present the clinical course of a child with Triploidy that is now more than 10 months old being cared for at home with oxygen and feeding via feeding tube respectively PEG. Only a very slight neurological development was noted till now.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 703
TITLE: CLINICAL AND GENETIC ASPECTS OF RESPIRATORY DISTRESS SYNDROME IN PREMATURE NEWBORN
AUTHORS: Anastasiya Sukharava 1; Georgy Shishko 2; Marina Artsiusheuskaya 3; Alena Mikhalenka 4, Volha Malyshava 5; Inna Valentsiukevich 6; Vanda Adasko 7
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CONTENT:
Polymorphic variants of genes encoding surfactant proteins A, B, C, D (SFTPА, SFTPB, SFTPС, SFTPD), vascular endothelial growth factor (VEGF) can result in pulmonary morbidity in newborn infants (M. Somaschini, 2017; M. Tsitoura, 2016). The changes in the activity of xenobiotic biotransformation enzymes (MDR1, NAT2) and antioxidant system (GSTP1) associated with the presence of genetic polymorphism can lead to an increased susceptibility of the organism to adverse effects and, as a consequence, to an increased risk of respiratory diseases (A. Hadchouel et al., 2008; N. Ambalavan, 2009).

The preterm male baby V. was born at 29–30 weeks gestation from the second pregnancy complicated by intrauterine growth restriction. The first pregnancy ended in term with a normal delivery. The baby C. was born by emergency caesarean section. His weight

Polymorphisms detected by molecular genetic analysis in SFTPБ (intron 4, promoter area), SFTPА (exon 3) can be the markers of the severity of respiratory disorders in this patient.

IMAGE/TAB: 
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=4c2403402b09bcd0701282d7ea9bcafe8-MjAxOS0wNSM1Y2UyNjJyY2Y2MzZjIl

IMAGE/TAB CAPTION: Fig.1 Molecular genetic analysis of the surfactant proteins complex, xenobiotics biotransformation enzymes and the antioxidant system, vascular endothelial growth factor of the child V.

COI: None declared
ID: 705
TITLE: EPIDEMIOLOGY OF SERRATIA MARCESCENS INFECTION AND CARRIAGE IN A NEONATAL INTENSIVE CARE UNIT
AUTHORS: Maria Tsirigotaki 1, Nicole-Hilda Anagnostatou 1, Olga Michopoulou 1, Sofia Maraki 2, Eleftheria Hatzidaki 1
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CONTENT:

Serratia marcescens (SM) is a gram-negative bacterium recognized as a cause of healthcare-related outbreaks in neonatal intensive care units (NICU). SM may colonize the nasopharynx and the gastrointestinal system and can cause invasive (bloodstream, CNS, respiratory tract infections) and noninvasive (conjunctivitis, urinary tract) infections in neonates.

We performed a retrospective, cohort study including all SM clinical isolates in neonates admitted to a level III NICU from 2013 to 2018. Clinical and microbiological characteristics were reviewed.

From January 2013 to December 2018, we detected 80 neonates with SM (37 infections, 43 colonizations). The mean gestational age at birth was 33.7 weeks (range of 25 to 41 weeks) and the mean birth weight was 2055gr (range of 740 to 3600gr). The vast majority of neonates were preterm (67/80, 83.7%), 23.7% required prior endotracheal intubation, 31.2% had central catheter devices and 33.7% received parenteral nutrition. The most common infections were conjunctivitis (18/37), blood stream (16/37) and CNS infections (2/37). A cluster of cases was observed between February 2015 and March 2016 involving 61/80 neonates. All isolates were resistant to ampicillin, amoxicillin/clavulanate and cefoxitin and in their majority susceptible to carbapenems (78/80) and ciprofloxacin (80/80). The mean length of stay was 33.1 days (1 to 254) and the case fatality rate was 3.7%.

Serratia marcescens can cause recurrent and long-lasting outbreaks in NICU despite close surveillance and hygiene measures. We emphasize the importance of early implementation of aggressive infection control measures in patients, care-givers and NICU personnel.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 708

TITLE: HIGH SEIZURE BURDEN AND DISSOCIATION BETWEEN CLINICAL AND EEG SEIZURES IN NEONATAL ENCEPHALOPATHY IN A HOSPITAL SETTING IN GHANA

AUTHORS: Martinello, Kathryn A 1,2,3.; Mathieson, Sean 4,5; Enweronu-Laryea, Christabel 6,7; Rose, Maggie 2; Manu, Sally 7; Tann, Cally 2,8; Meek, Judith 2; Ahor-Essel, Kojo 7; Boylan, Geraldine B 4,5; Robertson, Nicola J 1,2,9.

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7. Neonatal Intensive Care Unit, Korle Bu Teaching Hospital, Accra, Ghana
8. Maternal, Adolescent, Reproductive and Child Health Centre, Department of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom
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CONTENT:

Neonatal encephalopathy (NE) is a significant problem worldwide with the highest rates in sub-Saharan Africa. Neonatal seizures, a common feature of NE, are difficult to diagnose even with access to EEG. Access to full video EEG is rare in both low and high resource settings and seizures are typically managed clinically. The aim of this study was to assess neonatal seizure burden and the relationship between EEG and clinical seizures in a setting with high rates of birth-associated NE.

This prospective pilot observational cohort study was conducted at Korle Bu Teaching Hospital, Accra, Ghana, in June-July 2017. Infants ≥36 weeks with moderate to severe NE were enrolled as soon as possible after birth. 11 infants (82% male) were recruited: mean 39+3 weeks (SD 12d) and 3083 (SD 421)g. Multichannel 9 lead video EEG (Lifelines iEEG, Kvikna Medical) was commenced after enrollment (median 9 (IQR 4-12)h) and recorded for ≥48h. The EEG screen was obscured, excluding impedance tests. A clinical seizure record was kept as standard care. Neurological assessments were performed for 4 days. EEGs were assessed (SM, GB) and all seizures annotated, quantifying seizure number, mean duration, burden (SB) (min), and instantaneous SB (ISB) (min/h). Videos were retrospectively reviewed (KM).

4 (36%) infants had EEG seizures. For these 4 infants, SB was median (IQR) 194 (86-289) min, and number 88 (47-162). EEG seizure onset was at 35 (32-45) h, and the time of max ISB was 45 (35-65) h. 3 infants with EEG seizures had video recorded; clinical seizure correlation ranged from 17-57%, including clonic, automatisms, and autonomic seizures. 9 infants were suspected of seizures by the treating team. Anticonvulsants (AED) were given to 8 (72%) infants (2 phenobarbitone (PB), 1 PB & phenytoin (PT), 5 PB, PT & midazolam). Five (63%) of these infants had no EEG seizures. The infant with greatest EEG SB had 1 documented clinical seizure and received no AED. Age at first AED was 2.7 (2.0-3.2) h, which was prior to EEG onset for all but 1 infant. There was no correlation between EEG seizures (number, SB, ISB) and day 4 Thompsons score (R2≤0.04). 1 of 3 infants that died had EEG seizures.

In a mid resource setting with high rates of NE, seizure burden is high. Apparent clinical seizure activity is frequently dissociated from EEG seizures. Electrographic seizures peak on day 2 to 3, however this may be contributed to by the common use of AED early after birth (prior to EEG commencement). Pragmatic therapies to reduce seizure burden in low and mid resource settings may include prophylactic AED.
Table 1. Description of seizures for the 4 infants with EEG seizures. ISB = instantaneous seizure burden

Figure 1. Seizure burden (SB) min/h plots for the 4 infants with EEG seizures, Baby A - D. EEG commencement is indicated by the start of the orange bar.

COI: None declared
ID: 709
TITLE: CLINICAL MANIFESTATIONS AND RESISTANCE PATTERNS OF STAPHYLOCOCCUS AUREUS INFECTION IN THE NEONATAL PERIOD
AUTHORS: Maria Tsirigotaki 1, Sofia Maraki 2, Emmanouil Athanasopoulos 1, Eleftheria Hatzidaki 1
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2Department of Clinical Microbiology, Heraklion University Hospital, Crete

CONTENT:

Staphylococcus aureus (S. aureus) is a common cause of neonatal infections worldwide. MRSA is associated with increased morbidity and mortality, especially in the premature neonates. Aim of this study was to evaluate the clinical manifestations, resistance patterns and incidence of culture proven S. aureus infection in neonates admitted to a tertiary-care neonatal intensive care unit (NICU).

We performed an 11-year retrospective cohort study in neonates admitted at a level III NICU with culture-proven, invasive and non-invasive, methicillin resistant (MRSA) or susceptible (MSSA) S. aureus infection between January 2008 and December 2018. Community-acquired (CA), community-onset healthcare associated (COHA) and hospital-acquired (HA) infection was defined according to CDC criteria. Logistic regression analysis was performed to identify risk factors for MRSA infections in the neonatal period.

A total of 59 clinical isolates of S. aureus were identified (46 CA, 12HA, 1 COHA) among neonates 1 to 30 days old, mean birth weight 3278gr [range 1020-5050gr]. Skin and soft tissue infections were the most common (54/59) while invasive infections were rare (5/59, CNS infection: 1, septicemia: 4). A total of 35.5% (21/59) were MRSA, erythromycin and clindamycin resistance were seen in 27.1% (16/59) and 16.9% (10/59) of isolates respectively. 80.9% of neonates received intravenous antibiotics (vancomycin 31/34, cloxacillin 5/34). The incidence of S.aureus infections increased during the study period from 3.76 per 1000 admissions in 2008-2012 to 19.75 per 1000 in 2014-2018. In logistic regression analysis, there was decreased risk of MRSA in neonates born by caesarian section (OR 0.015-0.902, p 0.03). A 7-fold rise of MSSA was noted from 1.88 to 13.31/1000 in the second half of the study.

The burden of S.aureus infections is considerable in the neonatal period. Rising trends of CA infections were noted along with an increase in methicillin sensitive strains.
ID: 710

**TITLE:** MODELING OXYGEN EXPOSURE DURING CARDIOPULMONARY BYPASS CIRCULATION IN THE NEWBORN

**AUTHORS:** Åsa Jungner 1; David Ley 2

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2 Lund University, Skane University Hospital, Department of Clinical Sciences Lund, Pediatrics, Lund, Sweden

**CONTENT:**

Cardiopulmonary bypass circulation in the newborn challenges the immature physiology with supranormal oxygen tensions. In this study, we aimed to quantify oxygen exposure during cardiopulmonary bypass circulation to define an independent variable when assessing systemic oxidative stress response.

40 neonates born with critical congenital heart defects requiring open heart surgery on cardiopulmonary bypass within thirty days of life were included. Oxygen exposure during cardiopulmonary bypass circulation was quantified using arterial blood gas analyses obtained hourly, and flow(Q) in the bypass circuit to estimate DO2. Oxygen exposure models incorporating Q, or pO2 only, were plotted against time on cardiopulmonary bypass, and AUC were calculated using trapezoid method. Neonates requiring selective cerebral perfusion were grouped into a separate category.

One patient was excluded due to bypass time less than 60 min. Initial pO2 during cardiopulmonary bypass circulation was in our study 29.8(15.9) (median(IQR)) kPa. When calculating a fictive normoxic exposure assuming a time of 180 min on bypass (median time on bypass in our cohort was 181 minutes) and a pO2 of 10 kPa, all neonates but one experienced a supranormal oxygen exposure. AUC of oxygen exposure plotted against time shows a good discrimination between subjects, see fig 1. Adding Q to the calculations did not result in an improved discrimination.

Cardiopulmonary bypass circulation presents the newborn physiology with supranormal oxygen tensions. Quantifying oxygen exposure during cardiopulmonary bypass circulation using AUC is a feasible method with a good discrimination between subjects. If the supranormal oxygen tensions translates into systemic oxidative stress and end organ damage remains to be investigated.

**IMAGE / TAB:**
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=9662a74a8be8f123574ff7cf2bf3d02-MjAxOS0wNSM1Y2UyNjY2Y2M2MDI

**IMAGE / TAB CAPTION:** Oxygen exposure calculated as AUC in all patients. Normoxic exposure is indicated by dotted line.

**COI:** None declared
ID: 712
TITLE: DISCORDANT PREGNANCY AND INTRAUTERINE GROWTH RETARDATION: NEONATAL EVOLUTION OF THE EUTROPHIC TWIN.
AUTHORS: Titouan Thiry 1
Catheline Hocq 2
Olivier Danhaive 3
AFFILIATIONS: 1, 2, 3 Cliniques Universitaires St Luc, Brussels, Belgium

CONTENT:

Weight discordance between fetuses occur frequently in dichorionic-diamniotic twin pregnancies. The presence of a weight discordance is associated with neonatal complications at various levels (digestive, neurological, hemodynamic and other) in the hypotrophic twin, whereas an increased risk of respiratory complication has been described in the eutrophic child compared to the hypotrophic one in the few available reports. The aim of the study is to describe neonatal outcomes of the eutrophic sibling in discordant twin pregnancies with premature induction of delivery for intrauterine growth restriction (IUGR) of the other sibling.

This is a retrospective single-center study conducted between January 2006 and December 2015. Out of 543 twin pregnancies, 3 groups were selected: the study group was composed of the eutrophic twin from discordant pairs (n=21), the control group included eutrophic twins born from non-discordant pairs (n=42), and the IUGR group consisted of the hypotrophic siblings of the study pairs (n=20 - one intrauterine death). The neonatal morbidities analyzed were: need of respiratory support (invasive and non-invasive), necrotizing enterocolitis, early onset sepsis (suspected, clinical or proven), metabolic disorder (hypoglycemia and/or need of phototherapy) and retinopathy. We used Chi-square, t-student and Anova statistical tests.

Mean gestational age at birth was 34 weeks. Mean birth weight was 2,150g for the study group, 2,148g for the control group and 1,403g for the IUGR group. 52% of study group need respiratory support vs 38% of control group and 15% of IUGR group (Anova: p = 0,04); there was a statistical difference between the study group and the IUGR group (p = 0,01), but none between the study group and the control group (p = 0,28). There were no significant differences between other morbidities, except metabolic disorders: 80% of IUGR neonates developed metabolic disorders vs. 57% of their eutrophic siblings and 48% of control twin (Anova: p=0,02).

The difference in respiratory morbidity observed between eutrophic and IUGR siblings results from a better-than-expected respiratory course in the IUGR sibling, who appears protected against neonatal respiratory failure. Conversely, respiratory failure in the eutrophic siblings appear related to induced prematurity.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=3adbcfb616bab28070a51c30a4d3c472-MjAxOS0wNSM1Y2UyNjY2M3YWRm

IMAGE / TAB CAPTION: Comparison of respiratory support's need between study, control and IUGR groups

COI: non declared
ID: 713

TITLE: EARLY AND LATE PROBLEMS OF SGA INFANTS: DOES THE SGA DEFINITION NEED TO BE RE-EVALUATED?

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CONTENT:

Small for gestational age (SGA) babies are under risk of neonatal morbidity and mortality. These babies on the long term are also under the risk of growth retardation, puberty problems and metabolic syndromes. SGA is defined as birth weight being under 10 percent of gestation week by neonatal team while pediatric endocrinology team define it as birth weight being under -2 standard deviation (SD). In this study, the early neonatal problems and postnatal growth data of the babies whose birth weights were under 10 percent but over -2 SD and the ones under -2 SD were compared.

Records of 4481 babies born in Acıbadem University Atakent Hospital were studied. Birth weight scores were calculated according to gestation week, babies under 10 percent were determined. Among the 3860 babies included in this study, 147 babies’ birth weight were under 10 percent and among these babies 28’s were under -2 SD. According to birth weights: Group 1 was defined with babies under -2 SD, Group 2 with babies between -2 SD and 10 percent and Group 3 with babies at the same gestation week and with the same gender whose randomly selected birth weights changed between -0.5 and +0.5 SD. Groups were compared by hospitalization, any hypoglycemic event, capillary glucose levels and their anthropometric values in their follow-up.

Groups were found to be similar in gestation week, gender and type of delivery. Group 1 and 2 were observed to have more hospitalization, more frequent hypoglycemic event and received more IV fluids (p<0.05). Height SDS values at the mean age of 2.2±1.0 of healthy babies, who are monitored in our hospital, were -0.94±1.1, 0.1±0.9 and 0.6±0.9 respectively for group 1, 2 and 3 (p<0.001). According to height SDS, meaningful difference was found between group and 2, and also between group 2 and 3 (p=0.029). Positive meaningful correlation was found between height SDS and birth weight SDS (r=0.417; p<0.001).

Discussion of interdisciplinary SGA definition is still ongoing. This study shows that SGA as “being under 10 percentile” can be used for early neonatal complications whereas -2Sd can be used for the long term follow-up.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 716

TITLE: EFFECTS OF REPEATED SIMULATION-BASED TEAM TRAINING ON OPERATOR'S STRESS LEVEL AND RESUSCITATION SKILLS: A PROSPECTIVE LONGITUDINAL STUDY OVER A ONE-YEAR PERIOD


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2) Division of Neonatology, Perinatal Center Großhadern, LMU-Munich
3) Institute for Emergency Medicine and Medicine Management, LMU-Munich

CONTENT:

Emergencies in the delivery room, are a source of stress for healthcare personnel, which may lead to reduced quality of resuscitation. Simulation-based team training is now part of many neonatal resuscitation programs, since it offers the possibility to enhance both, technical and non-technical skills.

The aims of this study were to evaluate the effect on operator’s stress level of different training sessions over a one-year period and to analyze whether the initial steps of neonatal resuscitation were performed correctly according to the actual resuscitation guidelines.

This prospective longitudinal study was performed at the simulation facilities of LM-University in Munich, after approval of local ethics committee. High-fidelity neonatal resuscitation training sessions at 0-3-6-12 months involving 4 teams (a consultant, a fellow and a nurse recruited after informed consent) were performed. Each training session consisted of 3 neonatal emergency scenarios.

Operators’ stress level was measured through salivary cortisol via a Salivette (Sarstedt, Germany) at baseline, before and after every scenario. Video analysis regarding resuscitation skills was performed by an independent analyzer on the basis of the European Guidelines for neonatal resuscitation 2015.

From Dec 2015 to Jan 2017 we performed 16 training sessions including 48 scenarios. We analyzed 336 cortisol samples from 12 participants with a mean age of 31.9 years (24-44) and mean experience in neonatology of 60 months (6-190 mo). Although not significant, we observed a clear decreasing trend of baseline, pre- and post-scenario cortisol (p=0.07) between 0, 3 and 6 months and a new rise at 12 months (Fig 1).

The first steps of neonatal resuscitation, monitoring and the beginning of positive pressure ventilation (PPV) were performed correctly and timely in all training sessions. The mean time for starting timer was 27,4s (10,5-50,2s), stimulation/drying 14s (6,2-22,6s), head positioning 30,6s (20,9-38,5s), heart rate and breathing checking 29,9s (19,6-42,3s), application of ECG electrodes 45,6s (43,8-45,5s), SpO2 sensor positioning 32,5s (23,1-44,8s) and PPV start 48,7s (36,9-54,3s).

Cortisol reduction from time 0 to 3-6 months, even if not statistically significant, indicates that simulations may reduce stress level if performed within 6 months. The analysis of resuscitation skills showed that the first steps can be performed correctly within 60 seconds, according to the guidelines for neonatal resuscitation and that these skills have been maintained over time.

IMAGE / TAB:

IMAGE / TAB CAPTION: Mean baseline salivary cortisol level at time 0-3-6-12 months.
COI: Non declared
ID: 718

**TITLE:** PARENTS PRACTICES IN PREPARING MILK FORMULA

**AUTHORS:** Marta Stanonik 1; Renata Vettorazzi 2;

**AFFILIATIONS:**
1 University Clinic Golnik, Golnik, Slovenia
2 University of Ljubljana, Faculty of Health Sciences, Ljubljana, Slovenia;

**CONTENT:**

When using the powdered milk formula, parents must be careful to prepare it properly, ensuring the hygiene of bottles and teats. The powder is not sterile and may contain Cronobacter sakazakii, dangerous bacteria for infants. The purpose of the research was to determine parent’s awareness of the safe preparation of milk formula and importance of bottle and teat hygiene.

A descriptive quantitative research method was used, with structured questionnaire. The survey involved 263 parents who had a child up to two years old and use milk formula.

Although at the time of pregnancy mothers plan to exclusively breastfeed, many of them start to use milk formula shortly after childbirth. Most information on the safe preparation of milk formula parents got on internet and packaging labels. 1/3 of the parents prepare the feed in advance and store it in the refrigerator, despite the fact that this is not advice. Less attention is paid to the time of boiling and the temperature of the water at which the milk formula should be added according to the WHO guidelines. When preparing the milk concentration, most parents follow the manufacturer’s instructions. 3/4 of the parents discard the rest of the milk immediately. Feeding bottles and teats are usually washed with water and the detergent, or merely with water. Less than half of the parents wash their hands before preparing the feed and a weak third of them tidy the working surface.

The research showed that parents are often unaware of the importance of safe preparation of milk formula, and of hygienic handling of bottles and teats. They find preparing the formula separately each time they want to feed their baby too time-consuming, so they take various shortcuts. There is a great need that healthcare workers should educate parents on the proper preparation and handling of milk formulas.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 719
TITLE: PHENYLButYRATE AS AN OFF-LABEL TREATMENT OPTION IN SEVERE NEONATAL CHOLESTASIS
AUTHORS: Rudi Ascherl; Corinna Gebauer; Ulrich Thome
AFFILIATIONS: Universitätsklinikum Leipzig, Germany

CONTENT:
Most regimens used in neonatal choletasis aim at decreasing intestinal reabsorption of bile salts. Originally intended for the treatment of urea cycle disorders phenyl butyrate (PB) has recently been used in deficiencies of ABC transporters. PB influences postranslational modification of proteins: It promotes proper protein folding and, in those with wild type proteins, increases the longevity of transporters and therefore their number on the cell membrane by reducing ubiquitination. This way PB can amplify canalicular ABC transporters MRP2 and BSEP augmenting export of bile salts and bilirubin. In addition PB can mitigate endoplasmatic reticulum stress caused by bilirubin in neuronal cells.

We present the case of a critically ill preterm born at 31.6 weeks by emergency CS due to decreasing fetal heart rate. An abdominal mass later turning out to be a mesoblastic nephroma was found on ultrasound only hours before delivery and was resected on t

This is the first report about using PB in a preterm without primary liver disease in Europe. We want to introduce PB as a off-label treatment option in severe IHC not responding to canonic regimens.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=98ba3c825cb1981ef64a05fe5cb85d44-MjAxOS0wNSM1Y2UyNjY2Y2NiZWEz

IMAGE / TAB CAPTION: Total bilirubin determined by a point-of-care blood gas analysis unit over time. Therapies: PT phototherapy, UDCA ursodeoxycholic acid, Ctyr colestyramine, 4PB phenylbutyrate. Direct bilirubin is estimated by linear regression of the fraction of direct bi

COI: None declared
ID: 720

TITLE: DOES THE CARNITINE LEVELS CHANGE IN SGA BABIES?


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CONTENT:

The babies which are classified as small for gestational age (SGA) or large for gestational age (LGA) according to their gestational week should be monitored after birth due to excess postnatal energy requirement. Carnitine is an essential cofactor for fatty acid (FA) metabolism which has a role in energy balance. The aim of this research is the evaluation of relationship between postnatal carnitine level and intrauterine growth.

For this research the records of 4481 babies who were born at Acıbadem University Atakent Hospital between 2015-2019 are evaluated. The babies who have one of following criteria are excluded from the research: GW (gestation week) under 37, hospitalization immediately after birth, multiple pregnancies, congenital anomalies. The profile results of carnitine/acyl carnitine that are taken before discharge and are analyzed by tandem mass spectrometry are recorded. The results indicate that in total there were 11 babies who had abnormal results and these babies were also excluded from the research. 3520 babies which are included in the research are divided into three groups (SGA (n=80), AGA (n=3061) and LGA (n=379)) according to their gestational week and birth weights.

The results indicate that in total there were 11 babies who had abnormal results. 6 of these babies’ propionyl carnitine/free carnitine ratio is high. While for the remaining 5, one for each baby following abnormalities were detected: the high ratio of propionyl carnitine, C6 carnitine, C5OH carnitine and C18:1 carnitine and also decreased ratio of free carnitine. During the follow up of these 11 babies, no permanent metabolic disorders were found.

No differences were detected between groups according to GW and gender (p>0.05). In SGA, AGA and LGA babies, free carnitine levels were (average±SD) 29.9±12.05; 22.6±8.32 and 23.1 ± 7.72 mol/L respectively. In SGA group, free carnitine levels were found to be high (p<0.001). A negative correlation was determined between birth weight standard deviation score and free carnitine (r=-0.179; p=0.01).

The maternal-fetal carnitine passage is important for the neonatal energy homeostasis due to the fact that the fetus isn’t able to synthesize carnitine. In this research it is indicated that the free carnitine level is higher in the SGA babies who were born without any fatty acid oxidation disorder. It is thought that in the babies with intrauterine energy disorders, the placental carnitine passage shows a compensatory increase.
ID: 721
TITLE: Born too soon... but in the right place - The Luton and Dunstable National Maternal and Neonatal Health Safety Collaborative quality improvement project.

AUTHORS: Abha Khushu 1; Maria Karam 2; Claire Adamson 3; Martina McIntyre 4; Samita Das 5

AFFILIATIONS: 1, 2, 3, 4, 5 - Luton and Dunstable University Hospital, Luton, UK

CONTENT:

As part of the diagnostic phase of the National Maternal and Neonatal Health Safety Collaborative we found that our NICU was refusing up to 80% of referrals in a month from our own neonatal network. Our neonatal HDU occupancy was large, decreasing our ITU capacity. It is a UK national ambition to ensure every baby is born in a maternity facility with a neonatal unit appropriate for baby’s gestational age. Very premature babies have a higher survival rate when born in a maternity with a neonatal intensive care. Therefore our aim was to use quality improvement methodology to reduce the number of refusals of in-utero and ex-utero referrals for tertiary level care by 10% by April 2019.

We used various quality improvement tools: cause and effect diagrams, run charts, driver diagrams and PDSA cycles. Some of our change ideas were initiating maternity and neonatal daily huddles, developing a huddle proforma, a neonatal and maternity operational pressures escalation levels policy, and referral tracker. We also created a discharge coordination team and a senior on call rota, to ensure repatriation of our high dependency patients to their local unit in a timely manner. Our primary outcome measure was number of referral refusals from our operational delivery network (ODN). Process measures included proportion of daily huddles and proportion of NICU ITU beds occupied. The balancing measure was measurement of burnout climate and resilience of staff through our culture survey.

In the year before the start of our National Maternal and Neonatal Health Safety Collaborative (NMNHSC) project, our referral refusal rate was 44% with wide range from 0% to 87%. Since the initiative was started and the change ideas implemented, our referral refusal rate has dropped to 27.5% with a smaller range from 0% to 59%. Prior to the project our ITU care days averaged 63% per month, with a wide range from 34.8% to 93.8%. This has now increased to 66%, with a smaller range from 46.9 to 78%. Our HDU occupancy has not been affected by these changes, initially 112% with range from 76% - 151% prior to the start of the project, and now 123% with range from 92% - 150%.

Our quality improvement project as part of the NMNHSC has successfully reduced our referral refusal rate from our ODN and increased the number of ITU care days. Moreover we have found that the daily huddles enhance situational awareness and communication between the neonatal and maternity teams, improving our working relationship to build trust and motivate staff. This gives our most vulnerable premature babies the best start possible in life.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=dbac6679f841ca70fe97bd50d7693a3-MjAxOS0wNSM1Y2UyNjY2Y2Zj

IMAGE / TAB CAPTION: Driver Diagram

COI: None declared
ID: 722

TITLE: ‘COSTLY COFFEE’ FOR PREMATURE INFANTS: COULD REGULATION MAKE IT CHEAPER?

AUTHORS: Bernadette Murphy1; Roy K Philip2,3

AFFILIATIONS: 1 Department of Pharmacy, UL Hospitals, Limerick, Ireland
2 Graduate Entry Medical School (GEMS), University of Limerick, Ireland
3 University Maternity Hospital Limerick (UMHL), Limerick, Ireland

CONTENT:

Caffeine is one of the most widely used medicines in neonatal care. There is near universal use of caffeine citrate (CC) among extremely low birth weight (ELBW) cohort and among a significant proportion of very low birth weight (VLBW) infants. Perception of relative safety of CC results in the prolonged neonatal use over many weeks. Even though patient-level cost per unit dose may not be considered high, cumulative expenditure is often under recognised by clinical community. European Medicines Agency facilitates the authorisation of medicines for ‘rare diseases’ which are termed ‘orphan medicines’. Caffeine citrate was designated ‘orphan medicine’ status by the European Commission in 2003.

We aimed to analyse the purchase cost of CC for a regional neonatal unit in Ireland over a decade and highlight the importance cumulative cost curve (CCC) for caffeine. Annual purchase cost of CC by the hospital pharmacy was retrieved from the computerised pharmacy management system of UL Group of hospitals in the Mid-West of Ireland from 1st January 2009 to 31st December 2018. Based on annual number of ELBW and VLBW infants, cost per regional premature birth cohort was determined and was extrapolated to reach the national figures. We did not evaluate costs associated with product wastage, vial sharing, non-usage after expiry or variations at the patient-level dosage due to changes in clinical guidelines. Hospital audit committee approved the study as part of quality improvement project.

Mean yearly purchase cost of CC from 2014 to 2018 was €17,421 in order to care for our annual birth cohort of 35-45 infants of <1,500 gm. birth weight. Nationally the cost, if assumed without significant variation in unit cost or variation in dosage or duration of treatment, could be €265,102 annually with approximately 625 infants born <1,500 gm. birth weight. Actual figure could be higher allowing for the potential variations. During 2009 to 2013 when a CC preparation without an exclusive EU orphan drug license was used, our annual cost was €4,225 and if projected nationally would be €73,932. Cumulative cost curve for caffeine demonstrates (graphically) the under perceived financial burden from repetitive dosing.

One CC product holds market exclusivity in EU until July 2019. When period of market exclusivity for an indication ends, orphan designation could be removed from the EC register. In many non-EU countries, with non-exclusivity of market access, cost of CC has come down. Clinical communities, pharmaceuticals and EU regulatory bodies should work together towards sustainable availability of commonly used neonatal medicines at relatively low cost.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 723
TITLE: CEREBRAL TISSUE OXYGENATION DURING OSTEOPATHIC THERAPY IN NEONATAL UNIT
AUTHORS: Roksana Malak 1&2, Zuzanna Kożłowska 2, Zuzanna Owsiańska 2, Dorota Sikorska 1, Mirosław Andrusiewicz 3, Włodzimierz Samborski 1, Marta Szymankiewicz-Bręborowicz 2, Tomasz Szczapa 2
AFFILIATIONS: 1 Dept and Clinic of Rheumatology and Rehabilitation, Poznan University of Medical Science, Poznan, Poland
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3 Dept of Cell Biology, Poznan University of Medical Science, Poznan, Poland

CONTENT:
Premature infants present immature organization of their systems. The assessment of components of autonomic nervous system: may be a good predictor of a neonate condition. Many efforts are done in order to regulate premature infants. All procedures have to be safe for neonates. These are studies that show benefits for some parameters of autonomic nervous system after osteopathic procedures. The aim of the study was to assess the impact of an osteopathic technique the “4th ventricle compression” (CV4) cerebral oxygenation

22 infants born between 25 and 39 weeks of gestation (GW) with corrected age between 32 and 40 GW were enrolled. No patient needed ventilatory support during the study. Infants were fed enterally using gastric tube (n=9) or bottle (n=17). Inclusion criteria included signs of hyperactive autonomic nervous system assessed by a Neonatal Behavior Assessment Scale (NBAS). Cerebral tissue oxygenation (StO2) was monitored using near-infrared spectroscopy. Oxygen saturation (SpO2) and heart rate were measured with pulseoximetry. Continuous monitoring of StO2, SpO2 and HR was performed 10 minutes before CV4, during the procedure and 10 minutes after its termination

The mean value of StO2 before CV4 was 69% (SD±8), during CV4 69% (SD±8), after CV4 70% (SD±8). Repeated measurement one-way ANOVA showed no statistical differences in StO2 values before, during and after the procedure. Before CV4, the mean value of SpO2 was 96% (SD±3), during CV4 95% (SD±3), and after CV4 95 (SD±4). Friedman’s rank test showed no statistical differences between SpO2 values before, during and after the procedure. Repeated measurement one-way ANOVA showed no statistical differences in HR between studied periods either. The mean value of HR before CV4 was 153/min (SD±21), during CV4 151/min (SD±18) after the treatment 151/min(SD±20)

CV4 osteopathic procedure appears to be safe and well tolerated by neonates. Its use does not influence significant changes in cerebral oxygenation, SpO2 or HR. Future studies might focus on possible influence of CV4 on other biophysical parameters

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: We have no conflict of interest to declare
ID: 731
TITLE: LONG-TERM TRENDS IN SURVIVAL AND CEREBRAL PALSY AMONG EXTREMELY PRETERM INFANTS (≤ 28 weeks) IN NORTHWEST GREECE
AUTHORS: Aikaterini Drougia 1, Maria Baltogianni 1, Theodoros Gouvias 1, Dimitrios Rallis 1, Nikolaos Krallis 1, Iliada Nakou 2, Natasa Bega 3, Meropi Tzoufi 2, Vasileios Giapros 1.
AFFILIATIONS: 1 Neonatal Intensive Care Unit (NICU) University Hospital of Ioannina, 2 Paediatric Clinic - Department of Paediatric Neurology University Hospital of Ioannina, 3 Hellenic Society of Children with Special Problems - Ioannina Branch, Ioannina, Greece.

CONTENT:

Improved perinatal and neonatal care has significantly increased the survival of extremely preterm (EP) infants. However, surviving children born EP are at high risk of long-term neurodevelopmental problems, particularly cerebral palsy (CP). The aim of the study was to investigate the trends in survival and evaluate the prevalence of CP among EP neonates hospitalized in the Neonatal Intensive Care Unit (NICU) of Ioannina University Hospital – the referral tertiary perinatal centre for northwest Greece. Also the perinatal data of the study population were recorded.

The study population comprised all neonates with gestational age (GA) ≤ 28 weeks who were cared for in the NICU from January 1, 2000 to December 31, 2015. The survival rates and the perinatal characteristics were retrospectively analyzed from the electronic NICU database. Cerebral palsy cases were identified at the outpatient neonatal follow-up clinic and subsequently referred to the special CP team. Minimum age for the diagnosis of CP was the age of 2 years. Changes in these parameters were evaluated and compared in two periods: Period I (2000-2007) and period II (2008-2015).

193 EP neonates were cared for in the NICU: 74 in period I and 119 in II. The mean GA and BW were 26.3 weeks and 858g respectively. Outborns were 23% in period I vs 8% in II (p<0.01). 84 neonates (43.5%) were born to multiple pregnancies. A total of 121 (62.7%) survived to discharge: 43 (58.1%) in period I and 78 (65.5%) in II. Survival rate was 39.1% in neonates ≤ 26 weeks vs 75.8% at 26+1-28 weeks (p<0.01). Increased survival trend was observed at 26+1-28 weeks during period II (79.5% in period II vs 69.6% in I). Among 121 discharged infants, 93 (76.9%) attended the follow-up clinic: 36 in period I (83.7%) and 57 in II (73.1%). CP was diagnosed in 10 children (10.9%): 4 in period I and 6 in II. In period I 3 had severe tetraplegia and 1 diplegia. In period II 2 had tetraplegia and the remaining 4 had mild hemiplegia. All CP cases had severe cerebral lesions on neonatal ultrasound scan.

During the 16 years of the study, the total number of EP neonates and their survival at hospital discharge were increased at the second period. However CP prevalence remained stable in the study population and also during the second period CP cases were less severe. This demonstrates that increased number of survivors was not at the cost of later severe neurodevelopmental disability.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 736

TITLE: PREDICTORS OF EARLY MORTALITY IN VERY LOW BIRTH WEIGHT INFANTS

AUTHORS: Mehmet Buyuktiryaki1, Evrim Alyamac Dizdar1, Bengü Karacaglar1, Esra Beser Ozmen1, Fatma Nur Sari1, Serife Suna Oguz1, Cuneyt Tayman1

AFFILIATIONS: 1Division of Neonatology, Health Sciences University, Zekai Tahir Burak Women’s Health Education and Research Hospital, Ankara, Turkey.

CONTENT:

It is very important to determine the factors predicting early mortality in very low birth weight (VLBW) premature infants who constitute the most sensitive group in neonatal intensive care units. We aimed to describe the potential risk factors of mortality in the first seven days of VLBW infants.

Data of all preterm infants born in our clinic at 24 0/7 and 29 6/7 gestational age between 2013-2017 were retrospectively analyzed. In addition to demographic and clinical features, laboratory tests of patients were recorded. Infants with major congenital anomalies and incomplete data were excluded from the study. VLBW infants who died during the first 7 days of life were determined as study group and were compared with control group who were alive.

117 (14.3%) of VLBW premature infants included in the study died within the first seven days. Mean gestational age and birth weight were significantly lower in the study group in comparison with control group [(26.1 ± 1.8 - 27.6 ± 1.6 weeks), p <0.001; (780 ± 246 - 1032 ± 237g), p <0.001, respectively]. The first and fifth minute APGAR scores were significantly lower while CRIB score was higher for VLBW newborns who died. Surfactant requirement for respiratory distress syndrome, early onset sepsis and grade III-IV intracranial hemorrhage were significantly higher in the study group. Multivariate logistic regression analysis revealed early onset sepsis, surfactant requirement two or more, birth weight 50 pg/ml as independent risk factors for mortality (Table).

In addition to current mortality scores, other simple clinical and laboratory parameters may predict early mortality in preterm infants. This may provide an opportunity for physicians to carefully assess the delicate preterms in the early days of life.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=bcce371f33a71a30bbfd980b0c8f3a4e-MjAxOS0wNSM1Y2Q0NDg1

IMAGE / TAB CAPTION: Independent risk factors for early mortality

COI: None declared.
ID: 744
TITLE: THE MODERATE AND THE LATE PRETERM INFANT: COMPARISON ON NEONATAL OUTCOMES
AUTHORS: Laschi Elisa 1; Nanni Giuliana 1, Giordano Maurizio 2, Muraca Maria Carmela 1, Palombo Daniele 1, Buonocore Giuseppe 1; Perrone Serafina 1
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2 School of Medicine, Federico II University of Naples, Naples, Italy
CONTENT:
Moderate preterm (MPT, 32-33 weeks gestational age-GA) and late preterm infants (LPT, 34-36 wks GA) represent over 80% of preterm births, but are overall less known than those born at term and less studied than those born at lower gestational age. Since the maturational development takes place along the gestation continuum, each week of GA at birth can affect differences in the neonatal outcomes of these infants and thus influence their management.

An observational study on all live births of GA 32-36 weeks in a single III level center (Azienda Ospedaliera Universitaria Senese) in the years 2016-2017 was conducted. The aim of our study was to evaluate the short-term outcomes of MPT and LPT, with particular reference to the differences between the two groups related to care management and the frequency of the most common neonatal pathologies. The data concerning the obstetric history and the neonatal course were collected from the medical records of hospitalization; the auxological parameters at birth and discharge were calculated with reference to INeS neonatal anthropometric charts.

Study population consisted of 176 infants (7.9% of all births; 34 MPT, 142 LPT). Significant differences emerged between the two groups regarding the following outcomes: need for resuscitation at birth (70.5% vs 29.5%); hospitalization in Neonatal Intensive Care Unit (NICU; 97% vs 35.9%); duration of admission to NICU (10.5 vs 1.5 days) and of overall hospitalization (28 vs 15 days); neonatal respiratory distress syndrome (85.2% vs 23.9%); need for any respiratory support (94.1% vs 45.7%); intraventricular hemorrhage of any degree (52.9% vs 9.8%); jaundice treated with phototherapy (55.8% vs 16.9%); iron supplementation (79.4% vs 7%); antibiotic therapy (100% vs 43.6%). Auxological parameters were significantly different between the groups, as well as the need for any nutritional support, the beginning of enteral feeding and the time to reach enteral and oral autonomy (p<0.0001).

Moderate preterm infants are at greater risk of unfavorable neonatal outcomes compared to late preterm infants. In fact, the moderate preterms seem to behave more similarly to those born with a lower gestational age compared to the more "mature" LPT, although they also need particular attention and greater assistance, especially with regard to feeding methods.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 745
TITLE: RISK STRATIFICATION AND INFECTIOUS COMPLICATION’S IN GASTROSCHISIS MANAGED WITH PRE-FORMED SILO: EFFECT ON OUTCOMES.
AUTHORS: Rebecca Lee 1; Niyi Ade-Ajayi 2, Theodore Dassios 3, Ann Hickey 4
AFFILIATIONS: 1, 3, 4: Neonatal Intensive Care, King’s College Hospital, London, UK
2: Department of Paediatric Surgery, King’s College Hospital, London, UK

CONTENT:

Risk stratifying patients with gastroschisis has been proposed to facilitate early prognostication of outcomes and to counsel parents on the anticipated clinical course of their baby. Risk stratified outcomes have not previously been described in a cohort of babies exclusively managed with a staged reduction using a Preformed Silo (PFS) as the intended surgical choice of closure. Aims: To compare outcomes between patients stratified into ‘simple’ and ‘complex’ gastroschisis groups managed with PFS’s and investigate whether location of birth (surgical or non-surgical centre), time to closure, or sepsis events were associated with length of stay (LOS) or days of parenteral nutrition (PN).

A retrospective cohort study of babies managed with PFS for gastroschisis closure between 1st January 2008 and 31st December 2017 in a single tertiary NICU was performed. Babies were stratified into ‘complex’ and ‘simple’ gastroschisis groups, as per internationally recognised pathological findings, and whether they had the complication of an episode of blood culture positive sepsis. Location of birth was recorded from admission records. Total length of stay and PN days were selected as outcome measures. Data presented as medians (IQR), or counts (%). Non-parametric analysis, correlation coefficient and chi-squared statistical analysis was utilised. Multivariate linear regression assessed the independence of confounding variables.

100 patients were identified, 91 underwent PFS closure. Complete records for 77 infants: [38 male, gestation 36+6(35+3 – 38+0), birthweight 2458(1993 – 2757)g]. Mortality was 0%. Location of birth did not influence outcomes in terms or developing sepsis p= 0.499, whether a baby had ‘complex’ gastroschisis p= 0.282, PN days p= 0.293 or LOS p= 0.306. Sepsis (positive blood culture) affected the total LOS and PN days, p= <0.001 respectively. There was no association with days to closure and the incidence of sepsis p=0.582. Babies with complex gastroschisis showed a significant difference in the number of PN days and LOS p<0.001 respectively. Babies with complex gastroschisis were significantly more likely to have an episode of sepsis p = 0.033. Multivariate linear regression analysis identified that having complex gastroschisis or sepsis were independent risk influencers on LOS p= <0.001.

In a population of gastroschisis patients managed exclusively with PFS, ‘simple’ and ‘complex’ gastroschisis stratification appears to provide reliable prognostication for parents on PN days and LOS. Infectious complications from blood culture positive sepsis had a deleterious effect on outcomes in both the complex and simple groups individually. Efforts should be focussed on identifying modifiable factors to reduce these.

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IMAGE / TAB CAPTION:

COI: None declared.
TITLE: COMPARISON OF LISA AND INSURE METHODS IN ELBW INFANTS GIVEN SUSTAINED LUNG INFLATION VIA SHORT BINASAL PRONG AT BIRTH

AUTHORS: Tuğba Alarcon-Martinez1, Mehmet Buyuktiryaki, Bengü Karacaglar1, Gulsum Kadioglu Simsek1, Fuat Emre Canpolat1, H. Gözde Kanmaz Kutman1

AFFILIATIONS: 1Division of Neonatology, Health Sciences University, Zekai Tahir Burak Women’s Health Education and Research Hospital, Ankara, Turkey

CONTENT:

Application of sustained lung inflation via short binasal prong at birth has been reported to decrease the requirement of mechanical ventilation and respiratory morbidities. Herein, we compare the effects of less invasive surfactant administration and Intubate-Surfactant-Reintubate methods in terms of mechanical ventilation requirement in the first 72 hours and other respiratory outcomes in preterm newborns who were applied prophylactic sustained lung inflation via short binasal prong immediately after birth.

Medical records of preterm infants who were born at 26+0/7 to 29+6/7 weeks of gestation between 2015 and 2017 were assessed retrospectively in terms of prophylactic SLI application at birth and surfactant administration via LISA or INSURE method. Infants who were given SLI at birth and administered surfactant either with LISA or INSURE were included into study. Poractant alfa was given at 200mg/kg dose as a surfactant preference.

Analysis of the data of 43 LISA-treated and 39 INSURE-treated infants revealed the mean gestational age as 28.1±1.1 and 28.1±1.2 weeks and mean birth weight as 1046±227 and 1035±236 g in LISA and INSURE groups, respectively. Demographic characteristics of the infants in both groups were similar. The mechanical ventilation requirement in the first 72 hours of life (%20.9–%51.3, p=0.004) was lower in LISA-treated infants. Although it was no statistically significant, LISA group had lower incidence of moderate-severe BPD (%8.3–%21.9, p=0.17). As well as the shorter duration of mechanical ventilation, requirement of intubation and treatment with multiple doses of surfactant were lower in LISA-treated infants. LISA method was found as an independent factor in reducing mechanical ventilation requirement in the first 72 hours of life and at any time (Table).

Administration of surfactant via LISA method decreases mechanical ventilation and treatment with additional doses of surfactant in premature newborns who were given prophylactic sustained lung inflation at birth.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=762827dfa78ee3c75b6fe8613089dffd-MjAxOS0wNSM1Y2UyNjY2Y2RhNzg2

IMAGE / TAB CAPTION: The Rates of BPD and MV Requirements among the groups

COI: None declared.
ID: 748

TITLE: THE AUXOLOGICAL OUTCOME IN THE FIRST YEAR OF LIFE OF THE MODERATE AND LATE PRETERM INFANTS

AUTHORS: Laschi Elisa 1; Nanni Giuliana 1, Giordano Maurizio 2, Muraca Maria Carmela 1, Palombo Daniele 1, Buonocore Giuseppe 1; Perrone Serafina 1

AFFILIATIONS: 1 Department of Molecular and Developmental Medicine, University of Siena, Siena, Italy
2 School of Medicine, Federico II University of Naples, Naples, Italy

CONTENT:

Moderate preterm (MPT) and late preterm (LPT) represent the majority of preterm births and up to 5-9% of all live births. The growth pattern of infants born severely preterm has been correlated in recent years to their neurodevelopmental outcome, but few data are available regarding the growth of infants born at 32-36 weeks of gestational age (GA).

We conducted a prospective observational study on subjects born at 32-36 weeks GA at the University Hospital of Siena in the years 2016-2017 was conducted. The aim was to evaluate the pattern of weight growth during the first year of life of MPT and LPT newborn infants. The newborns were divided into two groups: MPT (32-33+6 wks GA n=16) and LPT (34-36+6 wks GA, n=39 infants). Data related to obstetric and neonatal history were collected from medical records. The auxological parameters at birth and discharge were calculated with reference to INeS neonatal anthropometric charts. All the newborns under examination were followed in a follow-up program, periodically at 1, 2, 3, 6, 9, 12 months. The z-scores (zsc) of weight were calculated with reference to the WHO 2006 growth charts.

Anthropometric data at birth were appropriate for gestational age in the two groups. The need of nutritional supports at birth (parenteral nutrition, intravenous infusion, gavage) was significantly greater in MPT than LPT. From birth to discharge, 56.2% of MPTs vs. 48.7% of LPT showed a change in weight zsc > 1DS. A significant difference in the zsc was observed between the two groups at 1, 2, 3 and 6 months of life; this difference was no longer appreciable in the second semester of life, with both groups reaching the average of the reference population (zsc -0.33 MPT; 0.08 LPT). MPTs showed a growth retardation from birth for the first 3 months of life, with evidence of catch-up growth (reaching a DS>2) between 3 and 6 months of life and recovery at 12 months; instead, LPTs showed a more linear weight growth trend with a gradual recovery after the first month of life.

Growth trajectories after birth of MPTs and LPTs are quite different. MPTs present an extrauterine growth deficit that lasts up to 3 months, but the subsequent catch-up between 3 and 6 months allows to reach the average centile of the reference population at 12 months. Further studies are needed to evaluate whether this growth rate can influence body metabolism of MPT infants in later ages.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 750

TITLE: PREDICTORS OF NON-INVASIVE VENTILATION FAILURE IN PRETERM INFANTS ≤ 30 GESTATIONAL WEEKS

AUTHORS: Mehmet Buyuktiryaki1, Evrim Alyamac Dizdar1, Tugba Alarcon-Martinez1, Nilufer Okur1, Fatma Nur Sari1, Cuneyt Tayman1, Serife Suna Oguz1

AFFILIATIONS: 1Division of Neonatology, Health Sciences University, Zekai Tahir Burak Women’s Health Education and Research Hospital, Ankara, Turkey.

CONTENT:

Non-invasive ventilation (NIV) has been demonstrated to decrease the mortality and requirement of invasive mechanical ventilation in premature infants. However, the rate of NIV failure in very low birth weight infants ranges from 25% to 50%. Herein, we aimed to identify the variables associated with NIV failure and determine the preterm morbidities in very low birth weight (VLBW) infants who failed with NIV.

Medical records of VLBW infants who were born before 30 weeks of gestation and who required non-invasive ventilation (nCPAP, NIPPV, BIPAP) in the first hours of life were assessed retrospectively. Respiratory support is augmented to NIPPV or BIPAP when preterm infants fail under nCPAP support. Failure of NIV was defined as either hypoxemia (PaO2 < 50 mmHg and FiO2 > 50), respiratory acidosis (pH < 7.20 and PaCO2 > 60 mmHg) or recurrent apnea. Preterm infants who failed in the first 72 hours of life were compared with stable infants. Predictors of NIV failure were determined with multivariate regression analysis. Infants who required intubation in the first hours of life, infants with perinatal asphyxia and major congenital anomaly were excluded from the study.

Of 443 infants eligible for analysis, 101 (22.8%) preterm infants failed under NIV support. Gestational age, birth weight and antenatal steroid exposure were significantly lower in preterm infants who failed. The incidence of severe IVH, moderate-severe BPD and severe ROP were higher in infants with NIV failure (Table). The first respiratory support was determined as CPAP (75.2%) and NIPPV or BiPAP (24.8%) in preterms who failed NIV. According to the multi-variate logistic regression analysis, antenatal steroid treatment decreased the risk of NIV failure (OR: 0.53, 95% CI: 0.29-0.94; p=0.03). However, using nCPAP as primary respiratory support (OR:2.61, 95%CI:1.53-4.48; p<0.001), surfactant requirement (OR:2.40, 95%CI:1.36-4.25; p=0.003) and 2 or more doses of surfactant administration (OR:3.57, 95%CI:1.89-6.74; p<0.001) were associated with significantly higher likelihood of NIV failure.

Antenatal steroids and primary NIPPV support might be advantageous for a successful NIV.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Demographic and clinical characteristics of study groups

COI: None declared.
ID: 758

TITLE: Impact of cardio-respiratory events on cerebral oxygen status in preterm infants during the first 72 hours of life.

AUTHORS: Silvia Martini 1, Luigi Corvaglia 1, Viviana Perrone 1, Giulia Frabboni 1, Marek Czosnyka 2, Peter Smielewski 2, Anna Giulia Cimatti 1, Arianna Aceti 1, Giacomo Faldella 1, Topun Austin 3

AFFILIATIONS: 1 Neonatal Intensive Care Unit, St. Orsola-Malpighi University Hospital, Bologna, Italy
2 Brain Physics Laboratory, Division of Neurosurgery, Department of Clinical Neurosciences, Addenbrooke's Hospital, University of Cambridge, Cambridge, UK
3 Neonatal Intensive Care Unit, Cambridge University Hospitals, Cambridge, UK

CONTENT:

Cardio-respiratory events (CRE), defined as intermittent episodes of hypoxemia and/or bradycardia, are particularly common among preterm infants. It has been previously shown that, in the neonatal population, CRE may result in transient brain hypoxia and hypoperfusion, thus representing a possible risk factor for neurodevelopmental sequelae. In the preterm population, the first 72 hours (h) of life are characterized by a significant cardio-respiratory and hemodynamic instability. In this study we aimed to evaluate changes in cerebral oxygenation (CrSO2) and cerebral oxygen extraction (cFTOE) in response to different CRE types during this transitional period.

Non-invasively ventilated newborns (<32 weeks’ gestation or <1500 g) underwent a continuous monitoring of heart rate (HR) and arterial oxygen saturation (SpO2) by pulse oximeter and of CrSO2 by Near Infrared Spectroscopy (NIRS) over the first 72h. Data were simultaneously recorded by ICM+ software (Cambridge Enterprise Ltd, UK) and cFTOE was calculated. CRE≥10sec were divided into isolated desaturation (ID, SpO2<85%), isolated bradycardia (IB, HR<100bpm or <70% baseline) and combined desaturation/bradycardia (DB). Percent CrSO2 and cFTOE changes (%delta) between pre-event baseline and event nadir were compared between ID, IB and DB with Kruskal-Wallis test. Generalized estimating equation was used to adjust the results for other variables. Significance level was set at p<0.05.

A total of 558 events from 22 neonates (mean gestational age 30±2 weeks) were analysed. Of these, ID were 343 (61.5%), IB 61 (10.9%) and DB 154 (27.6%). As shown in Figure 1, %delta SpO2 was significantly higher in DB compared to ID, whereas no difference in %delta HR was observed between IB and DB. A significant difference in %delta cTOI (p <0.001) was observed among ID, IB and DB, with greatest negative variations during DB and smallest during IB. A significant decrease was observed in %delta cFTOE with DB and ID compared to IB, whereas no significant difference was seen between ID and DB. The effect of different CRE types on %delta cTOI (p<0.001) and %delta cFTOE (p<0.001) was confirmed even after adjustment for patients’ identity, gestational age, antenatal Doppler status, antenatal steroids, patent ductus arteriosus and type of ventilatory support.

CRE have a significantly different influence on cerebral O2 status in preterm infants <72 h. Combined bradycardias and desaturations have the highest impact on cTOI, suggesting that a concomitant HR reduction could further contribute to decrease O2 supply. Moreover, both ID and DB showed a significant cFTOE decrease from baseline compared to IB, consistently with a transient reduction in O2 delivery with no compensatory increase of O2 extraction.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1. Percentage changes from baseline of arterial oxygen saturation (%delta SpO2), heart rate (%delta HR), cerebral oxygenation (%delta cTOI) and cerebral fraction of tissue oxygen extraction (%delta cFTOE) among different types of cardio-respiratory
COI: None declared.
ID: 766

TITLE: FAMILY CENTRED APPROACH TO CARE OF THE NEWBORN INFANT ADMITTED TO A LOW RESOURCE SETTING NEONATAL INTENSIVE CARE UNIT (NICU)

AUTHORS: Aoife Hurley 1; Kunda Mutesu-Kapembwa 2

AFFILIATIONS: 1 Neonatal Unit, University Teaching Hospital, Lusaka, Zambia
2. Neonatal Unit, Leeds Teaching Hospitals Trust, Leeds, UK

CONTENT:

The Neonatal Intensive Care Unit (NICU) at University Teaching Hospital Lusaka is Zambia’s only tertiary neonatal unit. It is a busy unit, with regularly 100 patients admitted with limited staffing and resources. Doctors and nurses in the low resourced NICU setting may be too busy with the patients to update and answer questions of family. There is a risk that infants get discharged without the families ever knowing what the initial problem and what happened to their child whilst on the unit. There is a shift towards a more family centred approach to neonatal care, involving them more in the infants care and take back some control they may feel they lack, in partnership with medical teams.

A questionnaire was distributed to families of NICU graduates attending outpatient clinic to assess their experiences. Both qualitative and quantitative aspects to it. Assessing maternal background, reasons for neonates admission, explanation to parents, fathers experiences and their overall impression of their child's care. Written feedback was also asked for. The forms were handed to family prior to appointment or if literacy skills an issue clinic workers filled forms out with the family.

115 questionnaires were completed by families in the clinics. The average length of stay was 12.1 days and average maternal age 27.5. 19% said they did not know why their baby was admitted, and 26% did not receive updates about the baby’s condition. Of the fathers that visited, 52% had restricted visits and of those 55% were updated. 36% of fathers did not have restricted visits, with 78% updated. 34% of families were not involved in discharge decisions. 69% were given safety advice prior to discharge. The average satisfaction score was 4.1/5. Whilst there was lots of positive feedback, the lack of communication, poor nursing staff attitudes and lack of clean were commented on. Other factors were mentioned such as distance from the mothers ward to NICU, lack of maternal facilities such as toilets and not being able to stay with their child on the unit all the time.

Parental experience is easily overlooked aspect of neonatal care. From this proposed changes include mothers wearing their own clothes, regular changing of linen, opening toilets nearer the NICU and a daily review sheet including a prompt to speak to parents. Nursing education days including sessions on staff attitudes. Parental experience will be re audited in outpatient clinic to see if this has helped improve the families experiences.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=527cd0dede5840eff19f cd705e25fcbd-MjAxOS0wNSM1Y2UyNjY2Y2UwMTA5

IMAGE / TAB CAPTION: Results table

COI: none declared
ID: 769

**TITLE:** THE CHALLENGES OF DEVELOPING SUSTAINABLE NEONATAL LIFE SUPPORT PROGRAMMES IN ZAMBIA, A LOW TO MEDIUM RESOURCED COUNTRY.

**AUTHORS:** Aoife Hurley 1

**AFFILIATIONS:** Neonatal Unit, University Teaching Hospital, Lusaka, Zambia
Neonatal Unit, Leeds Teaching Hospitals Trust, Leeds, UK

**CONTENT:**

The Neonatal Intensive Care Unit (NICU) at the Women and Children’s Hospital in University Teaching Hospital Lusaka in Zambia is the country’s only tertiary neonatal unit. The average monthly mortality rate is 25.1%, 23% due to birth asphyxia. A Neonatal life support (NLS) course based on the UK NLS algorithm was rolled out to over 300 local midwives, nursing and medical staff in 2018. Since then there has been no re-training, with concerns skills haven’t been sustained. Infants are brought to NICU without any attempts at resuscitation. This pilot project was developed aiming to deliver shorter sessions directly to staff in clinical areas, minimising disruption of work and improve skills.

Involved medical and nursing staff based on NICU, labour ward and obstetric theatres. Sessions were also included in nursing teaching days. A pre and post NLS questionnaire was filled out. Sessions included brief introduction to NLS and key differences to paediatric and adult life support. We then taught the NLS algorithm up to the point of drugs being used. We did not go over intubation or insertion of UVC as UVCs are not routinely used. Staff had to practically demonstrate skills taught on resus mannikins.

93% of staff had not received NLS training previously and yet 68% had assisted with real NLS scenarios. Post NLS questionnaires showed improved confidence. 100% of staff felt the session improved their NLS skills, and 100% would be interested in future sessions.

The short small repeated training sessions were well received by the local team and fitted around their clinical work. The team will continue this format and deliver these sessions to as many staff as possible. There will be re-training and re-auditing of staff in a few months time. Further formal training days will be rolled out to staff.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
Antisecretory factor (AF) is an endogenous protein involved in the innate regulation of secretory and inflammatory processes. Inflammation contributes to preterm labour and various complications of prematurity. We have previously described lower levels of AF associated with increased markers of inflammation in preterm placental tissue compared to term. The objective in this ongoing study is to further describe the involvement of AF in the perinatal period, here in breastmilk after term and preterm birth.

Mothers of preterm (<30 weeks gestation) and term control infants born at Karolinska University Hospital, Sweden had breastmilk collected < 1 week (colostrum), at 4 week (mothers of preterm only) and at 12 weeks (mature milk) postpartum. The level of active AF was determined using sandwich ELISA.

The level of AF in breastmilk was higher in colostrum (n=62) compared to mature milk (n= 51) (p<0.001). In milk from mothers of preterm infants AF levels was higher at week 1 than week 4 (1.33 vs 0.44 p<0.001) and week 12 (1.33 vs 0.62 p<0.001). Breastmilk from mothers of term (n=22) and preterm (n=40) infants had similar AF-levels in colostrum (p=0.80). In mature breastmilk (n=51), the level of AF was higher (p=0.01) in mothers of preterm (n=25) infants than in mothers of term (n=26) infants. There was a wider variability in the level of AF in mature milk from mothers of preterm infants.

Following birth, levels of active AF appear to be higher in colostrum than in mature milk, in line with many other immunological factors in human milk. High levels of active AF in colostrum may have a role in protection against inflammatory processes after birth. A higher level of AF in mature milk of preterm mothers may suggest a compensatory role in protection for inflammatory complications in the preterm infant.
ID: 771

TITLE: Urine Metabolomic analysis from late-preterm newborns: co-relation with morbidity

AUTHORS: Irini Christopoulou1; Konstantina Matzarapi2; Stella Chasapi2; George Spyroulias2; Anastasia Varvarigou1

AFFILIATIONS: 1. Neonatal Unit, University hospital of Patras, Greece
2. Department of Pharmacy, University of Patras, Greece

CONTENT:

Metabolomics represent a new and promising area of research in neonatology. It has been successfully applied to monitor the rapid metabolic changes after birth and to detect the metabolic responses that may be characteristic for specific neonatal disorders. This will help us to develop new therapies and to improve prognosis.

In neonatology late pre-terms newborns (34W -36W), represents almost 80% of all preterm births and although mortality rate is low, they are prone to considerable morbidity. But not all late-preterm newborns are the same. Some can stay with their mothers in the postnatal ward, while others needed to be admitted in the NICU.

The aim of our study was to develop a reference model of urinary metabolomics in healthy late preterm newborns and to compare with a corresponding model of the late preterms who have been hospitalized in NICU. The study included 51 healthy term newborns and 54 late-preterm newborns who were hospitalized in NICU.

Urine samples were collected immediately after birth and at the end of the third day of life. Metabolic profiling of the samples was performed by H-NMR spectroscopy. Statistical analysis was conducted in R-environment using in-house scripts.

Principle component analysis showed that there were significant differences in urine metabolome of the late pre-terms at the first and third day of their life. 79 metabolites were identified from which 20 showed statistically significant change between D1 and D3.

Seven metabolites of those (7/20) were decreased in the third day of life like myo-inositol and dimethylglycine, while the rest (13/20), like gluconate and leucine were increased.

We also observed differences in the urine metabolome between the late-preterm and the terms newborns in both D1 as well as D3.

Our preliminary data confirmed the rapid changes in the urinary metabolic profile after birth. Ongoing research will enable us to develop the reference model of urinary metabolomics in healthy newborns during the period of adaptation to the extra-uterine life.

IMAGE / TAB:

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COI: None declared
ID: 773
TITLE: IS NEONATAL GROWTH POSSIBLE IN LOW TO MIDDLE RESOURCED NEONATAL INTENSIVE CARE UNITS?
AUTHORS: Aoife Hurley 1
AFFILIATIONS: Neonatal Unit, University Teaching Hospital, Lusaka, Zambia
Neonatal Unit, Leeds Teaching Hospitals Trust, Leeds, UK

CONTENT:

The Neonatal unit at University Teaching Hospital in Lusaka, Zambia is the country’s only tertiary Neonatal unit. It is a busy unit with regularly 100 inpatients, accepting patients with weights of 700g or more. There is no total parental nutrition (TPN) or breast milk fortifier available. The only supplements used are multivitamin and oral iron. The unit has feeding guidelines in place with two streams one for infants greater than 1.5kg and the other for infants less than 1.5kg or less than 32 weeks. Generally it is expected a preterm neonate would gain 15g/kg/day and term 20g/kg/day. With limited resources, we wanted to review growth is still possible in this low income resourced setting.

Collected data on all preterm and term infants admitted to the unit 14 days or longer from March to April 2019. Recorded birth and current weight, time to first feed, full feeds, maximum feed volume. Projected growth based on weight and length of stay was calculated along with actual growth in g/kg/day.

In total there were 59 infants. 19% only had birth weights documented. 12% lost weight, and 3% had static weights. 50% had weight gains below expected 15g/kg/day. 8% had weight gain within recommended range of 15-20g/kg/day and 8% had weight gain above this. No infants had head circumferences documented at any point. Average length of stay was 23 days. Average birth weight was 1.6kg, lowest being 700g and maximum 4.2kg. Time to first feeds on average 1.5 days, average time to full feeds was 5 days. All received expressed breast milk, those deemed preterm received maximum 200mls/kg/day and term infants 150mls/kg/day.

Despite the challenges the unit faces, with a small data set, this shows that infants do grow with just breast milk. Due to the large number of very junior doctors with minimal neonatal experience, a daily review sheet has been created to help focus reviews. This includes documenting weights, feed volumes, multivitamins and iron supplements and head circumference. This will be re audited to see if this can be a low cost way to improve growth.

IMAGE / TAB:

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COI: None declared
ID: 779

**TITLE:** Reducing retrieval time in high risk Transposition of the Great Arteries (TGA) significantly improves clinical outcomes: A quality improvement study

**AUTHORS:** Amir Zayegh 1
Michael Stewart 2
Bennett Sheridan 3

**AFFILIATIONS:** Amir Zayegh: Neonatal Unit, Royal Children's Hospital Melbourne, Australia
Michael Stewart: Paediatric Infant and Perinatal Retrieval Service (PIPER), The Royal Children’s Hospital Melbourne, Australia
Bennett Sheridan: Paediatric Intensive Care Unit, The Royal Children’s Hospital Melbourne, Australia

**CONTENT:**

Babies with Transposition of the Great Arteries (TGA) can deteriorate rapidly post birth if they have inadequate intracardiac blood mixing due to no or small restrictive ventricular septal defects and a restrictive foramen ovale. Prompt administration of prostaglandin E1 (PGE1) and urgent balloon atrial septostomy (BAS) are often required prior to definitive corrective surgery in this high risk group. Following concerns raised about a perceived high rate of pre-surgical ECMO utilisation for TGA babies, a quality improvement project was implemented to reduce retrieval team response time and improve outcomes for babies born outside a cardiac centre with antenatally diagnosed high risk TGA.

Retrospective cohort study involving babies with antenatally diagnosed TGA anticipated to require urgent BAS. The babies were born in a tertiary maternity service and required transfer by the regional neonatal retrieval service to the nearby paediatric cardiac intensive care (ICU) at the Royal Children’s Hospital in Melbourne, Australia. This study of a quality improvement project implemented in 2015 assessed if reducing retrieval team response time to achieve a more rapid retrieval to the cardiac ICU resulted in improved clinical outcomes. The primary outcome was time from birth to arrival in the cardiac ICU. Secondary outcomes included need for emergent extracorporeal membrane oxygenation (ECMO) and clinical outcomes following BAS and definitive surgery.

There were 15 babies in the three years before and 27 in the three years after the quality improvement changes who had antenatally diagnosed TGA anticipated to require urgent BAS. The mean (SD) time from birth to cardiac ICU arrival was 159 (12) minutes pre intervention, and 103 (6) minutes post (mean difference −57 minutes [95% CI, −81 to −32]). There was a significant decrease in need for ECMO (33% pre intervention and 4% post, RR 0.11 [95% CI 0.02 to 0.65]), with a number needed to treat of 3.4 to prevent one ECMO episode.

Reducing the time from birth to arrival in the cardiac ICU for high risk babies with TGA is achievable and significantly improves clinical outcomes. Designing and implementing a process that details the critical steps in the collaboration between the tertiary maternity service, retrieval service and the cardiac ICU is the key to achieving improved outcomes.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Table 1: Clinical outcomes post balloon atrial septostomy (BAS) pre and post quality improvement intervention to reduce retrieval time

**COI:** None declared.
ID: 783

**TITLE:** Effect of exclusive breastfeeding on the trajectory of childhood growth and nutrition

**AUTHORS:** Sui-Ling Liao1,2, Shen-Hao Lai1,4, Jing-Long Huang1,3

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**CONTENT:**

To evaluate the effect of exclusive breastfeeding on the trajectory of serum vitamin D and other micronutrients deemed to affect body growth; and to compare anthropometric measurements between exclusively breastfed and mixed-fed children.

This study is part of a prospective birth cohort called the PATCH. Anthropometric measurements of the children were obtained during scheduled clinical visits. Blood tests were performed at ages 12, 24, and 36 months. Clinical records of breastfeeding and detailed questionnaires on dietary habits were also obtained.

Results showed that after 1 year of age, children who were exclusively breastfed for more than 4 months had lower mean z scores for body weight and height when compared to those who were mixed-fed. They also had a higher prevalence of having low body height parameters (<15th percentile). Laboratory results revealed these children to have lower serum ferritin at 1 year, and persistently low serum 25(OH)D throughout the first three years of life. No difference was noted in serum zinc level.

Although most exclusively breastfed children had growth parameters within the WHO standards, their growth were considerably slower than average. Whether this was associated with underlying nutrient deficiency deserves further investigation. Our study highlighted the importance of supplementing iron during the first year and vitamin D for at least 3 years in exclusively breastfed children.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 786

TITLE: An Audit of Pre-term Infant Positioning in the Neonatal Intensive Care Setting

AUTHORS: Emma Poff 1; Anne Keane 2.

AFFILIATIONS: Physiotherapy Department, Our Lady of Lourdes Hospital, Drogheda, Co Louth, Ireland

CONTENT:

It is reported in the literature that physiological flexion is not achieved until 36 weeks gestation. In utero, the foetus is contained in midline with no gravitational pull. Pre-term infants in the neonatal intensive care (NICU) setting are working against the effects of gravity making it challenging to achieve midline and normal physiological flexion. Positioning these infants promotes autonomic stability, self-regulation and aids posture and movement as well as reducing muscle imbalance or movement disorders. The aim of this study was to observe pre-term infant positioning in the NICU and neonatal unit (NNU) in Our Lady of Lourdes Hospital and recognise potential areas for improvement.

An audit was carried out in the NICU and NNU in Our Lady of Lourdes Hospital Drogheda once a week for four weeks. This is a level 2 NNU. The audit day was randomly selected each week and NICU staff blinded as to day/time of audit. Two separate assessors reviewed each infant in the same position at the same time using the Infant Positioning Assessment Tool (IPAT). All pre-term infants born at<36 weeks gestation were included. An Excel record of resting infant position and their IPAT score was noted. The results were analysed and presented back to staff on the NICU/SCBU during an in-service training session. The IPAT was also made available in each ward. The audit was repeated following a one month period and results were recorded and analysed as per the initial audit.

68% of infants in the NICU/NNU met the inclusion criteria for the audit, this correlated as 52 infants. Gestational age was the only reason for infant exclusion. On initial audit, the average IPAT score was 7.8. A score of less than 9 indicates a need to reposition the infant. 58% of the infants assessed during the initial audit had an IPAT score below 9. On repeat audit, the average IPAT score was 9.9. 28% of infants assessed during the repeat audit had an IPAT score less than 9. Head, neck and prone positioning as well as infants positioned in prone were identified as key areas for improvement. These scores improved from averages of 0.5, 1.2 and 3.0 to 1.0, 1.9 and 9.0 respectively. Overall, the IPAT scores on repeat audit correlated as a 48% improvement in pre-term infant positioning.

On initial audit the average IPAT score indicated that recommended pre-term infant positioning standards were not being met. Following in-service training, the repeat audit showed significant improvement in average IPAT scores. In future continued monitoring of infant positioning is recommended in particular of head, neck and prone positioning. All staff entering the NNU environment should be educated on the best practice for infant positioning.

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IMAGE / TAB CAPTION: Audit Results

COI: None declared
ID: 789

TITLE: The influence of patent ductus arteriosus and others heart disease on outcomes in patients with necrotizing enterocolitis

AUTHORS: The influence of patent ductus arteriosus and others heart disease on outcomes in patients with necrotizing enterocolitis (NEC)

AFFILIATIONS: Gonçalves-Ferri, WA1; Volpe, FP2; Canesin, WCC2; Martins, LR2; Sbragia, L2

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CONTENT:

The presence of patent ductus arteriosus (PDA) and others heart disease (HD) has unclear effects on outcomes in patients with necrotizing enterocolitis (NEC). The objective was to assess the influence of patent ductus arteriosus (PDA) and others heart diseases on necrotizing enterocolitis (NEC) outcomes.

A retrospective study of 271 infants with established NEC was performed. Outcomes were death, thrombocytopenia (1 mm (n=51) and with others heart diseases (77)). For the estimation of relative risks (RR) and their 95% confidence intervals, simple log-binomial regression (gross RR) and multiple regression models (adjusted RR) were adjusted using gestational age, apgar5, amniorrex time and use of corticoids as covariables.

Birth weight and gestational age were significantly lower in patients with PDA [mean (95% CI): 1063 g, 28.7 wk] than in those without PDA [mean (95% CI): 1474 g, 31.6 wk; P<0.05] and heart disease (HD) [mean (95% CI): 1474 g, 31.6 wk; P<0.05].

The risk of death was the same in NEC patients with PDA (35%) than in NEC patients without PDA (25%), and higher in HD (50%) [RR adj[PCA] (IC95%) = 1.22 (0.80; 1.86)/RR adj[HD] (IC95%) = 1.65 (1.15; 2.36)].

There wasn’t difference in thrombocytopenia [RR adj[PCA] (IC95%) = 1.15 (0.76; 1.76)/RR adj[HD] (IC95%) = 1.03 (0.66; 1.60)] and pneumoperitoneum [RR adj[PCA] (IC95%) = 0.92 (0.45; 1.91)/RR adj[HD] (IC95%) = 0.61 (0.27; 1.37)].

There was difference in days of onset of symptoms (No PDA 11 days, PDA 15, HD 20, p-value < 0.01), hospitalization duration (No PDA 56 days, PDA 79, HD 69, p-value = 0.01), need of surgery (No PDA 26,5%, PDA 35,2%, HD 20,7%).

In patients with PDA, the presence of PDA is associated with an increased in hospitalization duration and need of surgery, but not with death. Heart Disease is associated with death and hospitalization duration.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 798
TITLE: A NEONATE WITH UNEXPECTED CHRONIC LUNG DISEASE IN ASSOCIATION WITH PERIVENTRICULAR NODULAR HETEROTOPIA
AUTHORS: Rachel Walsh 1; Dushyant Batra 2; Abhijit Dixit 3; Jayesh Bhatt 4
AFFILIATIONS: 1 Neonatal Medicine, Queens Medical Centre, Nottingham University Hospitals Trust, Nottingham, UK
2 Neonatal Medicine, Queens Medical Centre, Nottingham University Hospitals Trust, Nottingham, UK
3 Clinical Genetics, Nottingham City Hospital, Nottingham University Hospitals Trust, Nottingham, UK
4 Paediatric Respiratory Medicine, Queens Medical Centre, Nottingham University Hospitals Trust, Nottingham, UK
CONTENT:
Chronic lung disease is not an unexpected pathology in ex-preterm neonates at discharge. There are, however, a small number of children with clinical features and radiological findings in keeping with this diagnosis who do not fit the expected phenotype. This group of children may not be of the expected gestation or have significant risk factors for chronic lung disease. In this cohort, there is a need to look closely for atypical features and to investigate for alternative diagnoses. This case demonstrates the importance of considering all associated systemic findings.

Baby H was born by emergency caesarian at 35+3 weeks gestation. The pregnancy had been uncomplicated but she had a subsequent 32 day admission to the neonatal unit due to respiratory distress and oxygen requirement. She received CPAP, high flow and low fl

This case adds to the growing number of children with FLNA-related lung disease. It is an important example of the need to thoroughly investigate those with an atypical presentation of a common illness or disease. This growing cohort gives weight to the suggestion that MRI brain and/or FLNA analysis should be considered in cases of unexplained chronic lung disease. Examination and consideration of systemic features must not be overlooked.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 800

TITLE: NECROTIZING ENTEROCOLITIS (NEC) IN EXTREMELY LOW BIRTH WEIGHT INFANTS (ELBWI): IS IT MANAGEABLE?

AUTHORS: Georgios Mitsiakos 1, Euthimia Papacharalampous 1, Ilias Chatziioannidis 1, Paraskevi Karagianni 1, Vasilios Lampropoulos 2, Chrysostomos Kepertis 2, Vasilios Mouravas 2, Ioannis Spyridakis 2, Vasiliki Soubasi 1

AFFILIATIONS: 1 Second Department of Neonatology, Aristotle University of Thessaloniki, “Papageorgiou” Hospital, Thessaloniki, Greece
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CONTENT:

Necrotizing enterocolitis (NEC) is one of the most common emergency situations in extremely low birth weight infants (ELBWI) [birth weight (BW)<1,000g], which often leads to surgical management. The aim of this study was to determine the incidence of NEC in ELBWI and compare the risk factors for outcomes in ELBWI with surgical NEC (sNEC).

We have performed a retrospective review of ELBWI with NEC and those among them who underwent a surgical procedure between January 2009 to December 2018. Data collected include: mode of conception, gestational hypertension, placenta abruption, chorioamnionitis, preterm/premature rupture of membranes (PPROM), uterus contractions (UC), use of tocolytic medications (TM), mode of delivery, gestational age (GA), BW, perinatal asphyxia, gender, intrauterine growth retardation, respiratory distress syndrome, intraventricular hemorrhage, PDA, enteral feeding, age at perforation, interval time between the offspring of NEC and the operation while the mode of operation and laboratory findings (Ht, PLT, PT, INR, aPTT). Data above were analyzed regarding their possible relationship with mortality.

During study period 5750 neonates were admitted to our NICU and 322 (5.6%) of them were ELBWI. Among these 322, twenty-five (7.7%) had developed NEC. Those infants had BW 775±146gr and GA 26.9±2.45w. Of the 25 infants with NEC, 19 (76%) were operated on. Following surgical treatment, 12 patients (groupA) recovered and were discharged, while 7 patients (groupB) died (mortality 36%). The majority of the deceased neonates were male (6). The median age of NEC onset, the GA [groupA: 27.3±2.94w vs groupB:26.3±1.87w, (p=0.048)] and the BW [groupA:787±160g vs groupB:772±105g, (p=0.824)] were not different between the two groups. From the above factors male gender (p=0.027) and PROM (p=0.013) were associated with mortality, while the presence of UC (p=0.027) and the use of TM (p=0.048) were associated with a lower incidence of mortality. No difference was noticed between the rest of the factors.

In our NICU the incidence of sNEC in ELBWI was low and the survival rate was high and similar to that of other multicenter studies. However, sNEC remains a major cause of morbidity and mortality.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 806

TITLE: "The impact on bronchopulmonary dysplasia incidence after the implementation of the protocol with the guidelines of the European Consensus on Respiratory Distress Syndrome in preterm infants."

AUTHORS: Fukamichi, SL1, Martins-Celini, FP1, Aragon, DC1, Gonçalves, AB; Carnevale-Silva, A1, Calixto, C1, Ferreira, CHF1, Maiolini, BL1, Toffolo, RO1, Souza, GA1, Silva, ACB1, Martins-Filho, PF1, Souza, TR1, Couto, LDCA1; Gonçalves-Ferri, WA1

AFFILIATIONS: Department of Pediatrics , Ribeirão Preto School of Medicine, University of São Paulo

CONTENT:

The treatment of respiratory distress syndrome (RDS) still presents several points under discussion. The 2016 European Consensus on Respiratory Distress Syndrome normalized the care of preterm newborns with the disease in order to try to reduce the morbidity and mortality of these patients. Some units do not have specific protocols for the management of RDS which can determine negative reflexes in the neonatal outcomes. Thus, the objective of this study was to analyze the incidence of bronchopulmonary dysplasia (BPD) and death rates in very low birth weight (VLBW) infants after the implementation of the protocol based on the recommendations of the 2016 European Consensus on RDS.

Cohort. Included VLBW infants with SDR born at tertiary hospital. Excluded malformations and deaths in the delivery room. Study groups:
Group 1: VLBW infants 2010-2014, prior to protocol implementation, beractant (100mg/kg), FiO2> 60% and first dose after 2 hours of life. Group 2: VLBW infants 2016 - 2018, after protocol implementation, first dose of poractant alfa (200mg /kg) in ≤26 weeks GA or FiO2 > 40% and > 26 weeks GA, before 2 hours of life.

RR with their respective 95% IC were calculated, adjusted through simple and multiple log- binominal regression models. Inferential trees were used to associate Groups 1 and 2 with estimates of relative risks considering gestational age, use of antenatal corticosteroids, early sepsis and maternal chorioamnionitis as covariates (SAS 9.4).

Were born 957 VLBW infants with SDR, 858 completed the study. GA and birth weight means: 28.8 weeks (SD 3.1) and 1025.3 g (SD 301.8). Group 1: 581 newborns (67.8%); Group 2: 277 (32.2%). Significantly lower occurrence of BPD (18.1% vs 49.3%) in Group 2, even when the analysis adjusted for other risk factors [ AdjRR = 1.38 ( CI 95% 1.08 to 1.78) ]

Risk for BPD was 1.7 (CI 95% 1.24, 2.36) for patients submitted to surfactant re-treatment on Group 1, on Group 2 was not observed risk; RR= 1.54 (CI95% 0.59; 4.0).

Inference tree: Patients ≤ 26 weeks GA had high occurrence of BPD regardless of the treatment. Newborns > 29 weeks GA following European Consensus recommendations had significantly reduced occurrence of BPD, (p <0.01), even with other risk factors for BPD. However, patients pre-protocol, had higher incidence of BPD, and covariates significantly increased the risk of BPD. (Figure 1)

The European Consensus Guidelines for SDR 2016 implementation reduced BPD in VLBW infants. Preterm ≤26 weeks had high BPD rate regardless of the treatment submitted. Patients ≥ 29 weeks, the adequacy of the protocol decreased occurrence of BPD even in the presence of associated factors (early sepsis, absence of antenatal corticosteroids or need of retreatment). Therefore, these guidelines should be implemented in all neonatal units.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
TITLE: Review of Tight Junction Proteins as Potential Biomarkers for Necrotizing Enterocolitis (NEC)

AUTHORS: Griffin Victoria 1, Al Assaf Niazy 2 Khan Rizwan 2

AFFILIATIONS: 1 Graduate Entry Medical School, University of Limerick, Limerick, Ireland
2 Department of Neonatology, University Maternity Hospital Limerick, Limerick, Ireland

CONTENT:

Necrotizing enterocolitis (NEC) is a severe inflammatory bowel disease afflicting extreme micro preterms (<1500 grams), at an incidence of 7-10% along with high rate of mortality (1). A clear understanding of the pathophysiology of NEC is lacking. Tight junctions (TJ) are cell-cell adhesion complexes found on the apical portion of intestinal epithelial cells and are reflective of the functionality of the gut epithelial barrier are being increasingly recognized as a potential biomarker for the detection of NEC. This paper reviewed current literature focused on the role of tight junction proteins, specifically claudin proteins, and their use as potential novel non-invasive biomarker for NEC.

Articles were searched using the following databases: Pubmed, Embase, Medline, Web of Science, ScienceDirect. Guidelines were looked upon on PRISMA, MOOSE, Cochrane Handbook of Systematic Reviews of Interventions. All studies in the review were selected using these databases, none were hand-selected. Studies relating to Tight Junction and NEC were selected. Search terms used were: Claudin + NEC, Tight Junction + NEC

Inclusion criteria: Studies performed on above terminologies along with overlapping of terminologies.

Exclusion criteria: Studies performed prior to 2000 and studies that focussed on the development of research methods.

Most recent work done on tight junction proteins in relation to NEC has been done on animals models. Therefore, it was decided to concentrate on these studies.

Disruption of TJ is understood to be a core feature of NEC pathogenesis. This review supports that intestinal barrier disruption appears to involve various isoforms of structural proteins including claudins. Claudin isoforms may be a promising area for future clinical application based on extensive studies in animal NEC models and promising outcomes from small studies in human microprems. Recent literature reveals that changes seen in levels of claudin isoform expression has been shown to correlate with structural biology, intestinal integrity, and the unique environmental conditions that are appreciated factors in the development of NEC. Changes seen in claudin isoforms have been shown to correlate with conditions reflecting environmental factors including hypoxia, enteral feeds and nutrient supplementation, and interactions between probiotics & commensal bacteria within the gut lumen.

The gut barrier including TJ and their constituent proteins have a significant role in the maintenance of the gut epithelial barrier, and may be an area of interest for research towards understanding the pathophysiology of NEC. Future directions:

• Relationship between disrupted TJ and how this directly relates with the inflammation and severity of NEC.
• Alterations of claudin protein expression in tight junctions may be a useful biomarker.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
ID: 812
TITLE: INTRACRANIAL HAEMORRHAGE IN TERM INFANTS UNDERGOING THERAPEUTIC HYPOTHERMIA
AUTHORS: Elisa Smit 1, Richard Lee-Kelland1, Sally Jary 1, Andrew Whitelaw 1, Frances Cowan 1, Marianne Thoresen 1,2
AFFILIATIONS: 1 Department of Neonatal Neuroscience, University Of Bristol, Bristol, United Kingdom
2 Department of Physiology, University of Oslo, Oslo, Norway

CONTENT:

The incidence of intracranial haemorrhage (ICH) in term infants with neonatal encephalopathy (NE) undergoing therapeutic hypothermia (TH) is not well documented. We postulate that infants undergoing TH are at risk of ICH due to traumatic delivery, asphyxia, hypocarbia, hypoxia and acidosis, and clinical factors related to NE (hypotension, seizures, liver impairment and coagulation disturbance). TH in itself followed by gradual rewarming may pose an additional risk for the development of ICH. Cranial ultrasonography (cUS) before, during and following TH and routine magnetic resonance brain imaging (MRI) allowed us to describe the incidence and risk factors for ICH in infants undergoing TH.

Observational study over an 8-year period in a tertiary neonatal unit, which acts as the regional cooling centre. Infants ≥36 weeks with moderate or severe NE undergoing TH according to the extended CoolCap cooling criteria (n=193) were included. With ethical permission, demographic and clinical variables were collected prospectively. All infants underwent regular cUS on days 1-4 and a brain MRI scan on median day 8; both were used to identify ICH. Post mortem results were reviewed for the presence of ICH in non-survivors. Mann-Whitney U test, t-test, and Fisher-Exact test were used to compare groups. Regression analysis was used to identify factors associated with ICH. Survivors were followed up with Bayley-III neurodevelopmental evaluation at 18-24 months of age.

Intracranial haemorrhage was present in 70 infants (36%) and the predominant patterns of ICH were: 16% intraventricular (IVH), 21% intraparenchymal, 56% subdural/subarachnoid, 3% cerebellar, 2% sub-galeal haemorrhage. Seventeen infants (9%) had more than one type of ICH. Vaginal birth (80% in ICH vs 43% in no ICH group) and coagulopathy (36% vs 19%) were associated with ICH. An amplitude integrated EEG pattern before cooling of continuous normal voltage with seizures was seen in 21% of infants with ICH vs 8% in those without ICH (p<0.001). Infants with IVH showed significantly more thrombocytopaenia (<50 x10*9/L) and required more inotropic support. They also had a significantly lower cognitive Bayley outcome. Coagulopathy was associated with intraparenchymal haemorrhage. Vaginal birth, higher cord pH, and renal impairment were associated with subdural and subarachnoid haemorrhage.

More than 1 in 3 cooled infants with moderate to severe NE showed at least one type of ICH on brain imaging or post mortem examination. Vaginal birth is a known factor implicated in ICH, which we confirmed in this study. Coagulopathy was the second factor associated with ICH. Infants developing IVH appeared to have had greater cardiovascular instability and periods of hypotension, as reflected by their increased need for inotropic support.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 816

TITLE: GENDER DIFFERENCES OF ADIPOKINES LEVELS IN CORD BLOOD AND ON DAY 3 IN DISCORDANT TWINS

AUTHORS: Svetlana Milenkovic 1, Miljana Jovandaric 2, Dina Despotovic 3, Dusan Milenkovic 4, Ljiljana Mirkovic 5

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CONTENT:

Background - Leptin and adiponectin levels are higher in adult and pubertal female as compared with males. It was supposed that leptin concentration is enhanced under influence of estrogens and the amount of adipose tissue mass in women while adiponectin is suppressed by androgens in boys during the progression of puberty and later. Data on adipokines according to sex in cord blood (CB) and in early infancy are inconsistent. In some reports sex dimorphism of leptin is present only in term newborns contrary to adiponectin. The aim of our study was to investigate whether gender differences of adipokines concentrations exist in newborns with intrauterine growth restriction (IUGR).

Patients and methods: 36 discordant (birth weight BW discordance ≥20% calculated in relation to the heavier appropriate for gestational age - AGA twins) and 42 concordant (birth weight discordance ≤10%) twin pairs ≥32 gestational weeks (GW) were included in the study. BW of the smaller twins in discordant group was less than 10th percentile (IUGR twins) with abnormal umbilical artery Doppler velocimetry. Umbilical venous CB and venous blood samples on day 3 (D3) were obtained from each pair of twins in the fasting state for hormone determination (leptin, adiponectin and insulin). Mothers with chronic and gestational disorders (eclampsia, gestational diabetes) and fetal/neonatal disorders with impairment of fetal growth and adipokine levels (anomalies, asphyxia, sepsis) were excluded.

Results: No gender difference were found in discordant and concordant twins for leptin, adiponectin and insulin in CB - median (range): Leptin - AGA M (male) 4,28 ng/ml (0,46-22,83) vs F (female) 8,38 (1,21-18,22), p 0,09; IUGR M 4,28 (2,08-5,6) vs F 4,48 (0,87-14,3), p 0,51; Adiponectin- AGA M 67,6 mcg/ml (55,1-124) vs F 70,7 (50,8-95,8), p 0,86; IUGR M 72,5 (36,6-134) vs F 63,35 (52,2-88,9), p 0,27. Insulin: AGA M 8,4 microIU/ml (2,1-175) vs F 6,64 (2,56-39,75), p 0,94; IUGR M 25,54 (2,87-40,47) vs F 4,13 (0,8-169,7), p 0,053. Adiponectin and insulin were significantly higher in male IUGR twins on D3: Adiponectin D3: AGA M 76,15 (59,3-246,0) vs F 77,1 (41-160), p 0,51; IUGR M 124 (121,8-129) vs F 90,35 (27,9-144), p 0,019. Insulin D3: AGA M 2,74 (0,8-64,5) vs F 2,7 (0,8-169,7), p 0,79; IUGR M 40,29 (6,84-50,8) vs F 16,28 (0,28-92,2), p 0,020. Leptin D3: AGA p 0,20; IUGR p 0,172.

Conclusions: Although leptin levels were higher in female than in male IUGR and AGA twins in CB and on D3, that differences were not significant. Small sample size could explain lack of statistical significance. Higher levels of adiponectin together with insulin in male IUGR twins on D3 is an unexpected finding and reason is unclear. Further investigations are necessary in this field.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 819

TITLE: EFFICACY OF A DISCHARGE CHECKLIST FOR NEONATES IN REDUCING NEONATAL MORBIDITY AND MORTALITY

AUTHORS: Murila F 1, Odundo D 2, Wamalwa D 3

AFFILIATIONS: 1 Department of Paediatrics and Child Health, University of Nairobi, Nairobi, Kenya
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CONTENT:

Of the estimated 5.9 million child deaths in 2015, almost 1 million occurred in the first day of life while about 2 million deaths occurred in the first week. Most of these deaths are readily preventable or treatable with proven, cost-effective interventions. The checklist can act as a tool to reduce neonatal morbidity and mortality. The primary objective was to determine the impact of introducing a standardized neonatal discharge checklist on the rate of hospitalization during the neonatal period at the Kenyatta National Hospital. The secondary objective was to determine the acceptability of a structured postnatal discharge checklist among health care workers at Kenyatta National Hospital.

A mixed method study that included the Quasi experimental pre-post intervention design and focus group discussion was carried out in the postnatal wards at Kenyatta National Hospital, which is the main referral hospital. Neonates with no complications awaiting discharge were enrolled for the study after consent was obtained. Qualitative and quantitative methods were incorporated in this study. Structured questionnaires were administered to both the mothers in the postnatal ward and the trained nurses on the checklist for the danger signs of newborns, breastfeeding, immunization and the use of chlorhexidine in cleaning the umbilical stump. Qualitative data was obtained using focus group discussions.

Hospitalization rates were 7.4% and 3.2% in the pre intervention and post intervention periods respectively. There was significant improvement in knowledge on cord cleaning after the intervention (p =<0.001) as well as on identifying newborn danger signs (p=0.005). There was a trend noted for reduced hospitalization following introduction of the neonatal discharge checklist.

There was a trend for reduced hospitalization following implementation of the neonatal discharge checklist. Acceptability of the discharge checklist was appreciated by health care workers while a call for collaboration with the paediatric department was emphasized.

COI: None declared
ID: 823

TITLE: SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH HEALTH LITERACY IN A LARGE SAMPLE OF MOTHERS OF NEWBORN CHILDREN: CROSS-SECTIONAL FINDINGS FROM A BIRTH COHORT (KUNO-KIDS HEALTH STUDY)

AUTHORS: Susanne Brandstetter 1, Josefine Atzendorf 1, Birgit Seelbach-Göbel 2, Michael Melter 1, Michael Kabesch 1, Christian Apfelbacher 3, "KUNO Kids study group"

AFFILIATIONS: 1 University Children’s Hospital Regensburg (KUNO), University of Regensburg, Germany
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3 Medical Sociology, Institute of Epidemiology and Preventive Medicine, University of Regensburg, Germany

CONTENT:

Health literacy can be defined as a person’s capabilities to make sound decisions regarding health and determinants of health. It is considered an important public health goal and of particular relevance when people are starting a family. However, health literacy of new mothers has not been studied so far in Germany.

Health literacy and various sociodemographic variables were assessed among 2182 mothers of newborns who take part in an ongoing birth cohort study (KUNO-Kids health study). Health literacy was measured by the HLS-EU health care scale (Sørensen, 2013) from which an index (range 0-50) was derived with higher values indicating higher health literacy. Sociodemographic variables which were associated with health literacy in univariable linear regression analyses were included in a multivariable regression model.

Almost 40% of mothers had a limited health literacy level. The mean health literacy index was 35.5 (SD=2.2). In multivariable regression, higher education was associated with higher health literacy (β =.12, p<.001) and giving birth for the first time was associated with lower health literacy (β =-.08, p=.001), respectively.

Albeit the mean level of health literacy was high, there was a substantial amount of mothers experiencing problems in dealing with the health care system – this applied above all to first-time mothers and mothers with low education. An adaption of professional practices in paediatric health care is necessary since many parents have difficulties navigating through the health care system as it is currently designed.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 824

**TITLE:** MOTHER'S MILK WITH ETHANOL AND COW'S MILK - A DANGEROUS COCKTAIL

**AUTHORS:** Ulrike Wurst, Benjamin Ackermann, Corinna Gebauer, Ulrich Thome

**AFFILIATIONS:** Department of Neonatology, University Hospital for Children and Adolescents, Leipzig, Germany

**CONTENT:**

Ethanol intoxications in newborns are generally due to false preparation of formula with alcoholics or consumption of alcohol by the breastfeeding mothers. Rarely, intoxications occur in hospitalized newborns, e.g. from excessive use of alcoholic hand sanitizers. We herein report a strange case of acute ethanol intoxications on our NICU.

The extremely premature infant (23 weeks gestational age at birth, parents Syrian refugees) presented with seven episodes of sudden severe destabilization after the 45th day of life. We observed tachycardia, apnea, hypotonia and lactic acidosis (9.6mmol/l)

We identified the acute episodes of destabilization in an extremely premature infant as severe ethanol intoxications due to alcoholized breastmilk, possibly aggravated by transcutaneous absorption of alcoholic hand sanitizer. Cultural differences and high language barrier due to the family’s background caused these life-threatening events. Establishing a confidential relationship between parents and the medical staff is essential on the NICU.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared.
ID: 830

**TITLE:** Visually evoked cerebral hemodynamic responses in preterm-born neonates: Classification according to subgroups and analysis of frontotemporal-occipital functional connectivity

**AUTHORS:** Tanja Karen 1; Stefan Kleiser 2,3; Daniel Ostojic 2,3; Helene Isler 2; Sabino Guglielmini 2; Dirk Bassler 1; Martin Wolf 2,3; Felix Scholkmann 2

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2 Biomedical Optics Research Laboratory, Department of Neonatology, University Hospital Zurich, University of Zurich, 8091 Zurich, Switzerland
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**CONTENT:**

How neuro-vascular coupling develops in preterm neonates is still largely understudied.

In our study we measured visually (flicker light) evoked hemodynamic responses (HRs) in preterm neonates (n = 25, gestational age: 31.71 ± 3.373 weeks, postnatal age: 25.48 ± 23.94 days) at the visual cortex (VC) and left frontotemporal lobe (FTL) using functional near-infrared spectroscopy (fNIRS) neuroimaging.

We found that the HR characteristics show a large inter-subject variability and could be classified into three groups according to the changes of oxyhemoglobin concentration at the VC (increase (A), decrease (B) or inconclusive (C)). In group A and B, the HRs at the left FTL were correlated with those at the VC indicating a frontotemporal-occipital functional connectivity (fto-FC). Neonates in group A had the largest weight compared to B, and had the lowest baseline total haemoglobin concentration and haematocrit compared to C.

To the best of our knowledge, this is the first fNIRS study showing that (i) the HRs of preterms need to be classified into subgroups, that (ii) the subgroups differed in weight and hematocrit at measurement, and that (iii) HRs can be observed also at the FTL during visual stimulation in preterms. These findings add novel insights how the neuro-vascular coupling develops in preterm neonates.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** None declared
ID: 837
TITLE: HEART RATE PATTERNS IN HYPOXIC ISCHAEMIC ENCEPHALOPATHY
AUTHORS: Natalie Gallagher 1
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AFFILIATIONS: Neonatal Unit, Liverpool Women’s Hospital, Liverpool, England

CONTENT:

HIE remains the most common cause of death and neurodisability in term babies. At Liverpool Women’s Hospital all babies have their physiological monitoring parameters reported in monitoring charts at 1Hz. In infants with HIE we have previously observed three distinct patterns of heart rate, blood pressure and oxygen saturation recordings; (i) normal variability, (ii) reduced variability and (iii) sinusoidal patterns. We assessed whether these patterns were associated with markers of the severity of hypoxic ischaemic encephalopathy and outcome.

Infants born over a 2 year period with HIE were identified from our electronic patient record system. The physiological monitoring traces in the first 72 hours of life were reviewed and classified into three categories; (i) normal variability (ii) reduced variability (iii) sinusoidal pattern. “Normal variability” was defined as a chaotic pattern, with no rhythmic changes and variability >10bpm in the hour. “Reduced variability” as a trace with a change of 10bpm. The presence of reduced variability and sinusoidal patterns were then compared with recordings where these patterns were absent. Comparisons were made between cord/worst pH, worst base deficit, HIE grading, presence of seizures and hypotension. The outcomes of abnormal MRI, death and cerebral palsy at 2 years were compared.

A total of 67 babies were identified, 11 had normal variability, 26 had reduced variability, 12 had a sinusoidal trace and 18 had periods of both a sinusoidal trace and reduced variability. MRI data was available on 41 babies with 2 year outcomes available from 23 babies. All of the babies with normal variability survived and of the 5 assessed at 2 years none had cerebral palsy. Of the 44 babies with reduced variability, 11 died and 7/12 assessed at 2 years had cerebral palsy. Of the 33 babies with a sinusoidal trace all survived and 6/13 had cerebral palsy. There were statistically significant differences when those with reduced variability were compared with those without for 5 minute Apgar, HIE grade, death and the combined outcome of death and cerebral palsy. There was no statistically significant difference when those with a sinusoidal trace were compared to those without.

In the first 72 hours of life reduced variability (observed in 66%) and sinusoidal patterns (50%) were associated with the severity of HIE, increased mortality and cerebral palsy. All of the babies who died had reduced variability. All of the babies with normal variability survived without cerebral palsy. The simple visual inspection of physiological parameters may be helpful in identifying infants at increased risk of morbidity and mortality.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=37ba19ec5334397c3d95b66a19b24523-MjAxOS0wNSM1Y2UyNjY2ZDA3M2Ex

IMAGE / TAB CAPTION: Fig. 1 Sinusoidal pattern

COI: None declared
ID: 857
TITLE: THE FREQUENCY AND RISK FACTORS OF NECROTIZING ENTEROCOLITIS THAT DEVELOPED BEFORE INTRODUCTION OF ENTERAL FEEDING IN VERY LOW BIRTH WEIGHT INFANTS
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2 Department of Pediatrics, Health Sciences University, Kanuni Sultan Süleyman Training and Research Hospital, Istanbul, Turkey

CONTENT:
Necrotizing enterocolitis (NEC) is an important cause of morbidity and mortality in preterm infants. It has a multifactorial etiopathogenesis including prematurity, enteral feeding, hypoxia-ischemia, and inflammation. It was suggested to develop after enteral feeding in 90% of preterm infants. There is no data about NEC development before the introduction of enteral feeding in preterm infants. The aim of this study was to determine the risk factors for NEC development before enteral feeding in very low birth weight (VLBW) infants.

A total of 618 VLBW infants that were admitted to Neonatal Intensive Care Unit were included to this study. The exclusion criteria were refusal of parental consent, major congenital malformation and chromosomal anomalies. The infants with stage I NEC and/or infants who had diagnosis of spontaneous intestinal perforation (SIP) were also excluded. The infants were classified into 3 groups in terms of NEC development as infants with NEC before enteral feeding (NBF group), infants with NEC after enteral feeding (NAF group) and infants without NEC (no-NEC group). NEC was diagnosed according to clinical and radiographic findings, and were classified according to modified Bell’s criteria.

A total of 90 and 65 infants were determined in NBF and NAF groups, respectively. No-NEC group included 453 infants. The mean gestational age (25.6±2.8 w) and birth weight (739±272 g) of infants in NBF group were significantly lower than NAF ve no-NEC groups (p<0.05). The infants in NBF group had significantly lower Apgar scores and the incidences of SGA, severe respiratory distress syndrome (RDS) and hemodynamic significant patent ductus arteriosus (hsPDA) were significantly higher in the NBF group (p<0.05). NEC significantly developed earlier (5.4±3.4 vs 15.6±11.5 d) in the NBF group compared with NAF and no-NEC groups. The frequency of perforation, need of surgery and mortality were also significantly higher in the NBF group (p<0.05).

Extremely low birth weight, presence of SGA, perinatal hypoxia-ischemia, need of resuscitation at birth, severe RDS and hsPDA were found as the main risk factors for NEC development before the introduction of enteral feeding. These infants had significantly higher perforation and mortality rates. Therefore, NEC can develop in VLBW infants with these risk factors without enteral feeding and may have a more severe progress.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
Low cost, high quality and robustness makes bubble CPAP ideal for use in low income countries. The original bubble CPAP consists of a low resistance interface directly connected to wide bore expiratory tubing. Several modifications of this design, aimed for use in low-income countries, are available. We have identified three design alterations of potential clinical importance based on published manuscripts and online material. The aim of our study was to review design alterations to the original bubble CPAP system and confirm effects on performance related to interface resistance and the diameter of the expiratory tubing.

Effects of design alterations to the original bubble CPAP were investigated in a mechanical test lung (Ingmar Medical, Pittsburgh, USA). All measurements were performed with non-humidified air, without leakage and at room temperature. The commercially available Fisher & Paykel was added as an example of a system with the original design properties. With simulated infant breathing (32 mL, 60 RR) the expiratory tubing (1.5 m and 3-12 mm inner diameter) was tested with Hudson and Fisher & Paykel prongs and RAM cannula at a CPAP of 5 cm H2O and a fresh gas flow of 6 and 8 L/min. The main outcome was delivered CPAP (end expiratory pressure) and resistance to breathing recorded in 17 consecutive breaths.

The three design alterations identified were; high resistance interface, increased dead space and high resistance of expiratory tubing. 1) A high resistance interface displayed increased resistance to breathing (measured as imposed work of breathing). The delivered mean CPAP level comparable to interfaces with lower resistance. 2) Increased dead space would, in a setting without leakage, not be safe and was not further tested. 3) With increasing expiratory tubing resistance, the delivered CPAP was higher than the submersion depth indicated. The increase in delivered pressure was higher with higher fresh gas flows. Using expiratory tubing with a smaller internal diameter or interfaces with higher resistances such as the RAM cannula increased the resistance to breathing. Using a low resistance interface and expiratory tubing with an inner diameter greater than 8 mm eliminate the problem.

Unintentional use of high CPAP or resistance to breathing could potentially increase the risk of air leak, gastric distention and respiratory failure. Usage of novel designs in low-income countries are of particular concern since failure on CPAP or complications may be fatal. A hypothesis is that leakage to some extent prevent negative effects. Users have to be aware that modifying the original bubble CPAP alters performance and possibly safety.
Figure 1: Summary of deviations from the original bubble CPAP system of clinical concern. Effects of increased interface resistance and increased resistance of expiratory tubing was confirmed in a mechanical lung model. Increased dead space was not consid

COI: None declared.
The results have partly been presented at PAS 2019, Baltimore
ID: 872

TITLE: OXYTOCIN RESPONSIVITY DURING SKIN-TO-SKIN CARE AND DIURNAL CORTISOL PREDICT DEPRESSION, TRAUMA AND BONDING SCORES AT NICU DISCHARGE IN PARENTS OF PRETERM INFANTS

AUTHORS: Bieke Bollen 1, Chiara Bernagie 2, Johan Verhaeghe 3, Christine Vanhole 4, Sarah Van Ransbeek 5, Gunnar Naulaers 6

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CONTENT:

Preterm birth is a potential traumatic experience for parents. Several studies show a high prevalence of depressive and post-traumatic stress symptoms in mothers of preterm infants. Hormonal changes in cortisol and oxytocin have both been implicated in these stress responses and also in parent-infant biobehavioral synchrony. We aimed to predict parental depression, posttraumatic stress and bonding at NICU discharge. We hypothesized that the physiological response of parents to skin-to-skin care (cortisol and oxytocin) would predict emotional distress and feelings of bonding. We also took into account early markers of parental distress (questionnaires postnatal week 2).

Data were collected for the Resilience Study (NCT02623400): a prospective longitudinal cohort study performed in the University Hospitals Leuven. Parents of 136 infants (<34w GA and/or BW< 1500 g) were included. Parents completed questionnaires in postnatal week 2 and in the week before discharge. Depressive symptoms (EPDS), acute trauma symptoms (ASDS), and posttraumatic stress disorder (IES & TES-B), and Parental Stress (PSS-NICU) were measured, both in mothers and fathers. Bonding was measured using the PBQ. Furthermore, parental saliva samples were collected to determine diurnal cortisol profile (awakening, 30 min, 4h, 12h later) as well as oxytocin and cortisol response during kangaroo care (KC, before, 20 min, 60 min). Data were analyzed using multiple regression analysis.

Mothers and fathers of preterm infants in our sample show high levels of emotional distress. 76.5% of mothers, and 40.7% of fathers exceed clinical cut-off scores for postnatal depression. In general, these levels of emotional distress decrease during hospitalization.

Both in mothers and fathers, acute stress scores (postnatal week 2) but also diurnal salivary cortisol level (AUC) were significant predictors of parents’ post-traumatic stress symptoms at discharge (mothers: F(2,74) = 25.49, p <0.0001, R2=0.41; fathers: F(2,64) = 19.31, p<0.0001, R2=0.38). Interestingly, the salivary response in oxytocin level during KC is a significant predictor (p<0.01) of both depression and bonding scores at discharge in mothers: a higher increase in OT during KC care is associated with lower depression scores and with higher bonding scores in mothers.

This study finds high levels of emotional distress in both mothers and fathers of preterm infants. Acute stress scores and diurnal cortisol in postnatal week 2 predicted posttraumatic stress symptoms at discharge both in fathers and mothers. Changes in salivary oxytocin level during KC were a strong predictor for bonding and depression in mothers.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 873
TITLE: Parent empowerment through Family Integrated Obstetric and Neonatal level 2 Care in Single Family Rooms (SFR): Experiences of parents.
AUTHORS: Mireille Stelwagen 1, Alvin Westmaas 2, Anne van Kempen 3, Fedde Scheele
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Dr. Alvin Westmaas (MSc, PhD), Associate professor at the department of Social Psychology Maastricht University, Maastricht, The Netherlands/Lecturer, Faculty of Health at the University of Applied Sciences Leiden.
Prof. Dr. Fedde Scheele (MD, PhD), Professor in Health Systems Innovation and Education at VU University Amsterdam, Gynecologist and Dean Teaching hospital OLVG, Amsterdam, The Netherlands

CONTENT:
Parents at neonatal wards are important partners for healthcare professionals to improve the quality of care and health outcomes of newborns. The goal of parent empowerment is to increase parents capacities of managing their role as a parent. To improve parent empowerment we designed an infrastructure for closeness and participation of parents with their sick newborns. There is a need of knowledge and understanding of how parents can or cannot achieve empowerment in specific infrastructures, according to themselves. The aim of this study is to explore parents’ experiences with the contribution of an integrated infrastructure of Obstetric and neonatal level 2 care in SFR on their empowerment.

The study was conducted at the new integrated Mother-and-Child Center of the OLVG hospital, Amsterdam, the Netherlands. The rate of birth is about 3000 newborns/year. A total of 1300 newborns a year receive level 1, 2 or post-intensive neonatal care. A non-probability purposive sampling of parents who have had a newborn who was hospitalized for at least 7 days. Parents had to speak Dutch and had to be older than 21 years of age. Parents whose newborn died and parents under the supervision of youth care were excluded. A qualitative research design with a contextual constructivist approach was chosen using Focus Group Discussions and in-depth semi-structured interviews. The study was conducted between December 2015 and January 2017. Data were analyzed by using realistic evaluation.

9 fathers and 27 mothers participated in 4 focusgroup discussions and 9 in-depth interviews. Five categories experienced by parents are identified: 1). Feeling respected, 2). Gaining self-management tools, 3). Sense of meaning of the healthcare condition of the newborn, 4). Perceived control and 5). Self-efficacy. Participants mainly started by naming how enormously respected they had felt as a whole family due to the SFR. Due to the daily medical rounds parents experienced to be feeling respected as equal primary caregivers. From here it seems that the participants had the confidence to gain self-management tools and a sense of meaning of the healthcare condition of the newborn. All this made a positive contribution to feelings of control and ultimately self-efficacy, finally ready for discharge to home. Feeling disrespected seems to have a negative influence on all other categories.

The infrastructure influences the empowering process. Being able to be close to the child and involved in care and medical decision making for 24 hours a day, contributes to a sense of competence in parenthood and a feeling by parents of equality with the staff. Parents also face new challenges, such as healthcare conflicts and sleeping deprivations, feelings of isolation from staff and fellow-sufferers and new kind of power issues with staff.
COI: none declared
ID: 880

TITLE: Does nasal CPAP decrease neonatal mortality of preterm infants with RDS in developing countries?

AUTHORS: Nicole Rouvinez Bouali 1; Marcelline D’Almeida 2; Dyne Bello 2; Nicole Tchiakpe 3; Noe Akonde 3; Lehila Bagnan 2; Maroufou Jules Alao 3; Blaise Ayivi 2.

AFFILIATIONS: 1 Department of Pediatrics, University of Ottawa, Ontario, Canada
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CONTENT:

Respiratory Distress Syndrome (RDS) is a leading cause of preterm infant death in developing countries. Nasal Continuous Positive Airway Pressure (CPAP) is recommended by the World Health Organization for preterm RDS. High quality evidence confirms the efficiency of CPAP to treat RDS in high-income countries and low quality evidence suggests it is safe and efficient for preterm RDS in low- and middle-income countries (LMIC), but there is a lack of evidence that CPAP reduces the mortality of preterm newborns in low-resource countries. We report the impact of CPAP on preterm survival after the introduction of nasal CPAP in the two main neonatal units of Benin, Sub-Saharan Africa.

We report the results of 1) a safety and feasibility study of CPAP for the treatment of preterm RDS in the main neonatal unit of Benin (2013), and 2) a descriptive longitudinal cohort study after the introduction of CPAP in the two main neonatal units of the country, coupled with a multifaceted educational program targeting the main causes of morbidity in the preterm infant (2015-2019). Survival numbers and percent are reported by birthweight categories (1000-1499 grams, 1500-1999 grams, 2000-2499 grams). We describe the effect of co-interventions (hand-hygiene, enhanced nutrition, Kangaroo-mother care and phototherapy) on preterm survival and the main reasons behind failure of survival despite nasal CPAP.

Baseline preterm RDS mortality was 36%. Our safety and feasibility study showed that CPAP was culturally acceptable and efficient to decrease the first day mortality of preterm RDS, but that most infants would then succumb due to malnutrition and infections within 1-2 weeks of age – hence mortality of preterm infants treated with CPAP for RDS decreased only to 32%. Survival was poor for preterm with birthweight below 1500 grams. Our longitudinal cohort study showed that preterm RDS survival increased significantly after our multifaceted intervention, with mortality from preterm RDS being as low as 22%, and that survival increased significantly in the BW category of 1000-1499 grams. Best results were observed when Kangaroo Mother Care (KMC) was applied, with mortality at/below 3%. Lack of human resources and lack of universal coverage are serious elements limiting preterm survival.

CPAP alone has limited effect on the survival of preterm infants with RDS in low-resource countries such as Benin, but the association of CPAP with co-interventions to improve hand hygiene and nutrition, with emphasis on KMC, have proven to decrease sustainably the mortality of preterm infants with RDS in the 2 main neonatal units of Benin. These interventions have the potential to decrease preterm mortality in other low-resource countries.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 882
TITLE: IS IT TIME TO RE-EVALUATE ANAEMIA IN PRETERM BABIES?
AUTHORS: Rebecca L. Puddifoot 1
Anna M. Rose 2
Simon J. Stanworth 3
Charles C. Roehr 4
AFFILIATIONS: 1 Newborn Services, John Radcliffe Hospital, Oxford, UK
2 Molecular Haematology Unit, MRC Weatherall Institute of Molecular Medicine, University of Oxford, Oxford, UK
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CONTENT:
Anaemia is a common challenge encountered in preterm infants, yet the full clinical consequences and benefits of different treatment options remain unclear. Many factors contribute to neonatal anaemia, including inherited and acquired disorders such as infection, blood loss, iron and haemotinic deficiencies, and iatrogenic anaemia due to frequent blood sampling. One main intervention is packed red cell transfusion (PRCT) of which national guidance [New 2016] currently recommends a restrictive approach.

We undertook a single centre retrospective observational study of all inborn <32 weeks’ gestation infants admitted to our tertiary neonatal unit at the John Radcliffe Hospital, Oxford in 2017. The aim was to describe the distribution of haemoglobin (Hb) concentrations and prevalence of anaemia in preterm infants and correlate this with the number of administered PRCTs.
T1 was defined as the 1st Hb measured after birth; T2 was defined as the last recorded Hb before discharge. Anaemia was defined as per national standards, Hb <120g/L [New 2016]. Previously estimated Hb drop of 50g/L from day 0-28 [Jopling 2009] was used to predict T2 from T1. Data was collected from electronic and paper patient records. All data was routinely available, anonymised and entered into a data base for analysis.

Data was collected for 102 infants. 77 survivors at discharge, with a median gestational age of 28+1 weeks, were included. 7 (6.9%) infants were anaemic at T1 which rose to 45 (58.4%) at T2 (p<0.001). The median Hb at T1 was 170.5g/L and 109g/L at T2 (p<0.001). Lower gestational age was significantly correlated with lower Hb at T1 and T2 (p<0.001). Gestational age sub-group analysis (29 weeks) showed a significant decrease between T1 and T2 across all groups. The 26-28+6 week sub-group had a larger than expected Hb drop (Wilcoxon z=-2.814, p=0.005). Data was analysed for transfused and non-transfused groups. The average Hb at T1 and T2 of the non-transfused group was significantly higher than the transfused group. Mortality was significantly lower in infants who did not receive PRCT (p<0.000001).

Anaemia is highly prevalent in infants <32 weeks’ gestation during and specifically at discharge, with a progressive decrease in Hb during admission across all gestational ages. The management of anaemia to date has largely focussed on treatment during admission, little attention has been devoted to understanding the long-term consequences of anaemia after discharge, and in an infant population characterised by major neuro-developmental changes.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=bfb2469a6c0dedbf79bc0561f264e315-MjAxOS0wNSM1Y2UyNyY2ZDE4NjQ4
IMAGE / TAB CAPTION: (A) Paired analysis showed that the Hb decreased significantly between T1 and T2 in both non-transfused and transfused infants. (B) Measured Hb at discharge was lower than the predicted Hb in the sub-group who received PRCTs.

COI: None declared
ID: 884

TITLE: “REDUCTION IN DURATION OF LONG-TERM OXYGEN THERAPY IN BABIES WITH CHRONIC LUNG DISEASE WITH A NEW WEANING PROTOCOL”

AUTHORS: Mahesh Tammali 1
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AFFILIATIONS: Neonatal Department
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CONTENT:

The number of cases of chronic lung disease and babies discharged on long-term oxygen therapy (LTOT) have been increasing. There is a significant variation in the strategy of oxygen withdrawal due to lack of specific evidence, hence lack of consensus on best practice. Within University Hospitals Leicester, a time-based weaning protocol was followed until December 2015. From January 2016, a new protocol was trialed where weaning was based on clinical condition of the baby and overnight oximetry study (OOS) result. The aim of the study was to assess the clinical and economic impact of the new weaning method compared to the previous protocol.

Retrospective review of clinical records of babies discharged in 2014-15 were compared to 2016-17 for duration of oxygen (O2) therapy, number of clinic and community visits, number of OOS and cost of O2 cylinders used. O2 flow is weaned by 0.1L/min based on OOS done every 2 weeks until the flow rate is 0.1L/min. With old protocol, further daytime weaning was done in increments of 30 min, 1 hr, 2 hr, 3 hr twice daily off, 6 hr, 8 hr, 10 hr off with an OOS at each step. With new protocol, clinical parameters i.e. general health and nutritional status guide the daytime O2 weaning. Weaning is done in increments of 30 min, 2 hr twice daily off, 6 hr and 12 hr off in day time followed 2-3 weeks later by two OOS, one in oxygen and one in air. Babies who moved out of region or died were excluded.

In 2014-15, 33 babies were discharged on LTOT; 2 babies were excluded as moved out of region. In 2016-17, 33 babies discharged on LTOT; 1 baby died and 3 moved out of region. Both groups were comparable with regards to mean birth weight (kg), gestational age at birth and proportion of babies having co-morbidity. New protocol was associated with shorter duration of O2 therapy (P value 0.005). There was saving of £3215.54 for cost of oxygen in 2016-17 group with change in protocol. The parent satisfaction and the Friends and Family test score were 100%.

Structured monitoring and weaning based on clinical parameters led to shorter duration of LTOT and significant cost benefits in addition. The service users’ feedback was 100% positive. With only calculating oxygen cylinder cost benefit shown 3,200 pounds. This highlights the importance of coding & calculation of services cost to improve the service provision. The new protocol was recommended to revise O2 weaning guidelines in our center.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=cd78a60d805564f204cf20ab834221e-MjAxOS0wNSM1Y2UyNjY2ZDE5MWE1

IMAGE / TAB CAPTION: Results

COI: “none declare”.

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ID: 885

TITLE: NEONATAL HOMECARE REDUCES POSTPARTUM DEPRESSION AMONG WOMEN WHO GIVE BIRTH PREMATURELY

AUTHORS: Kristine Andersen 1; Kristina Garne Holm 2; Carsten Hjorthøj 3

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CONTENT:

Preterm birth is a major risk factor for postpartum depression. The neonatal intensive care units (NICU) have developed an early discharge program, so the families can get neonatal homecare instead of long hospitalizations. Neonatal homecare has already many known benefits for both infants and parents, but this study investigates if the implementation of neonatal homecare has reduced the incidence rate of postpartum depression among mothers to preterm infants.

Population based retrospective register study using nationwide Danish registers, including all mothers who gave birth prematurely from 1994-2017, with at least one day spent at NICU. Outcome measures were postpartum depression diagnosis or the use of anti-depressive medication within the first six months after birth. We performed an interrupted time series analysis to investigate the incidence rates of postpartum depression before and after the implementation of neonatal homecare.

Before the neonatal homecare implementation a significant increase in postpartum depression incidence over time was found; (IRR=1.03 [CI: 1.03-1.05] pr. 6 months, p<0.001). The implementation of neonatal homecare made a significant level change, the IRR was reduced with 33 % (IRR=0.66 [CI: 0.55-0.81], p<0.001). The implementation of neonatal homecare also made a significant slope change (p=0.001); after the implementation no change in incidence of postpartum depression over time was found. The incidence of postpartum depression were stabilized (IRR=1 [CI: 0.98-1.00], p=0.83).

Before neonatal homecare the incidence of postpartum was increasing with a factor 1.03 every 6 months among women who gave birth prematurely. The implementation of neonatal homecare reduced the incidence of postpartum depression with 33 % and seemed to stop the increasing incidence of postpartum depression; the incidence was stabilized without any change over time following implementation of neonatal homecare.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
NURSES' OPINIONS ON POSITIONING FOR NEONATAL LUMBAR PUNCTURE - LYING OR SITTING?

AUTHORS: Alexandra Scrivens 1,2; Jessica Webster 2; Rhea Navani 3; Charlotte Bannink 4; Andrew Marshall 1; Charles C Roehr 1,2

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CONTENT:

Neonatal lumbar punctures (LP) require skill in positioning the needle in the intervertebral space and also a skilled holder to keep the baby still during the procedure, a task often allocated to the nurse caring for the baby. As part of a study to determine the optimal position for neonatal LP, the sitting position was introduced as an alternative to the traditional lying position for lumbar punctures at a tertiary neonatal unit. Whilst data will soon be available comparing lying and sitting LP success rates, the opinions of nurses who regularly hold for LPs are very valuable in assessing infant comfort and ease of holding.

Aim: To gauge the acceptability of the sitting position compared to the lying position to the nursing team. Nursing staff at a tertiary neonatal unit were surveyed, asking in which LP position do they feel that the baby is most comfortable? In which do they feel it is easier to hold the baby still? And which do they feel is most likely to result in a successful LP? Options were given as ‘definitely lying’, ‘probably lying’, ‘no preference’, ‘probably sitting’ or ‘definitely sitting’. Nurses were asked to consider these options for a 1 kg preterm baby, a 3.5kg term baby and a 5kg term baby.

Of 72 ITU/HDU nurses, 34 responded to the survey (47%). Of these, 15(44%) had held a baby for a sitting LP, all had held for a lying LP. Results are summarised in figure 1. Participants felt that preterm infants tolerated LP best in the lying position (23/34 answered definitely/probably lying); whereas term infants, particularly larger infants, were more comfortable in the sitting position (19/33 answered probably/definitely sitting for a 5kg baby). Sitting was felt to be easier to hold in larger babies, yet it was easier to hold a smaller baby in a lying position. The chances of success were thought to be equal in both positions, with 39% expressing ‘no preference’ for all sizes of infant. Nurses who have held a baby for a sitting LP show confidence in the position and a stronger preference for the sitting position than those who have not held an infant in the sitting position.

The nursing team feel that lying is more comfortable and better tolerated by smaller babies. The nurses show preference for the sitting position (for comfort and ease of holding) for term and larger babies. There is no clear preference for likelihood of success. Most nurses who have never held an infant in the sitting position indicated that, with appropriate training, they are willing to try and feel it may be more suitable in larger infants.

IMAGE / TAB:
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IMAGE / TAB CAPTION:

COI: None declared
TITLE: SEMIQUANTITATIVE LUNG ULTRASOUND, SURFACTANT FUNCTION AND INFLAMMATORY MEDIATORS IN PRETERM NEONATES WITH RDS

AUTHORS: Giulia Vigo1; Shivani Shankar-Aguilera1,3; Autilio C4; Nadya Yousef1; Daniele De Luca1,2,3

AFFILIATIONS: 1 Division of Pediatrics and Neonatal Critical Care, Medical Center, ‘A. Béclère’, South Paris University Hospitals, Assistance Publique-Hopitaux de Paris (APHP), Paris - France; 2 Physiopathology and Therapeutic Innovation Unit – INSERM U999, South Paris/Saclay University, Paris – France; 3 Lab of Bronchial Diseases, Institut Pasteur, Paris; 4 Department of Biochemistry and Molecular Biology, Faculty of Biology, and Research Institut-Hospital “12 de Octubre”, Complutense University, Madrid - Spain

CONTENT:

Lung ultrasound using a semiquantitative score has been proven to significantly correlate with oxygenation and predict surfactant need in preterm and extremely preterm babies.(1,2) We do not know, however, if there is any relationship between lung tissue inflammation and the lung aeration measured by lung ultrasound score (LUS). We aim to investigate this issue.

Prospective, translational cohort study, within a larger project on surfactant catabolism whose protocol has been published elsewhere.(3) Babies enrolled in this project underwent nonbronchoscopic bronchoalveolar lavage (BAL) to study inflammatory mediators and surfactant efficiency, prior to any surfactant administration. Inflammatory mediators were measured with customized Luminex and corrected for serum-to-BAL urea ratio. Surfactant phospholipids were extracted and adsorption test was also done as we reported earlier.(4) As per clinical routine, all babies with RDS are evaluated with lung ultrasound and LUS is calculated, as we previously published.(5)

17 preterm neonates were enrolled. There were significant correlations between LUS and IL8 (rho=0.562 p=0.045), IL6 (rho=0.52 p=0.033) and total proteins (rho=0.52 p=0.05). There was also a significant inverse correlation between LUS and the adsorption of surfactant at the air/liquid interface (rho= -0.81 p=0.028).

Lung aeration, as measured by LUS, might be reduced by proinflammatory mediators and is inversely correlated to the surfactant efficiency, as expressed by the adsorption at the air-liquid interface.

REFERENCES
2. De Martino L, Pediatrics 2018
5. Raschetti R. J Pediatr 2019

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared
ID: 888

TITLE: EFFECT OF MATERNAL PRE-ECLAMPSIA ON HEMATOLOGICAL PROFILE OF NEWBORNS IN QATAR


AFFILIATIONS: 1 Neonatal Intensive Care Unit (NICU), Women’s Wellness and Research Centre (WWRC), Hamad Medical Corporation (HMC), P.O. Box 3050, Doha, Qatar.
2 Department of Medical Education, Hamad Medical Corporation (HMC), P.O. Box 3050, Doha, Qatar.
3 Medical Research Center, Hamad Medical Corporation (HMC), P.O. Box 3050, Doha, Qatar.
4 Medical Records Department, Women’s Wellness and Research Centre (WWRC), Hamad Medical Corporation (HMC), P.O. Box 3050, Doha, Qatar.

CONTENT:

Pre-Eclamptic Toxemia (PET) is a major cause of pregnancy-related maternal morbidities. However, PET also carries higher rates of morbidities and mortalities in neonates. This study aimed to assess the effect of maternal pre-eclampsia on hematological profile of the newborn as well as certain maternal and fetal outcomes and to compare it with those of healthy normotensive mothers in Qatari population.

This was a hospital-based case control study. We reviewed the data and complete blood count (CBC) results of neonates born to Qatari mothers with the diagnosis of PET in Women’s Wellness and Research Center (WWRC) in 2017 and compared it with the data of a control group with almost the same number during the same year. Statistical analysis was done using unpaired t test, Chi-square test and logistic regression analyses.

108 neonates of women with pre-eclampsia and 103 neonates of healthy normotensive women were recruited. The mean weight, length, head circumference, placental weight and gestational age were significantly lower (P<0.05) in neonates born to women with pre-eclampsia. Only 13% of babies born to pre-eclamptic women developed neonatal thrombocytopenia. This is significantly higher than the control group in which 2% only developed neonatal thrombocytopenia. Surprisingly, no statistically significant difference (P>0.05) was noted between the two groups regarding the white blood cells or the Absolute Neutrophilic Count (ANC).

There was a positive association between PET and neonatal thrombocytopenia. Prematurity, placental insufficiency, fetal growth restriction and need for neonatal resuscitation were found to be significantly higher in babies born to preeclamptic mothers when compared with the healthy controls. Hematological parameters of neonates of mothers with PET should be properly monitored to reduce the incidence of developing potential complications.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=b08385a8c8bf7957f52c9c92eff7e914-MjAxOS0wNSM1Y2UyNjY2ZDFhZjI0

IMAGE / TAB CAPTION:

COI: None declared
ID: 890

TITLE: USING AN EARLY ONSET SEPSIS CALCULATOR TO GUIDE DECISION-MAKING DOES NOT CAUSE A DELAY IN STARTING ANTIBIOTICS IN INFANTS OVER 35 WEEKS' GESTATION

AUTHORS: Adam King; Charlotte Weeks; Laura Croucher; Sarah Davidson; Mike Hall

AFFILIATIONS: Neonatal Department, Princess Anne Hospital, University Hospitals Southampton NHS Foundation Trust, Southampton, UK

CONTENT:

Early Onset Sepsis (EOS) describes infection in the newborn within 72 hours. NICE guideline CG149 uses a combination of clinical indicators and risk factors to advise which babies need antibiotics for prevention and treatment for EOS. In the USA the use of a sepsis calculator has been shown to safely reduce the proportion of infants who receive antibiotics. CG149 formed the basis of decision-making for starting antibiotics in our UK maternity hospital setting up to September 2018, when it was replaced by an EOS risk calculator for babies ≥35+0 weeks' gestation. This study assessed whether use of the calculator was associated with a delay in the initiation of antibiotic treatment.

Blood culture data were reviewed for babies born ≥35+0 weeks' gestation between April 2018 – August 2018 when CG149 was in use (“Period 1”). The age in days on which antibiotic treatment commenced was recorded following review of the clinical records. The same data were then recorded for babies born between September 2018 – January 2019 when the Kaiser Permanente EOS calculator was in use (“Period 2”). All babies who had blood cultures taken in Period 1 received antibiotics, while in Period 2 not all infants who had cultures taken had antibiotics. This was not a practice previously used on our unit. Blood cultures taken in other paediatric locations in infants up to 14 days old were reviewed during Period 2 to identify any septic babies after discharge from maternity services.

During “Period 1” 286 blood cultures were reviewed and all patients found to have been started on antibiotics. The average day for commencing antibiotics was within the first 24 hours (range 0-4 days). During “Period 2” 191 cultures were reviewed, and 169 of the infants cultured were started on antibiotic treatment. Again, the average day of taking the blood culture was within the first 24 hours (range 0-4 days). This is outlined in Table 1. Comparison using a Mann Whitney U Test shows no difference in the day of taking culture using CG149 or an EOS calculator to guide decision-making (p=0.44). There was one readmission who went on to grow Group B Streptococcus. They presented clinically unwell and started treatment on day 3. This infant was not highlighted as at risk by either CG149 or by the EOS calculator.

We have demonstrated that using an EOS calculator as a decision-making tool does not delay the decision to treat for presumed EOS when compared to practice using CG149. There was no increase in the number of babies presenting to paediatric services with presumed sepsis following discharge from maternity services. Ongoing review and analysis will be needed to establish the safety of using an EOS calculator in clinical practice.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=52ce55c7b7d7c73360c66fac6b247159-MjAxOS0wNSM1Y2UyNjY2ZDFiNzk0

IMAGE / TAB CAPTION: Table 1 – A table comparing the day of taking blood cultures in Period 1 (using CG149) and Period 2 (using the Kaiser Permanente EOS calculator)

COI: None Declared
ID: 892

TITLE: How skin anatomy influences transcutaneous bilirubin determinations

AUTHORS: Marlijn van Erk 1; Lida Dam-Vervloet 2; Foky-Anna de Boer 3; Martijn Boomsma 4; Irma van Straaten 5 Nienke Bosschaart 6

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CONTENT:

Transcutaneous bilirubinometry is an effective screening method for neonatal hyperbilirubinemia. Current transcutaneous bilirubin meters are designed for the ‘standard’ situation of transcutaneous bilirubin (TcB) determinations on the forehead, or sternum of term newborns. We hypothesize that skin anatomy can considerably influence TcB determinations in non-standard situations – e.g. on preterm newborns, or alternative body locations.

A commercially available bilirubin meter (JM-105) was evaluated on phantoms that accurately mimic neonatal skin. We varied the mimicked cutaneous hemoglobin content (0–2.5 g/L), bone depth (0.26–5.26 mm) and skin maturity related light scattering (1.36–2.27 mm-1) within the clinical range and investigated their influence on the TcB determination. To obtain a reference frame for bone depth at the forehead, the magnetic resonance head scans of 46 newborns were evaluated.

The TcB meter adequately corrected for hemoglobin content. However, TcB determinations were influenced considerably by clinically realistic variations in bone depth and light scattering, with deviations up to 72 μmol/L. This greatly exceeds the specified accuracy of the device (±25.5 μmol/L).

As bone depth and light scattering vary with gestational maturity and body location, caretakers should be cautious when interpreting TcB measurements on premature newborns and non-standard body locations.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared
ID: 898

TITLE: UMBILICAL CATHETERS – CLINICAL PRACTICE AND COMPLICATION IN TERTIARY NICU

AUTHORS: Sylvia Gkantseva-Patsoura, Dionisia.Lampropoulou, Magdalini Papadopoulou, Petroula Georgiadou, Kalliopi Kappou, Rita Theofanopoulos, Martha Theodoraki

AFFILIATIONS: 1.NICU, General Hospital of Nikaia “Agios Panteleimon”- Piraeus, GREECE
2.1st TOMY, Sparti, GREECE

CONTENT:

BACKGROUND: Insertion of umbilical arterial and venous catheters (UAC / UVC) is a common practice in NICU. The placement is done by the use of standard aseptic technique for the purposes of arterial blood sampling, central blood pressure or blood gas monitoring, the intravenous access for the administration of fluid, drugs, or hypertonic glucose, exchange transfusion, or when peripheral access cannot be obtained. Insertion, management and removal of umbilical catheters (UCs) are standard procedures performed routinely on the NICU. However, there are complications related to catheter malpositioning, vascular or equipment-related accidents and other such as infections, NEC, hemorrhage etc.

METHODS: Retrospective descriptive study during a four years period in our tertiary NICU. Medical files of the neonates with umbilical catheters were reviewed for gestational age, birth weight, gender, need for mechanical ventilation, duration of catheter dwell time, clinical neonatal variables, complications and incidents. UCs were placed in high position UAC (T6-10), UVC at the level of the diaphragm. Tip position was confirmed by x-ray. In case of failure to place or management UCs, a peripheral inserted central catheter (PICC) or a central Broviac line were inserted. Our aim was to observe cranial and abdominal ultrasounds, to record the incidents, to define possible causes and compare our results with those of other centers. Routine ultrasound was performed by experienced radiologist.

RESULTS: Our study involved 148 neonates hospitalized in the NICU. 78(52%) were males and 71(48%) were females. The vast majority (73%) were preterm neonates. 17(11%) neonates had only UCV, 21(14%) – had only UAC and 110(75%) – had both UVC and UAC. The most common complication was sepsis with 33 incidents (22%), from which 20 incidents were dominated by Gram(-) bacteria. Laboratory results revealed cholostasis in 13(8,7%) neonates. Predominant ultrasound findings were pericholecystic edema and gallbladder sludge. Other findings include portal vein thrombosis (3) and renal artery thrombosis which eventually lead to kidney atrophy (2). Thrombophilia examination revealed MTHFR and V Leiden heterozygosity (2). Other complications were necrotic enterocolitis (2), hepatic hemATOMA (1) and supra ventricular tachycardia (1). Finally, only one incident was recorded with blood loss from UAC.

CONCLUSIONS: In general, our study demonstrated lack of extremely severe complications due to umbilical vascular catheterization. This was attributed to the presence of an experienced neonatologist throughout the procedure, along with radiologic and ultrasound confirmation of the exact position of the catheter. However, extreme caution should always be taken during umbilical vascular catheterization as sever or ever lethal complications can occur.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared

Organising Institutions: Supported by: Powered by:
TITLE: Retrieval and Transport of Cooled Infants: 1 year regional service analysis

AUTHORS: Paul Cawley 1, Katherine Fenlon 1, Laura Martin 1, Laura Bubb 1, James Tooley 1

AFFILIATIONS: 1. Newborn Emergency Stabilisation and Transport Team (NEST), St Michael’s Hospital, University Hospitals Bristol, UK

CONTENT:

Therapeutic Hypothermia (TH) initiated within 6 hours of birth reduces death & disability in infants with moderate or severe Hypoxic Ischaemic Encephalopathy (HIE). Effectiveness of TH initiated after 6 hours is less certain. In the UK, infants requiring TH are centralised. Our network criteria for TH include evidence of perinatal asphyxia plus encephalopathy on examination & Cerebral Function Monitoring (CFM); interpretation is dependent upon the referring centre. We provide intensive care transport and clinical advice for our level 1 & 2 units. We have increasingly requested referring units send CFM traces to us to aid our clinical advice. We aimed to audit our service over the past year.

We audited all infants retrieved for uplift of care from a level 1 or 2 unit, to a level 3 unit, for management of HIE. All level 1 & 2 units within our region are able to initiate active TH. We continue active servo-controlled TH during transport. 12 month audit period: April 2018 to March 2019.

We assessed time to dispatch, time for infant to reach target core temperature (33.0-34.0°C), reasons for delayed dispatch (>60 minutes), & reasons for failure to reach target temperature within 6 hours. We analysed if our transport team were able to view CFM images prior to dispatch, & if this impacted on decision to uplift. Sources included discharge summaries, transport medical records & our transport database. Analysis: linear regression, median average & Interquartile Range (IQR).

We uplifted 44 infants. Gestational ages 35-42 weeks. Median time to dispatch when at base 52 minutes (IQR 41 to 56). No correlation between time of referral & time to dispatch (R²= 0.02). We observed clustering of referrals at the start & end times of medical shift patterns. Median time to target temperature 213 minutes (IQR 138 to 313). Age at time of referral was positively correlated with time to reach target temperature (R²= 0.52, p<0.0001). Failure to reach target within 6 hours occurred in 8 infants (18%); contributing factors included meeting criteria for TH towards 6 hours of age (27%), use of passive cooling (27%) & local misinterpretation of CFM (18%). CFM was reviewed prior to dispatch for 22 infants (50%). In 2 cases (9%) an abnormal CFM was incorrectly interpreted as normal by the referring centre, in both instances this directly impacted decision to cool. (See figure)

A significant number of infants requiring TH are outborn & need uplift to tertiary centres. Correct interpretation of CFM can be difficult, but is vital for treatment decisions. Transport teams & receiving centres are able to remotely aid in decision making & may offer ‘fresh eyes’ for CFM interpretation. This may be especially prudent in infants where TH is not being initiated.

IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=8b7a6c124e76c72c7acf3554cbbc34-MjAxOS0wNSM1Y2UyNjY2ZDFIZWFi

IMAGE / TAB CAPTION: Pie chart demonstrating proportion of infants with CFM trace sent to transport team prior to dispatch. Breakdown shows percentage misinterpreted at the referring centre.

COI: None declared
TITLE: INCIDENCE AND RISK FACTORS ASSOCIATED WITH PULMONARY HEMORRHAGE IN VERY LOW BIRTH WEIGHT PREMATURE INFANTS

AUTHORS: Hadeel Atout1, Aseel Bzoor1, Amir Ataweh1, Hatem Khammash1,2

AFFILIATIONS: Makassed Islamic Charitable Hospital1 – Jerusalem – Palestine Faculty of Medicine – Al-Quds University2 – Jerusalem – Palestine

CONTENT:

Pulmonary hemorrhage is a serious complication of preterm infants with incidence (8%)* and high mortality in very low birth premature (VLBW).

Objective: The aim of this study is to calculate the incidence, mortality and the risk factors associated with pulmonary hemorrhage in (VLBW) premature infants (<1500 gm).

A case series study at Al-Makassed Hospital NICU in Jerusalem city, in which all live infants below 32 weeks with birth weight less than 1500 gm reviewed from January 2016 to December 2018, infants who had at least one episode of massive pulmonary hemorrhage (PH) (resulted in cardiopulmonary compromise) selected, all suspected risk factors evaluated in this subgroup and compared with control group.

A total of 23 (12.17%) out of 189 VLBW infants developed massive PH, with 18 (78%) out of 23 died during the episode. The mean gestational age was 27.8 weeks (SD ±2.9) compared with 29.1 weeks (SD ±2) in control group P-value 0.016, the mean birth weight was 928 g (SD ±193) compared with 1150g (SD±264) in control group P-value 0.0004, and the onset age was 3.23(SD±3.71) days after birth with 61% had the episode at age 2-3 days. thirteen (56.5%) neonates had low Apgar score at one minute (<5). Fifteen(65%) neonates had low temperature on admission (<36 degree) with temp average 35.52(SD±0.9) compared with 35.5 (SD±0.9) in control group P-value 0.06. twenty-one (91%) neonates were given surfactant as RDS cases with seven received 3 doses of surfactant. Eleven (48%) neonates had low PaCO2 (<35) at or just before the hemorrhagic episode.

PH occurred in 12.17% of VLBW infants with high mortality 78%. Risk factors include smaller GA, lower BWT, lower Apgar scores at 1, severe RDS with use of 3 doses of surfactant are at a greater risk of PH as previous studies showed, the data suggests that other risks play a role in PH including hypothermia on admission and hypocarbia prior to the hemorrhagic episodes.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 910
TITLE: NEONATAL OUTCOMES OF PREMATURE INFANTS OF WOMEN WITH PRETERM PREMATURE RUPTURE OF THE MEMBRANES
AUTHORS: Ozge Saglam1; Ilker Gonen1; Merih Cetinkaya1
AFFILIATIONS: 1 Department of Neonatology, Health Sciences University, Kanuni Sultan Süleyman Training and Research Hospital, Istanbul

CONTENT:

There is limited and conflicting data about the effect of preterm premature rupture of the membranes (pPROM) on neonatal morbidities in premature infants. The aim of this study was to determine the neonatal morbidities in infants born to mothers with pPROM and to compare it with non-pPROM premature infants.

This retrospective study included 140 premature babies with a maternal history of pPROM and 140 premature babies who had no maternal history of pPROM. Maternal data (age, parity, duration of pPROM, antibiotic usage, duration of hospitalization), neonatal demographics, neonatal morbidities (RDS, PDA, IVH, NEC, BPD) and mortality were all recorded.

The mean gestational age and birth weight of infants were 28.8 ± 1.7 w and 1098 ± 67 grams, respectively. The rates of early sepsis and mechanical ventilation were significantly higher in infants born to mothers with pPROM. The urine/cervical swab culture was found to be positive in 60 (42.8%) mothers with pPROM including Gram negative (n=45), positive (n=10) and fungal organisms (n=7). The mean birth weight and gestational age of infants born to mothers with Gram negative bacteria were significantly lower and the duration of hospitalization, repeated dose surfactant requirement and mortality were significantly higher in these infants compared with Gram positive and fungal positivity (p <0.05).

Although neonatal outcomes of infants born to pPROM and non-pPROM mothers seem to be similar, maternal Gram negative infections caused preterm labor with lower gestational age and birth weight. These infants had higher surfactant requirement and mortality. Therefore, knowledge of maternal organism may be helpful for clinicians to determine the prognosis in infants born to mothers with pPROM.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 911

TITLE: SHORT TERM NEONATAL OUTCOME ACCORDING TO DELIVERY MODE IN LATE PRETERM INFANTS

AUTHORS: Maria Livia Ognean1,2, Corina Zgârcea1, Oana Boantă2, Raluca Iosifescu1, Cristina Vlad1, Aurelia Ștefăniță1, Radu Chicea1,3

AFFILIATIONS: 1Faculty of Medicine, University Lucian Blaga Sibiu
2Neonatology Dept., Clinical County Emergency Hospital Sibiu
3Obstetrics-Gynecology Dept., Clinical County Emergency Hospital Sibiu

CONTENT:

Introduction
An increased incidence of late preterm birth was noted in the latest years, part of them due to elective delivery due to maternal conditions and changes in maternal demographics.

Aim: The study aimed to evaluate the influence of the delivery mode on the short term outcome in late preterm infants (LPIs).

Material and methods:
All LPIs delivered in our regional level III unit between 2013 and 2018 were included in the study. Anthropometric data, Apgar score, birth status, and incidence of postnatal complications were comparatively analyzed between LPIs delivered vaginally and those delivered by C-section. Statistical analysis was performed using SPSS 19.0 for Windows for p significant if <0.050 (95% CI); odds ratio (OR) were calculated where appropriate.

Results:
The study group comprised 970 LPIs, 585 born vaginally (60.31%) and 385 delivered by C-section. No differences were found between groups as regards GA (p=0.283), BW (p=0.553), and Apgar scores at 1, 5 and 15 minutes (p>0.50) although LPIs needed more often resuscitation (14.3% vs 9.1%, p=0.012). Also, LPI infants delivered by C-section were more often diagnosed with anemia at birth (28.6% vs 14.4%, p<0.001, Or 1.58 95% CI 1.34-1.88), and had significantly lower hemoglobin levels (p<0.001). No significant differences were found as regards the incidence of respiratory distress syndrome, persistent fetal circulation, severe jaundice, hypoglycemia, hypocalcemia, persistent ductus arteriosus, transient renal insufficiency but despite these results, LPIs born operatively were significantly more often admitted in the NICU (38.2% vs 26.9%, p<0.001, OR 1.24, 95% CI 1.10-1.40).

Our results are suggesting that, as compared to vaginal delivery, the short time outcome of LPIs delivered by C-section may be significantly influenced by the need for resuscitation at birth and birth anemia since other significant neonatal conditions occurred with the same frequency in both groups.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None to declare
ID: 913
TITLE: NEONATAL OUTCOME IN PREGNANCIES COMPLICATED WITH DIABETES – CASE-CONTROL STUDY
AUTHORS: Maria Livia Ognean1,2, Oana Boantă2, Corina Zgărcea1, Raluca Iosifescu1, Radu Chicea1,3
AFFILIATIONS: 1Faculty of Medicine, University Lucian Blaga Sibiu
2Neonatology Dept., Clinical County Emergency Hospital Sibiu
3Obstetrics-Gynecology Dept., Clinical County Emergency Hospital Sibiu

CONTENT:
Abstract
Uncontrolled diabetes, pre-existent or pregnancy-induced, is associated with increased neonatal morbidity and mortality.

Aim: To evaluate the impact of maternal diabetes on neonatal short term outcome.

Material and methods:
All newborns delivered by mothers with diabetes between 2015 and 2017 in our regional level III unit were included in the study. For each infant of a diabetic mother two other infants with gestational age ± 1 week and birth weight ± 100g were selected from the unit database. Anthropometric data, Apgar score, birth status and postnatal complications were comparatively analyzed between the infants of diabetic mothers and the control group. Statistical analysis was performed using SPSS 19.0 for Windows for p significant if <0.050 (95% CI).

107 infants delivered by diabetic mothers and 207 infants in the control group were included in the study (just one control case could be found for 5 infants of diabetic mothers). Compared to the control group, infants of diabetic mothers were more often delivered by C-section (72.6% vs 40.6%, p<0.001), had lower Apgar scores at 1 minute (9.1±1.1 vs 9.4±1.0, p=0.003), presented more often neonatal respiratory distress (17.0% vs 7.7%, p=0.013), and ventricular septal hypertrophy (15.0% vs 0%), and were more often admitted to NICU (17.0% vs 4.8%, p<0.001). No significant differences were noted as regards other neonatal conditions evaluated, including hypoglycemia.

Maternal diabetes during pregnancy may complicate the neonatal course, increasing the risk for various neonatal morbidities. Hypoglycemia, the most common complication in these infants was found with equal frequency in case and control groups, most probably due to careful prevention measures applied in infants from diabetic mothers.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None to declare
ID: 914  
**TITLE:** ROUTINE CRANIAL ULTRASOUND SCAN IN PRETERM BABIES: CORRELATION WITH TWO-YEAR NEURO-MOTOR OUTCOME  
**AUTHORS:** Nishita Lal1  
Shalabh Garg 2  
Mithilesh Lal 2  
**AFFILIATIONS:** 1. Foundation Year Trainee, Northern General Hospital, Sheffield, UK  
2. Consultant Neonatologist, James Cook University Hospital, Middlesborough, UK  

**CONTENT:**

The cranial ultrasound scans (USS) are routinely done in preterm population for bleeding, ischaemic or cystic changes. The practice varies hugely across the globe in terms of timing, frequency, operator as well as reporting of these scans. A number of studies previously have also demonstrated limitations of these scans to predict the long term outcome. This also leads on to the vagueness in the communication to the parents while explaining the results of the scan and its potential long term implications. We designed this study to look into the correlation of early (within first week) and late (6 weeks postnatal) cranial USS to the neuro-motor outcomes at 2 years of corrected gestational age.

**Setting:** Tertiary (Level-3) Neonatal Unit in England (Annual delivery rate of around 5000)  
**Population:** Preterm baby born less than 32 weeks gestation were included. The babies in whom 2 year outcome is not available were excluded.  
**Duration:** Two years (Jan 2011 to Dec 2012)  

The criteria for normal(0) and abnormal (1) USS were predefined as highlighted in Table 1. Similarly the criteria for normal (0) or abnormal (1) neuro-motor outcome were also predefined (Table 1).

Both early and late USS were independently rated by two neonatal consultants who were blinded to the 2 year outcome of the baby.  

The babies were identified through a national neonatal database. If the scans or outcome were not found electronically, the paper medical notes were searched for the same.  

A total of 134 babies were included over 2 year period. The babies who either died or did not have 2 year outcome were excluded.  

The 2 year outcomes were available for around 70% of the babies.  
There was a high degree of agreement (132 out 134, agreement ratio 0.9) between the two raters who independently gave cranial ultrasound score of either 0 or 1 based on the USS reports using the criteria described in Table 1. This is a strength of our study as in our unit, trained paediatric radiographers do the scan with standardised imaging and reporting criteria.

The results of the correlations of USS and the outcome are shown in table 2. The sensitivity of the USS was quite low (18%) whereas the specificity was high (96%).  

The negative predictive value was 89% and the positive predictive value was 40%.

Our study shows that routine head USS still provide a good judgement about the overall outcome of the baby. The combination of week one and 6 scans can provide fairly accurate assessment of 2 year motor outcome. The clinician may give more positive outcome prediction based on the scan results rather than being vague about the outcome. Having a standardised scanning protocols to reduce inter-observer variability improve validity of cranial USS.
IMAGE / TAB: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=6ca28c7cd10f5060b8a4b4c06cc73780-MjAxOS0wNSM1Y2UyNjY2ZDIzNjdi

IMAGE / TAB CAPTION: Table 1 - Cranial Ultrasound Grading and Two-year Neuro-motor Outcome criteria
Table 2 - Correlation of combined Cranial USS grade to the 2-years motor outcome

COI: None declared
ID: 916
TITLE: THE IMPACT OF RISK FACTORS ON NECROTIZING ENTEROCOITIS OUTCOME AT VLBW NEONATES
AUTHORS: Melinda Matyas1, Andrade Urda 2, Monica Hasmasanu1, Ioana Ighian 3, Anca Budusan 4, Blaga Ligia1, Gabriela Zaharie 1

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CONTENT:
Necrotizing enterocolitis is the most common gastrointestinal complication of preterm infant. The incidence of NEC increase when two or more risk factors are associated to the preterm birth. Onset typically occurs in infants aged between 2 weeks and 2 months. The incidence and the severity of the disease are higher if two risk factors are associated. Mortality is reaching 30% and is higher among infants who develop severe forms of the disease that require surgical treatment. NEC is accompanied by inflammation, ischemia and infection. The use of feeding protocols in clinical practice has led to a decrease in the incidence of the disease over the past years.

A longitudinal retrospective study was conducted at the Neonatology Department of the Gynecology Clinic I Cluj-Napoca, between 2014 and 2018. The clinic where the study was carried out is a third-level facility which serves an important part of the population in North-Western Romania (4 counties), preterm infants less than 32 weeks of gestation being admitted to this center.

The current study included all preterm infants who were diagnosed with NEC in the mentioned period. Data were systematically extracted from the records of Neonatology department.

Modified Bell criteria were used for diagnosis. pH gas value were monitored in preterms with NEC. The aim was to find out if there was a significant link between the pH gas value and NEC onset. Data analysis was made using SPSS v. 25.

In the study period were admitted to the intensive care unit 596 (460 inborn and 166 outborn) preterm newborns having a gestational age of 32 weeks and birth weight below 1500 g, 37 (6.20%) of them were diagnosed with NEC. Of the NEC cases most were inborn, just 35.14% (13/37) were outborn. Influence of risk factors like growth restriction, missing of antenatal corticoids, preeclampsia, blood transfusion, enteral feeding type or metabolic acidosis on NEC’s severity and outcome were analyzed. In the study group 56,76% was enterally fed from the 3rd day of life with own mother milk. At 16 cases formula was used as no milk banks in the country. There was a statistically significant link between BE under -10 and patients’ NEC type (Fisher exact test: P=0.007).

The analysis of risk factors in the study performed revealed a significant association of NEC with the acid-base status of the preterm infant, the study group showing a significant association of NEC with the value of excess bases. Exposure of preterm infants to formula determined a higher rate of unfavorable evolution through NEC compared to preterm infants who were exclusively fed with breast milk.

IMAGE / TAB:
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IMAGE / TAB CAPTION:
COI: None declared
ID: 917
TITLE: CARDIOTOCOGRAPHY AND NEONATAL HYPOTHERMIA: PREDICTIVE VALUE AND LONG-TERM OUTCOME
AUTHORS: Carlotta Caccialupi 1; Alessandra Cecchi 2; Maria Rosaria Di Tommaso 3; Enrico Tartarotti 4; Carlo Dani 5
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CONTENT:

Blood Gas Analysys values (i.e. pH, SBE) consistent for perinatal asphyxia and possible ischemic hypoxic encephalopathy, have still uncertain predictive value for the long-term outcome of these newborns. APGAR score and BGA values are the most common methods to assessing neonatal wellbeing. An umbilical pH > 7.0 and/or an excess SBE < 12 mmol/l are rarely associated with irreversible neurological sequelae and even a pH < 7.0 in most newborns is not associated with adverse neurological outcome. In the literature there are many studies on the accuracy of CTG, but its correlations with long-term outcomes are lacking. We investigated this correlations among pH, SBE and 0-3 Apagar Score at 1° min of life.

We studied 75 infants born from 2010 up to 2016 in University Hospital Careggi of Florence who had pH < 7 in cord BGA. Only 23 needed hypothermic treatment. The recorded maternal parameters were: age, Body Mass index (BMI), course of pregnancy, Assisted Reproductive Technology (ART), single/twin pregnancy, oxytocin’s utilization and epidural anesthesia. CTG monitoring has been classified according to the ACOG Guidelines. The neonatal recorded parameters were: sex, Apgar at the 1st and 5th minutes, the pH and the SBE. Follow-up was planned on the basis of pathological or not pathological course and performed at 6, 12, 24 months using the Bayley Scale of Infant and Toddler development third edition (Bayley – III). The two populations were examined with the Mid-P Fischer test, chi square test and t test.

The CTG results an excellent indicator also in the long-term neonatal prognosis: in fact pathological or indeterminate traces of degree 2c, according to the Coletta algorithm are associated, with a significance of less than 0.01, to a negative outcome at 2 years compared to newborns who had reassuring CTG traces. The Apgar extremely low to the first minute of life of the group of infants defined as “sick” is associated, with statistical significance equal to 0.04, to a negative outcome at 2 years compared to the group of infants defined as “healthy”. Some literature data concerning neonatal hypoxic risk factors are confirmed, such as the use of oxytocin, obesity and male fetal sex. We’re in agreement with the literature about the association between very low pH (< 6.90) with more unfavorable neonatal outcomes as well as a loss of bases greater than -12 mmol/L, all without statistical difference.

The Cardiotocography (pathological or indeterminate traces of degree 2c, according to the Coletta algorithm) and an 0-3 Apgar score at first minute of life is predictive of an negative neonatal outcome at two years of life.

IMAGE / TAB:
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IMAGE / TAB CAPTION: P-Value of all maternal and neonatal parameters.

COI: None Declared
ID: 926
TITLE: Lotus Birth: ethical dilemma!
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CONTENT:

The ‘Lotus Birth’ is defined as not cutting or clamping the cord and placenta remains attached to the infant until it separates naturally. This is also termed as ‘Umbilical nonseverance’ or ‘Physiological cord clamping (PCC)’ There is a theoretical risk of infection to the infant, but severity is unknown. The closest comparable data will be on omphalitis (incidence of 1/1000) in developed countries.

With this background we report a Case of ‘Lotus birth’ where infant needed admission to the neonatal unit. We went through ethical dilemma in dealing with the situation as there are no national or international guidelines and sparingly available literature.

A term infant was born normally following 29 hours of premature rupture of membrane. Infant was born in good condition. Parents wanted ‘Lotus Birth’ therefore, cord was not cut. Infant developed tachypnoea at about 8 hours of age and required oxygen to ma

This situation posed an ethical dilemma for us while counselling parents as there is no evidence based research. What are the potential risks for this infant and to the other infants in the neonatal unit? To deliver a patient-centred care and accommodate family wishes it has to be medically safe. This case report highlights the need for a Internationally agreed guideline in managing such although uncommon but potentially challenging situation.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None
ID: 930

TITLE: Avoiding term admissions into the Neonatal unit (ATAIN) – How can we achieve this?

AUTHORS: Sonia Goyal 1
Nuha Homeida 2
Satwant Kaur 3
Harsha Gowda 4

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CONTENT:

In England 60% of the infants admitted to the neonatal unit are term infants. This indicate avoidable harm which might have been caused with an associated avoidable cost to NHS and families.

ATAIN is an NHS improvement initiative under patient safety to identify harm leading to term admissions. Program aim to benefit mother and baby by avoiding unnecessary separation.

Aims: 1. To evaluate the current admission rate of term neonates to neonatal unit. 2. To identify the main causes of admission.

Retrospective observational study which included all the term babies admitted to the unit between July-September 2018. Data for above babies was collected using Badger net admission record. We included all full-term infants (>37 weeks) admitted within seven days of birth to the neonatal unit and expressed as a percentage of all full-term live births. The study included 102 infants for whom demographic details were collected. We also collected and analysed the data for mode of delivery, cause for admission, age at admission, length of stay and treatment received.

102 term infants were admitted to the neonatal unit and the total number of term live births in the hospital was 1460. Admission rate was 6.98% per 1000 term live birth. 53% were born by caesarean section and 47% were normal vaginal delivery. The average age at the admission was 11.72 hours. The most common causes for the admission were suspected sepsis (65%) , respiratory problems (48%), Hypothermia (3.9%), Hypoglycaemia (4.8%), Asphyxia (6.8%) and Jaundice (7.8%). Average duration of stay was 3.8 days. There was a considerable overlap between hypoglycaemia and hypothermia infants. 40% infants admitted with Respiratory distress were born via normal vaginal delivery as compared to 60% born via caesarean section. All infants with hypoglycaemia and hypothermia were screened for suspected sepsis. All the blood cultures were negative.

The term admission rate for our unit was almost 7%, which was more than the national reported rate of 6%. Respiratory problems are the major cause for the term admission to the neonatal unit. More than half of them were born by caesarean section. Reducing Caesarean section, antenatal steroids for elective section and a robust management neonatal respiratory distress pathway is necessary to reduce the respiratory problems in neonates.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Causes of term admission to Neonatal Intensive care unit
COI: none
ID: 932
TITLE: IS EMA SCORING SYSTEM USEFULL TO ANTICIPATE THE CAUSATİVE ORGANISMS FOR LATE NEONATAL SEPSIS?
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CONTENT:
Neonatal sepsis is a common serious condition that leads to mortality and long-term morbidity in neonates. The diagnosis of sepsis in neonates is still problematic because no specific clinical symptom or biochemical markers are defined currently. Several studies conducted to anticipate causative agents of sepsis for diagnose and early intervention. The aim of this study was to investigate whether EMA scoring system can differentiate gram negative (-) and gram positive (+) sepsis in proven neonatal sepsis.

We conducted a retrospective cohort study of infants cared for at a single tertiary care neonatal intensive care unit between 1 March 2016 and 30 August 2018. Medical records of all infants with proven sepsis were reviewed. Symptoms and biochemical markers at the time of sepsis diagnosis and empirical antibiotics were recorded and used for scoring. The patients were divided into two groups regarding the organism grown in blood cultures as Gr (-) and Gr (+) sepsis groups.

One hundred ninety one cases of proven neonatal sepsis were included in the study. One hundred three patients (54%) had gram positive organisms and 88 cases (46%) had gram negative organisms as causative agents. Mean gestational weeks of gram positive and gram negative groups were 29.6 (± 5.8) and 29.3 (± 3.9) weeks, respectively (p = 0.69). Birth weights of two groups were similar (1422 (± 760) grams and 1294 (± 770 g (p = 0.25), respectively). EMA scoring gave a diagnosis of 87.2% of proven gram-negative sepsis cases and this ratio was 40% for proven gram-positive sepsis cases. There was a significant difference between the two groups in terms of positive EMA scores (p <0.01).

EMA scoring system failed to define more than half of Gr (+) positive sepsis cases. In infants with high EMA scores Gr (-) sepsis might be suspected and management should be done accordingly. New sepsis scores specific to the newborn are still needed.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
TITLE: IS LOW SERUM ALBUMIN ASSOCIATED WITH POSTOPERATIVE COMPLICATIONS IN NEONATES UNDERGOING CARDIAC SURGERY?

AUTHORS: Handan Bezirganoglu 1; Kiymet Celik 1; Nilufer Okur 1; Fatih Ozdemir 2; Onur Doyurgan 2; Osman Akdeniz 3; Murat Surucu 3; Bedri Aldudak 3

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CONTENT:

Serum albumin concentration which mainly depends on nutritional intake can be rapidly suppressed in metabolic stress and used as a negative acute phase reactant. Although it has been widely used as an early predictor of clinical outcomes after surgery in adult studies, knowledge about neonatal period is scarce. The aim of this study was to evaluate the role of preoperative (pre-op) and post-operative (post-op) albumin levels as a predictor of clinical outcome in neonates who undergo operative correction of congenital heart disease (CHD) with high mortality risk.

We conducted a retrospective cohort study of infants cared for at a single tertiary care neonatal intensive care during February 2017 and April 2019. All infants with CHD who admitted to neonatal intensive care unit (NICU) for postoperative care were included. Serum albumin concentration was obtained before surgery and on the first postoperative hours as a unit policy. Maximum decrease in albumin level defined as the difference of pre-op final albumin level and the lowest post-op level (ΔAlb). The primary outcome was mortality, acute renal injury, hepatic failure, duration of mechanical ventilation, total duration of respiration and duration of hospitalization was recorded as secondary outcomes.

A total of 68 patients were included in the study. Mean gestational weeks and birth weights were 38 (± 0.96) weeks and 3149 (± 371) gr, respectively. There was no correlation between ΔAlb value and mortality. However total respiratory support duration and length of hospitalization were longer in patients with low pre-op albumin levels (p = 0.038, p = 0.023). The effect of pre-op and post-op albumin on other outcomes was not significant.

Low albumin levels following cardiac surgery in neonates could be a promising predictor for adverse neonatal outcomes. The reason for not detecting a significant relationship between ΔAlb and mortality is may be due to use of intraoperative albumin infusions in some patients.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 940

TITLE: Classroom-evaluated school performance at nine years of age after very preterm birth

AUTHORS: Lisette Jansen 1; Cacha Peeters-Scholte 2; Sica Wiggers-de Bruine 3; Annette van den Berg-Huysmans 4; Jeanine van Klink 5; Andrea van Steenis 6; Monique Rijken 7; Robert Vermeiren 8; Sylke Steggerda 9.

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CONTENT:

Children born preterm are at risk for academic difficulties. They have a lower full-scale IQ compared to their peers and recent studies assessing school performance have found lower achievements for reading and spelling, but in particular for mathematics in extreme preterm (<28 weeks gestation). A major question for parents of a preterm born child is whether their child will be able to follow a regular educational trajectory. The aim of our study was to determine classroom-evaluated school performance nine years after preterm birth, in relation to perinatal risk factors, brain abnormalities on neonatal magnetic resonance imaging and maternal education.

Children were recruited from a cohort of 113 preterm infants (<32 weeks gestation), whom participated in a longitudinal prospective study, investigating brain injury and neurodevelopmental outcome. Data on perinatal risk factors, the presence of brain injury as seen on neonatal magnetic resonance imaging at term equivalent age and maternal education were collected. Information on school performance included enrollment in regular education or special (primary) education, grade repetition and classroom-evaluated school results from the Dutch Pupil Monitoring System regarding reading comprehension, spelling and mathematics.

Information on school enrollment was available in 87 children (77%), of whom 7 (8%) were in special primary education and 19 (22%) repeated a grade. These were higher percentages compared to their Dutch peers (p \leq .05). Twenty percent received additional assistance in the classroom. Classroom-evaluated school results were obtained from 74 children (65%). A below average performance was often seen for reading comprehension, spelling and mathematics. Univariate analysis showed that a lower performance on reading comprehension was associated with male sex and maternal education, spelling with male sex and mathematics with BPD, white matter injury and maternal education. In a multivariate model, male sex and a lower level of maternal education were independently associated with a poorer performance on reading comprehension and moderate/severe white matter injury with mathematics.

More than half of preterm born children need extra assistance during their school age, either through support in the classroom, grade repetition or enrollment in special primary education. Preterm born children more often have difficulties with reading comprehension, spelling and mathematics. Regular follow-up therefore remains important for preterm born children during school age.

IMAGE / TAB:

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COI: None declared
Pain in early life affects the postnatal development of the nociceptive system, including descending pain modulation. In order to understand the effect of neonatal procedural pain on descending serotonergic modulation, it is important to understand the normal physiological development of these projections. Developmental changes in expression of serotonin receptor subtypes may underlie and affect the functional postnatal maturation of the serotonergic modulation. However, knowledge in this field remains fragmentary. This review aims to summarize how descending serotonergic modulation of nociception changes with postnatal age in the rat.

Throughout the first postnatal weeks, descending serotonergic inhibition is functionally immature, where modulation changes from facilitatory before postnatal day 21 to a bimodal modulation in adulthood. Sprouting of descending serotonergic tracts, projecting from the rostroventral medulla to the spinal cord, as well as changes in receptor expression and function take place in the first postnatal weeks. The developmental stage of the descending serotonergic system should be taken into account when providing analgesia in the postnatal period as it may influence the mechanism of action for pharmacological agents acting on the descending serotonergic system.

A comprehensive understanding of the development of the descending serotonergic system based on preclinical data could help optimize treatment of pain through postnatal development in a clinical setting as for instance with neonatal procedural pain in the NICU.
ID: 945

TITLE: THERAPEUTIC HYPOTHERMIA IN ASPHYXIATED NEWBORNS WITH SEVERE CONGENITAL HEART DISEASE

AUTHORS: Vinzenz Boos 1,2; Felix Berger 1; Christoph Bührer 2

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CONTENT:

Perinatal asphyxia can lead to hypoxic ischemic encephalopathy (HIE), an important cause of acute neurologic injury at birth. Induction of moderate systemic hypothermia or selective head cooling, started within six hours after injury, has become standard of care to improve neurologic outcome in surviving neonates with perinatal asphyxia and clinical signs for HIE. Newborns with severe congenital heart disease (CHD) are at increased risk of perinatal hypoxic injury. However, large clinical trials on therapeutic hypothermia in asphyxiated newborns have excluded patients with CHD. We seek to investigate feasibility and safety of this method in CHD patients.

Patients with severe, ductal-dependent CHD, a gestational age > 35 completed weeks at birth, and perinatal asphyxia were included and analyzed over a period of six years in this retrospective observational study. All patients received prostaglandin E1 infusion for ductal maintenance immediately after birth, until cardiac surgery or death. Patients who demonstrated signs for HIE were treated with moderate systemic hypothermia at 33-34°C for 72 hours. After completion of the hypothermia protocol and rewarming, all surviving patients received cardiac surgery within the first two weeks of life.

Seven patients were diagnosed with HIE after perinatal asphyxia and suffered from ductal-dependent CHD. Cardiac diagnosis was d-transposition of the great arteries (d-TGA) in six patients, and hypoplastic left heart syndrome (HLHS) in one patient. The patient with HLHS died due to acute cardiac failure after 15 hours of life. Therapeutic hypothermia was discontinued after 19 hours in one patient with d-TGA due to severe arterial hypotension. Five patients with d-TGA completed 72 hours of cooling. During hypothermia, all patients required mechanical ventilation for respiratory failure, and common side effects were arterial hypotension requiring inotropic support, and pulmonary hypertension requiring treatment with inhaled nitric oxide. All six surviving patients had a successful cardiac surgery (arterial switch operation) without major perioperative complications after rewarming.

Therapeutic hypothermia can be a viable option for patients with severe CHD and perinatal asphyxia, with the objective of preventing brain injury in patients with HIE. Hypothermia compromises neither the efficacy of low-dose prostaglandin E1 in ductal-dependent CHD nor the safety of subsequent cardiac surgery, but cardiopulmonary adverse effects during cooling should be anticipated.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 952

**TITLE:** OXIDATIVE STRESS LINKED WITH CLINICAL OUTCOMES AND BIOMARKERS OF NEUROLOGIC DAMAGE IN INFANTS UNDERGOING CARDIAC SURGERY

**AUTHORS:** Stephanie Hadley 1; Debora Cañizo Vázquez 2; Miriam Lopez Abad 3; Laura Elena Carrara 4; Marta Camprubí Camprubí 5; Joan Sanchez-de-Toledo 6.

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**CONTENT:**

Infants with CHD are particularly vulnerable to brain injury, and cardiac surgery during infancy seems to increase the risk of pre-existing white matter damage and long-term neurocognitive impairment. Though there is evidence demonstrating a strong oxidative stress response to cardiac surgery, its impact on neurologic damage in CHD remains unclear. The aim of this study was to characterize the relationship between oxidative stress, serum neurologic biomarkers, and clinical outcomes in infants undergoing cardiac surgery.

This was a prospective, observational study. Patients 6 months of age or younger undergoing cardiac surgery, with or without cardiopulmonary bypass (CPB), were eligible for inclusion. Patients were divided into neonatal (<30 days) and pediatric (30 days - 6 months) groups for analysis. Pre- and post-surgical clinical data were recorded. Urine 8-iso-Prostaglandin F2α, a biomarker of oxidative stress (OS), was quantified immediately before surgery and at 0- and 24-hours post-surgery using enzyme-linked immunoassays (Cell BioLabs, Inc., San Diego, CA). Serum brain damage biomarkers, enolase (NSE) and S100B protein, levels were also analyzed before surgery and at 0- and 72-hours post-surgery. Values are expressed as median [IQR].

63 patients (aged 21 days [8-96]) undergoing surgery between November 2017-February 2019 were included. All pediatric patients had CPB surgery (n=25). Neonatal patients were categorized based on surgery: CPB (n=12), coarctectomy (n=14), or other (n=12). Neonatal CPB patients had the highest OS at all 3 time points (Table 1). CPB patients had higher post-operative OS than non-CPB (p=0.018). In pediatric patients, 24 hr OS was correlated with ICU length of stay (LOS) (rho=0.503, p=0.017) and overall LOS (rho=0.466, p=0.033). In CPB patients, 24 hr OS was associated with higher 24 hr inotropic support (rho=0.532, p=0.002), days of mechanical ventilation (rho=0.447, p=0.015), and ICU LOS (rho=0.420, p=0.017). Post-operative OS was correlated with S100B (rho=0.647, p=0.004; rho=0.472, p=0.015) and NSE (rho=0.512, p=0.036; rho=0.426, p=0.038) in pediatric and neonatal patients, respectively.

Infants undergoing cardiac surgery, particularly neonatal CPB patients, experience significant peri-operative OS. Elevated levels of OS are correlated with both biomarkers of cerebral damage and poorer clinical outcomes in the immediate post-operative period. These pilot data suggest that peri-operative OS may play a role in the mechanism of brain injury in children with cardiac disease and should be investigated on a larger scale.

**IMAGE / TAB:**

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IMAGE / TAB CAPTION: Table 1. Peri-operative 8-iso-Prostaglandin F2α levels.

COI: None declared.
ID: 954

TITLE: NEUROBEHAVIORAL AND VISUAL EVALUATIONS IN THE EARLY POST-OPERATIVE PERIOD FOLLOWING NEONATAL CARDIAC SURGERY

AUTHORS: Stephanie Hadley 1; Debora Cañizo Vázquez 2; Mercé Leonhardt Gallego 3; Marta Camprubí Camprubí 4; Joan Sanchez-de-Toledo 5

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CONTENT:

Long-term neurocognitive impairment is one of the most prevalent issues affecting neonates with congenital heart disease. Prompt identification of neurologic deficits is essential in order to provide adequate clinical follow-up and early intervention. This study aimed to identify functional neurological and optical deficits in the early post-operative period in neonates undergoing cardiac surgery.

This was a prospective, observational study. Patients less than 1 month of age undergoing surgery with or without cardiopulmonary bypass (CPB) were eligible for inclusion. Clinical data were recorded. Patients were monitored with near infrared spectroscopy (NIRS) intra-operatively and for 72 hours post-surgery. Urinary 8-iso-Prostaglandin F2α, a biomarker of oxidative stress (OS), was quantified at 0- and 24 hours post-surgery. Prior to hospital discharge, a neuropsychologist evaluated patients using the Newborn Behavioral Observations (NBO) and the ML Leonhardt Battery of Optotypes. The tests were analyzed by sub-categories: NBO as state (representing habituation to light and sound) and motor; and Leonhardt as optical interactions, optical function, optical perception, and ocular fields.

Twenty-seven neonates (median age 10 days [IQR 7-20]) were enrolled between January 2018-January 2019. Eleven underwent CPB surgery. The median age at neurologic evaluation was 31 days [21-44]. CPB patients had lower NBO state scores, representing poorer habituation to stimuli, but higher motor scores than non-CPB patients (p=0.047, 0.010). Lactate level and persistent NIRS values outside the normal range at 24 hours post-surgery were inversely correlated with NBO state score (rho=-0.643 and -0.645; p=0.045 and 0.044).

Patients with aortic obstruction had poorer optical interactions than those with no obstruction (p=0.026), and patients with higher post-operative OS had worse optical function (p=0.015). Length of stay (LOS) in the ICU was inversely correlated with optical perception and ocular fields (rho=-0.415 and -0.398; p=0.035 and 0.044).

Lower NBO state scores, representing poorer habituation, were observed in patients with abnormal cerebral oxygenation, elevated 24-hour lactate levels, and CPB; however, CPB patients performed better on motor tasks than non-CPB patients. Aortic obstruction, OS, and LOS were associated with poorer post-operative visual function. Higher-powered studies are needed for more thorough neurovisual follow-up after neonatal cardiac surgery.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 957

**TITLE:** NOVEL MODEL OF POST-HEMORRHAGIC VENTRICULAR DILATATION AND LONG-TERM OUTCOME FOLLOWING INTRAVENTRICULAR HEMORRHAGE IN THE PRETERM RABBIT PUP

**AUTHORS:** Olga Romantsik 1, Matteo Bruschtettini 1, Susanne Grönlund 1, Bo Holmqvist 2, David Ley 1

**AFFILIATIONS:** 1 Lund University, Department of Clinical Sciences Lund, Pediatrics, Lund, Sweden
2 ImaGene-iT AB, Medicon Village, Lund, Sweden

**CONTENT:**

Intraventricular hemorrhage (IVH) is a serious complication of prematurity and is associated with cerebro-cerebellar damage, leading to post-hemorrhagic ventricular dilatation (PHVD) and long-term neurodevelopmental impairment. The preterm rabbit pup model of IVH mimics to a high degree the patho-physiological events, the brain maturation and vessel anatomy of the extremely preterm infant with IVH. However, evaluation of long-term outcome has as yet been limited by an immature systemic physiology and high mortality. We here present a unique preterm rabbit model enabling study of long-term outcome following preterm IVH up to young adolescent age.

Rabbit pups were delivered by cesarean section at E29 (3 days prior to term). IVH was induced by intraperitoneal injection of 50% glycerol at 3 h of age. Following initial feeding via gastric tube the preterm pups were placed and housed with wet nurse rabbit does together with part of the does offspring. Presence and distribution of IVH was detected by high-resolution ultrasound (HRU, Visual Sonics Vevo 2100) at 24 and 48h. Neurological examination was performed at 28 days and behavioral tests between 28-31 days of age. Pups were terminated at 32 days of age following in vivo perfusion fixation. Cerebral ventricular morphology was assessed with HRU ex vivo and brain sections evaluated with immunohistochemistry (IHC).

A total of 21 (IVH=8; Control=13) preterm rabbit pups completed the study protocol. Postnatal growth did not differ between IVH and control pups with a mean (SD) weight at 32 days of 564 (99) g in IVH pups and 616 (77) g in control pups, p=0.19. Ex vivo ultrasound confirmed moderate/severe PHVD in 6/8 pups with an initial IVH. There were no differences in motor performance between the groups (motor activity, righting reflex, coordination and muscle strength on a 60° slope). Object recognition test revealed decreased recognition and exploration at a 4h interval in IVH pups as compared to control pups, p<0.05. Macroscopic appearance of brains with PHVD and control is illustrated in Fig 1. Evaluation with IHC of regional cerebral/cerebellar myelination, neuronal and synaptic density will be presented.

The presented model of preterm IVH and long-term outcome enables novel opportunities for the study of long-term outcome, extending the prospective for prevention and treatment of PHVD and functional impairment following preterm IVH.

**IMAGE / TAB:**
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**IMAGE / TAB CAPTION:** Figure 1.

**COI:** None declared
ID: 971
TITLE: COMPASION OF TWO MODES OF INVASIVE VENTILATION FOLLOWING NEONATAL CARDIAC SURGERY
AUTHORS: Kiymet Celik 1, Nilufer Okur 1, Handan Bezirganoglu 1
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CONTENT:

Post-operative ventilation strategy in critical congenital heart disease (CHD) is complicated by pulmonary and cardiovascular physiological changes during follow up. In this study, we aimed to compare different invasive ventilator modes in neonates who is operated due to congenital heart disease (CHD).

This is a randomized controlled study included patients who were operated with the diagnosis of CHD between February 2018 and February 2019 in our hospital. Patients were classified into two groups according to ventilation mode: volume guaranteed ventilation and pressure controlled ventilation. In both groups, PEEP and inspiration time were started with the same values. Primary outcome was duration of mechanical ventilation. Duration of total respiratory support, ventilation related atelectasis, pneumothorax, pulmonary bleeding, and duration of hospitalization were also evaluated.

Twelve patients were in volume guaranteed ventilation group and 19 patients in the other group were included. There was no difference in terms of birth weight, gestational week, operation day and postoperative first inotropic score. There was no significant difference between the groups in terms of duration of invasive respiratory support and total respiratory support. While extubation failure and atelectasis were more frequent in pressure-controlled group, this difference was not statistically significant.

Although invasive mechanical ventilation responses after surgery in CHD are similar, volume-guaranteed ventilation option should be kept in mind in these patients. Studies with larger samples are needed for the ventilation strategy.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 972

TITLE: ADVERSE EVENTS DURING NON-EMERGENCY NEONATAL INTUBATIONS; A DIAGNOSTIC AUDIT TO UNDERSTAND OPPORTUNITIES FOR IMPROVEMENT

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Kavita Desor 2

AFFILIATIONS: Sankara Narayanan, Neonatal Department, Watford General Hospital, Watford, United Kingdom
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CONTENT:

Endotracheal intubation is one of common procedures performed in a neonatal intensive care environment. Observational studies have shown intubation-related adverse events (IAE) in up to 40% of intubations. This is due to substantial variation in subscription to evidence-based practices relevant to intubation. Cognitive aids such as checklists optimise clinician performance but are not always used in this setting. The aim of our phase one quality improvement initiative was to audit the occurrence of IAEs during neonatal intubation and understand contributory factors. We then intended to use that information to guide implementation of specific improvement measures to reduce IAEs.

A retrospective audit of all non-emergency intubations in our neonatal unit over a 1-year period (2018) was performed. Emergency neonatal intubations in delivery room, operating theatres and emergency department were excluded as documentation standards were variable. Data-set included patient demographics, indication/preparation for procedure, premedication use, grade of practitioner performing intubation, time taken from decision to successful intubation and occurrence of any one of IAEs. IAEs were defined as; desaturations 30 seconds, bradycardia 30 seconds, tube malposition requiring removal and reintubation, procedure time > 30 minutes. Data was entered and analysed in an Excel spreadsheet.

A total of 62 neonatal intubations were performed during study period of which 36(58%) classed as non-emergent. 32 case notes were available for analysis. 21(66%) were preterm and 11(34%) term. Respiratory distress syndrome of prematurity was the predominant indication (18, 56%) and most intubations occurred 2 attempts. Median time from decision to intubation was 42 minutes. Desaturations <70% and/or bradycardia 30 seconds was noted in 14/32(44%) of cases Any one of IAEs was present in 21/32(66%) cases. There was evidence of profound variation in documentation standards and suboptimal communication between team members during the procedure.

Our data showed an unacceptably high rate of IAEs during non-emergency neonatal intubation. Lack of standard checklist, poor preparation and ineffective team communication were contributory. After consultation with multidisciplinary team we have implemented targeted simulation training and also developed an intubation timeout checklist (Figure 1) to reduce variability in practice. The impact of this intervention will be studied over next year.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Figure 1: Intubation Timeout Checklist

COI: none declared
ID: 974
TITLE: ANALYSIS OF TEMPORAL VARIATIONS IN CAFFEINE EFFICACY AND TOXICITY WITH A 24 HOUR DOSING REGIME IN PRETERM INFANTS
AUTHORS: Charlotte Bannink 1
Kathleen Lim 1
Charles Christoph Roehr 2
Andrew Marshall 3
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CONTENT:

Apnoea of prematurity occurs commonly in preterm infants as a result of respiratory system immaturity. Caffeine has been used for over 40 years in the treatment of apnoea, with well documented long-term safety and efficacy. The half-life of caffeine in newborns, estimated to be 60-100 hours, has resulted in a preference for 24 h dosing. Temporal variations in caffeine efficacy and toxicity with a 24 hour dosing cycle have not been fully elucidated in the preterm infant.

This was an observational adjunct to an interventional study of automated oxygen control in preterm infants 5sec, >10 sec and >15 sec were identified in the capsule pneumography signal. Heart rate (HR) was sourced from the bedside cardiorespiratory monitor. In each infant, average HR, RR and respiratory pause frequency were determined in pooled data from 5 time epochs in relation to caffeine dosing (0-2 h post-dose, 2-6 h, 6-12 h, 12-18 h and 18-24 h).

35 infants were studied, of mean gestation at birth 27 completed weeks (SD 1.85) and post-natal age 19 (13) days. Data were available from 5.0 (1.4) caffeine dose cycles per infant; caffeine dose was 6.5 (1.6) mg/kg caffeine base. The therapeutic effect of caffeine on cadence of respiration was maintained throughout the 24 h after caffeine administration, with RR and respiratory pause frequency similar in all post-dose epochs (Table). By contrast, HR was influenced by proximity to the last caffeine dose, with a 13 bpm overall reduction in HR in the period 18-24 h post-dose compared to other epochs (Table). Post-dose increase in heart rate did not correlate with caffeine dose in each infant.

These results demonstrate no loss of efficacy of caffeine with a 24 h dosing regimen, but suggest an element of toxicity with a higher heart rate for the first 18 h post-dose compared with the final 6 h.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Caffeine efficacy and toxicity data stratified into time epochs in relation to caffeine dosing

COI: None declared
ID: 975

TITLE: ULTRASOUND CHARACTERISTICS OF PERIVENTRICULAR HAEMORRHAGIC INFARCTION AFFECTING MORTALITY AND NEURODEVELOPMENT IN VERY PRETERM INFANTS.

AUTHORS: Philip Thwaites 1
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Giancarlo Natalucci 1,5
on behalf of the Swiss Neonatal Network and Follow-up Group

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CONTENT:

Periventricular haemorrhagic infarction (PVHI) is one of the most severe forms of brain injury seen in very preterm infants and is associated with high mortality and high rates of neurodevelopmental impairment (NDI). While broadly defined as a pathological condition, severity of PVHI can be graded by assessing specific features of the lesion. Bedside ultrasound (US) imaging allows diagnosis and monitoring of PVHI as well as characterisation of its features. We aimed to assess whether sonographic PVHI characteristics according to a previously published score are associated with outcomes of affected infants at age 2 years.

This was a retrospective analysis of cranial US imaging data from infants with PVHI, born <30 weeks of gestation in Switzerland, in 2002-2014, without major malformations. The PVHI severity score defined by Bassan et al. (2006) was assigned to the US image set where the bleed was deemed most extensive. Points were added for bilaterality, extension of the bleed and presence of midline shift, creating a score from 0 to 3. The data for the outcomes ‘death’ and ‘NDI’ at a corrected age of 2 years were exported from the prospective register of the Swiss Neonatal Network. NDI was defined as: mental or motor development index <−2SD, severe cerebral palsy, blindness or deafness. We used logistic regression to estimate the association between the Bassan score versus mortality or NDI.

Among 9103 live-born infants, 359 children suffered from PVHI. US imaging data for 157 children was considered adequate for reviewing. Within this collective 74/157 (48%) children died, 57 of which after withdrawal of care. Within the survivors, 2-year follow-up data was available for 74/83 (89%) children. Moderate to severe NDI was present in 38/74 (51%) infants. Table 1 shows the distribution of outcomes according to the Bassan scores. Logistic regression analysis showed that the Bassan score was associated with increased mortality [OR (95% CI) 3.3 (1.9 ; 5.7), p<0.001] and NDI [4.1 (1.7 ; 10.1), p=0.002].

In this collective of very preterm children, the association between the PVHI severity score and mortality may be confounded by the large proportion of children who died after decision of redirection of care. Based on three US characteristics of PVHI, this score predicts neurodevelopmental outcome at 2 years of age. This information could support parental guidance and supportive intervention of affected infants.
IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=5e7bd8a9ac22d2300dc3dfd0cdee74cc-MjAxOS0wNSM1Y2UyNyNjY2ZDNkYjdK

IMAGE / TAB CAPTION: Title
Distribution of outcomes according to the Bassan score.
Legend
GMFCS, Gross Motor Function Classification System.

COI: None declared.
ID: 977

TITLE: RESUSCITATION WITH HYDROGEN GAS FOLLOWED BY HYPOTHERMIA AFTER HYPOXIA-REOXYGENATION IN NEWBORN PIGLETS INHIBITS METALLOPROTEINASE ACTIVITY IN THE BASAL GANGLIA

AUTHORS: Leonid Pankratov 1; Torkil Benterud 1; Ronnaug Solberg 1, 2; Atneosen-Asegg 1; Michail Vorobev 3; Ola Didrik Saugstad 1

AFFILIATIONS: 1 Department of Pediatric Research, University of Oslo and Oslo University Hospital, Rikshospitalet, Oslo, Norway
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3 Institute of Cytology of the Russian Academy of Science, Saint Petersburg, Russia

CONTENT:

Neonatal encephalopathy is a leading cause of disability after perinatal asphyxia. Room air resuscitation and therapeutic hypothermia improve the neurologic outcome in term newborns. Increased activity of matrix metalloproteinases (MMPs) plays a pivotal role in the degradation of neurovascular matrix and the opening of the blood-brain barrier. In experimental animal models, resuscitation with room air (RA) and hydrogen gas (H2) was found to preserve brain tissue from post-hypoxic injury. Our group hypothesized that resuscitation with 2.0 % H2 in RA combined with whole-body hypothermia (HT) would inhibit the activity of MMPs in brain tissue compared with RA resuscitation.

Twenty-six newborn pigs were randomized to undergo severe hypoxia (n=22) or not (Control group, n=4). Animals exposed to hypoxia were further randomized into 3 groups: 1) resuscitation with RA followed by normothermia (RA+NT), 2) resuscitation with H2 followed by normothermia (H2+NT), 3) or resuscitation with H2 followed by HT (H2+HT). The observation period for all groups was 9.5 hours after the end of hypoxia. Tissue samples were snap frozen in liquid nitrogen and then stored at -80°C. In situ zymography was performed to localize MMPs activity in the basal ganglia. The samples were evaluated using a microscope (Axiovert 200M, Carl Zeiss, Germany). Image J was used for analyzing fluorescence in the basal ganglia. Statistical analysis was performed using SPSS Statistics 21.

The net gelatinolytic activity was significantly increased in all intervention groups compared to the control group. RA+NT versus Controls (51.3±10.6 vs. 43.9±10.2, p < 0.0001); H2+NT versus Controls (48.9±10.4 vs. 43.9±10.2, p < 0.05) and H2+HT versus Controls (46.1±5.5 vs. 43.9±10.2, p < 0.05). MMP activity was significantly reduced in 2% H2 resuscitation and NT group in comparison with the RA resuscitation and NT group (48.9±10.4 vs. 51.3±10.6, p < 0.05). Furthermore, there was statistic significance between H2+HT group and RA+NT group (46.1±5.5 vs. 51.3±10.6, p < 0.001). Net gelatinolytic activity did not display significant differences between groups receiving H2 with different temperature regimens.

The activity of matrix metalloproteinases was significantly reduced after resuscitation with 2.0% hydrogen gas and normothermia or in a combination with whole-body hypothermia compared with room air resuscitation and normothermia. Our findings indicate that hydrogen gas may have a protective influence on the basal ganglia after hypoxic-ischemic injury. Whole-body hypothermia could increase the effect of hydrogen gas.

IMAGE / TAB:
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IMAGE / TAB CAPTION: In situ Zymography in Basal Ganglia

COI: I do not have the conflict of interests
ID: 978

**TITLE:** SHORT-TERM MEDICAL OUTCOMES OF PREMATURE INFANTS IN A FAMILY-CENTERED CARE vs. STANDARD CARE IN NEONATAL INTENSIVE CARE UNITS

**AUTHORS:** Agnieszka Basiukajć 1, Piotr Ptak 1, Lucyna Kramer2, Liisa Lehtonen3, Jan Mazela1

**AFFILIATIONS:** 1 Department of Neonatology and Newborn Infectious Diseases, Gynecological-Obstetric University Hospital, Poznan University of Medical Sciences, Poland
2 Department of Computer Science and Statistics, Poznan University of Medical Sciences, Poland
3 Department of Pediatrics, University Hospital, Turku, Finland

**CONTENT:**

In modern technological environment of neonatal intensive care units (NICU), infants are physically and emotionally separated from their parents. Many family-centered (FC) care programs have been introduced to promote parental involvement. There is increasing evidence showing that family-integrated care practices do not only reduce parental anxiety and enhance parent-infant bonding but also have positive effects on clinical and neurodevelopmental outcomes of preterm neonates.

The aim of this retrospective study was to evaluate short-term clinical outcomes of preterm infants hospitalized in FC environment comparing with a standard care (SC) model.

The study population consisted of preterm neonates who were born at less than 32 gestational weeks or birth weight less than 1500 g and hospitalized in in 2017 in two level III NICUs in university hospitals in Turku (Finland) and Poznan (Poland). In Turku close collaboration with parents is established, they are able to stay with their infant 24 hours/day from admission to discharge and are active participants in neonatal care. The NICU in Poznan is a standard open-bay ward with a supportive role of the parents. Patient medical charts were reviewed and data were statistically analyzed.

The study included 131 patients (FC group n=47 vs. SC n=84). The most significant findings included: shorter length of parenteral nutrition in FC group (9.58 vs. 13.06 days; p<0.05), earlier introduction of enteral feeding (1.4 vs. 2.09 day of life; p<0.05), earlier initiation of breastfeeding (32 vs. 34.92 week of postnatal age; p0.05). In FC group gestational age at the end of incubator care was lower (30.76 vs. 33.57 weeks of postnatal age; p<0.05). Skin-to-skin care began remarkably earlier in FC (3.26 vs. 15.69 days; p<0.05) and was more common in the first 4 weeks of life (21.66 vs. 2.72 episodes; p<0.05). The incidence of bronchopulmonary dysplasia, retinopathy of prematurity, necrotizing enterocolitis (NEC), intraventricular hemorrhage (IVH) did not differ in both groups. However, the occurrence of NEC (0 vs. 10.17%) and IVH grade III-IV (0 vs. 8.47%) was lower in FC group.

Parental involvement in neonatal care is beneficial for preterm babies, especially regarding nutritional issues and has potential to improve other short- and long-term outcomes. A multi-centre randomized controlled trial is needed to evaluate feasibility and efficacy of family-integrated care in Poland.

**IMAGE / TAB:**

**IMAGE / TAB CAPTION:**

**COI:** NONE DECLARED
ID: 980
TITLE: PILOT TEST OF A MODULE ON NIRS FOR THE SAFEBOOSC III WEB-BASED TRAINING AND CERTIFICATION PROGRAM
AUTHORS: Mathias Lühr Hansen, 1
Marie Isabel Skov Rasmussen, 2
Gorm Greisen, 3
AFFILIATIONS: Neonatal Intensive Care Unit, Rigshospitalet
Copenhagen, Denmark

CONTENT:
SafeBoosC-III is an international clinical trial, aiming to randomise 1600 extremely preterm infants across twenty countries, to evaluate the effect of treatment based on cerebral near-infrared spectroscopy monitoring (NIRS) versus treatment and monitoring as usual. To ensure high quality of trial data and patient care, we have developed a multilingual online training program, to train relevant staff and test their competence. As we enter an under-explored area of e-learning, we have conducted a pilot study on the first of the five modules comprising the online training program, to test the feasibility of developing such a program on limited resources, for an international trial.

All modules are designed as integrated teaching and test modules and consist of initial learning material followed by a quiz, based on Blooms’ taxonomy. The teaching methodology is case-based and uses immediate detailed feedback. The quiz is designed to recognise prior learning. The piloted module in this study focuses on the principles of NIRS monitoring. One-hundred doctors and nurses from five Neonatal Intensive Care Units across China, Spain and Denmark were invited to participate. Due to limited resources, translation of the module to Chinese and Spanish was done by local staff. Upon completion of the NIRS module, participants were invited to evaluate their experience by completing a survey consisting of close-ended questions with Likert scale responses based on Wang’s principles.

In total 81 of 100 invited staff members entered the training module and completed the online survey. Overall, 57% had prior experience with NIRS monitoring. In Denmark and China, the prevalence of experienced staff was similar (40% and 50%), while 94% of Spanish staff had previous experience. The median time and number of questions for completion was fifteen minutes and seven questions, respectively. Spanish participants were faster than both Danish and Chinese (median 10, 14 and 20 minutes respectively), and used less questions (median 4, 7 and 8 questions). Almost all staff found the academic level of the learning material and quiz appropriate (85% and 93%), as well as agreeing that the module was relevant to prepare them to use the NIRS device (90%). Of those disagreeing on the latter, Spanish staff were strongly represented with 20% compared to 13% of Danish and 6% of Chinese staff.

We provide evidence of the feasibility of developing an online multilingual training program for an international trial, despite challenges such as low budget, language barriers and clinical differences. Exploring the integration of training and certification for international trials, the positive results of this study motivate further developments.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Table 1 - Overview of survey responses stratified by country in %.

COI: None declared
ID: 982
TITLE: HYPOTHERMIA FOLLOWING RESUSCITATION WITH HYDROGEN GAS AFTER HYPOXIA-REOXYGENATION INHIBITS CASPASE-3 EXPRESSION IN PREFRONTAL CORTEX IN A NEWBORN PIG MODEL
AUTHORS: Leonid Pankratov 1; Torkil Benterud 1; Ronnau Solberg 1,2; Moses Paneiakh 3; Ola Didrik Saugstad 1
AFFILIATIONS: 1 Department of Pediatric Research, University of Oslo and Oslo University Hospital, Rikshospitalet, Oslo, Norway
2 Department of Pediatrics, Vestfold Hospital Trust, Tønsberg, Norway
3 Department of Pathology, State Pediatric Medical University, Saint Petersburg, Russia

CONTENT:

Birth asphyxia and hypoxic-ischemic encephalopathy (HIE) are burdens to society worldwide. Moderate therapeutic hypothermia after room air (RA) resuscitation reduces the neurologic sequelae of HIE in term newborns. Caspase-3 is a hallmark of apoptosis in neuronal death. Our research group has shown that caspase-3 mRNA in the corpus striatum is down-regulated after resuscitation with RA. Hydrogen (H2) increased neuronal survival and suppressed Caspase-3 activity in a rat model of neonatal asphyxia. We suggested that resuscitation with 2.0 % H2 in RA combined with whole-body hypothermia (HT) would inhibit the expression of Caspase-3 in the prefrontal cortex compared to with RA resuscitation.

Forty-nine newborn pigs were randomized and subjected to either severe hypoxia (n=43) or normoxia (Control group, n=6). Animals exposed to hypoxia were further randomized into 4 groups: 1) resuscitation with RA followed by normothermia (RA+NT); 2) resuscitation with RA followed by HT (RA+HT); 3) resuscitation with H2 followed by NT (H2+NT); 4) resuscitation with H2 followed by HT (H2+HT). The observation period for groups was 9.5 hours after the end of hypoxia. Paraffin slides of cortex were prepared and cleaved Caspase-3 antibodies (Cell Signaling Technology, UK) for immunohistochemistry. Histoscanner Pannoramic MIDI II and Pannoramic viewer (3DHistech Ltd, Hungary) were used for analysis of Caspase-3 expression in the cortex. Statistical analysis was performed using SPSS Statistics 21.

There was a tendency towards the augmented cellular expression of Caspase-3 positive cells in all groups of hypoxia-exposed animals compared to the control group. Caspase-3 expression was significantly lower in both group receiving 2% H2 resuscitation compared to the RA+NT group (H2+NT: 0.1±0.1 vs. RA+NT: 0.29±0.27, p=0.046) and (H2+NT: 0.07±0.04 vs. RA+NT: 0.29±0.27, p=0.021). There was non-significant towards reduced of Caspase-3 activation in the H2+HT compared with the RA+HT group (0.07±0.04 vs. 0.18±0.17, p=0.057). The analysis of Caspase-3 positive cells did not show significant differences between groups receiving H2 followed by normothermia and hypothermia.

The expression of Caspase-3 positive cells in the cortex was significantly decreased after resuscitation with 2.0% hydrogen gas followed by normothermia or in combination with whole-body hypothermia compared with room air resuscitation and normothermia. Our data indicate that resuscitation with hydrogen gas may have an anti-apoptotic effect in the cortex after severe asphyxia. Whole-body hypothermia could enhance the influence of hydrogen gas.

IMAGE / TAB:
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IMAGE / TAB CAPTION: Expression of Caspase-3 positive cells

COI: I have no conflict of interest
ID: 983

TITLE: DYNAMICS OF CYTOKINE ELABORATION IN THE FIRST THREE DAYS OF LIFE FOR NEWBORNS WITH PREMATURE RUPTURE OF MEMBRANES. NEONATAL CORRELATION

AUTHORS: Gabriela Zaharie 1, Tudor Drugan 2, Carmen Crivii 3, Alexandru Zaharie 4, Monica Hasmasanu 1, Melinda Matyas 1

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4. AKH , Wien, Austria

CONTENT:

Newborns present distinct patterns of cytokine elaboration in different disease states.

ENA-78(epithelial neutrophil activating peptide) is the cytokine most strongly correlated with PMN concentrations in the lung fluids of patients with ARDS.

Tumour Necrosis Factor (TNF), is an inflammatory cytokine produced by macrophages/monocytes during acute inflammation.

IL-10(interleukin-10) is an anti-inflammatory cytokine, with regulatory role in neutrophil influx in the lung during inflammation.

The aim of the study is to evaluate the blood levels of cytokines, in the first three days of life and try to correlate it with neonatal complication.

It is a prospective study on 36 newborn that have had premature rupture of the membranes, in the III-rd level unit, Neonatology I, Cluj Napoca, Romania. We quantified paraclinical parameters in dynamics: the pH, means of oxygen saturation, means of FiO2, WBC and plaquettes in the first and third days of life.

We try to find correlation between the blood levels of TNF, ENA-78 and IL-10 with neonatal pathology developed by the newborn.

Blood levels of cytokines were measured with a specific ELISA according to the manufacturer’s instructions.

Antropometric data is presented in the Tables1 with no differencies for both groups.

Duration of premature rupture of the membrane was 78.40±139.90 hours for the study group.

Paraclinical parameters in dynamics is presented in Tables 2. Ph, oxygen saturation, WBC and plaquettes for the two groups are presented in the Tables 2. WBC and Plaquetts had a significant decreased value in the third day of life. Ph and saturation were improved significantly.

ENA 78 and IL 10 were significant reduced in the 3-rd day in the group with PROM (Tables3).

We evaluated the dynamics of cytokines in the survival compare to dece group. In survival group the decrease of ENA78 and IL 10 was significant. The blood level of ENA78 was significant higher in the first day in survival group(Tables 4).

The highest value of ENA78 was founded in the cerebral hemorrhage and NEC group (Tables 5).

1. Blood cytokines levels are elevated in the newborn with premature rupture of membranes.
2. ENA78 had the highest value in in the fist day of life in the survival group and also in the study group.
3. In survival group the decrease of ENA78 and IL 10 was significant.
4. We find no correlation between the blood levels of cytokines and specific pathology.
5. The highest values of ENA78 were founded in the cerebral hemorrhage and NEC group.
IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=c7c01d67a21a2205a50bf7a80ccbe078-MjAxOS0wNSM1Y2UyNjY2ZDQwYzg1

IMAGE / TAB CAPTION:

COI: None Declared
CONTENT:

Neonatal arterial ischemic stroke (NAIS) is defined as acute symptomatic focal cerebral infarction in an arterial territory between birth and 28 days of life that is confirmed by neuroimaging. NAIS usually involve Median Cerebral Artery (MCA). Occasionally, MCA-NAIS is considered to be massive (M_NAIS). In adults, it is defined as malignant or catastrophic infarcts when the TAC shows a stroke involving more than 50% from the MCA. We questioned if there are massive infarcts in neonates and about the relationship between qualitative findings and the volume of NAIS. Further we examine the clinical presentation and prognosis of patients suffering from a possible M_NAIS.

Prospective observational multicentre study; six paediatric university hospitals in Spain. Forty-five neonates with MCA-NAIS more than 35 weeks gestational age between 2009-2019 were studied. Infants with massive oedema of an hemisphere characterized by missing extraxial space and deviation from the middle line, and/or ventricular collapse uni or bilateral within the 48h from the onset of symptoms were considered to have M_NAIS by MRI (DWI) within six days after delivery. The lesions were segmented with ITK-Snap software to determine their volume. Neurodevelopment was assessed at 24 months using the Bayley-III, Gross Motor Function Classification System (GMFCS), and Bimanual Fine Motor Function (BFMF).

15 neonates had a M_NAIS and 30 a NonM_NAIS. Clinical debut occurred at a median of 18 hours after delivery. All M_NAIS were located significantly in MCA-M1, pre-bifurcation 9/15(60%) vs 3/30 (10%) of neonates with NonM_NAIS. Eight (57%) neonates with M_NAIS showed the absense signal in PLIC and, 13% NonM_NAIS. All M_NAIS had a lesion in optic radiations and, 13/15 (86%) had pre-Wallerian degeneration ( mainly in thalamus) and neonates with NonM_NAIS 14/30 (43%) and 6/30 (20%) respectively; p<0.002. Eight (80%) neonates with M_NAIS develop microcephaly during the first-year vs two (8%) NonM_NAIS; p<0.001. Of 13 infants with M_NAIS, 85% had an adverse outcome. Recurrent seizures, an adverse outcome and cerebral palsy in neonates with M_NAIS vs NonM_NAIS was significant. Median the relative infarct volume (RIV) M_NAIS was 21.99% (10.43, 27.71) vs 5.05% (2.45, 8.46) NonM_NAIS; p=0.002.

In our cohort, neonates with qualitative image criteria of M_NAIS had volume >20% of the hemisphere and these neonates had worse neuroutcome. The characterization of M_NAIS by MRI findings in neonates might be relevant for the prediction of outcome and also to allow for the identification of patients that could benefit from neuroprotective or neuroregenerative strategies.
COI: None declared
ID: 988

TITLE: A Retrospective Review of Endotracheal Tube Fixation Methods in a Tertiary Neonatal Intensive Care Unit

AUTHORS: Lucy E Geraghty 1; Jennifer M Geraghty 2; Deirdre Sweetman 3; John Coveney 4

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CONTENT:

In December 2017 our neonatal intensive care unit (NICU) was obliged to change the fixation device used to secure endotracheal tubes (ETTs) from device A to device B due to a cessation of manufacture of the former. Following this change, NICU staff perceived an increase in unplanned extubations. We hypothesised that the new fixation device may have a role in these unplanned extubations. We undertook a retrospective review comparing unplanned extubation rates in a cohort of patients who were intubated in our NICU with Device A versus Device B. Our primary aim was to determine if the new fixation device was a contributing factor leading to unplanned extubations and emergency re-intubations.

We conducted a retrospective chart review of all patients in our NICU who were intubated over a period of 16 months of April 2017 – August 2018, excluding those intubation events in the month of December 2017 when devices were transitioned. We collected data related to all intubation events over both time periods, including demographical details of patients, data from the time of the actual intubation events and the rate of unplanned extubations. We also sought to clarify the nature and circumstances of these unplanned extubations with a view to improving the quality of care in our NICU.

Our primary outcome measure was self-extubation.

We examined a total of 206 intubation events.
We divided our cohort into 2 groups;
- Group A: Intubated using Device A in the 8 months of April- November 2017 inclusive
- Group B: Intubated using Device B in the 8 months January- August 2018 inclusive.

We discovered a significant difference between self extubation rate in group A (4/99) versus group B (17/85) with a pearson chi-squared value of 9.108 and a p-value = 0.003
Regarding the gender breakdown = See Table B
Outcome breakdown = See Table C
Outcome compared between group A versus group B = Table D
No significant difference was found (chi-squared test p-value = 0.399)- see Bar Chart A
Self extubation Rate in group A versus group B = Table E- see Bar Chart B

An increase in the number of unplanned extubations occurred in the period following the introduction of the new fixation device. This device, while more economical and easier to apply may play a significant role in neonatal unplanned extubations. There is an urgent need to examine the efficacy of available fixation devices for neonates. We plan to continue to audit these devices as their use may be negatively impacting neonatal airway management.

IMAGE / TAB:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=91893f9dbdb47ac40c4dbafbec674d30-MjAxOS0wNSM1Y2UyNyY2ZDQyNjg

IMAGE / TAB CAPTION: Results Tables
COI: None declared
ID: 989

TITLE: THE ROLE OF aEEG RECORDINGS AND BIOMARKERS IN CHILDREN UNDERGOING CARDIAC SURGERY

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CONTENT:

Pediatric patients with congenital heart disease (CHD) are at risk for mortality and poor neurodevelopmental outcomes. The perioperative period might have a negative impact on the process of brain maturation in this population. We aim to utilize intraoperative neuromonitoring with amplitude-integrated electroencephalography (aEEG) in combination with biomarkers of brain damage and oxidative stress (OS) to identify children at risk of adverse neurological outcome following cardiac surgery.

This is a prospective observational study including patients undergoing cardiac surgery during the first six months of life. aEEG recordings were obtained during surgery and both background patterns and electrographic seizure activity (EA) were analyzed. Total seizure burden was also calculated. Serum biomarkers of brain damage such s100B protein and neuron specific enolase (NSE) and urinary OS were measured at baseline and immediately after surgery. Postoperative peak serum lactate was also analyzed.

Patients were divided in groups based on age (neonatal 1 month) and type of surgery (cardiopulmonary bypass (CPB) vs non-CPB).

Forty patients were included (26 neonatal and 14 pediatric). 69,23% of the newborns have abnormal background patterns and the most common intraoperative background pattern in this population was continuous low voltage (34,62%). 57,15% of the pediatric patients have a good prognostic patterns during the surgery. Four pediatric (28,5%) and 9 neonatal (34,6%) patients had EA. Neonatal patients presented with more total seizure burden compared with pediatric patients (p=0.024). Patients undergoing CBP had a higher seizure burden (p=0.008), especially neonatal patients (p=0.045).

Postoperative peak serum lactate was associated with poor aEEG background patterns (p=0.037). Postoperative s100B (p=0.026), lactate (p=0.045) and OS (p=0.027) were higher in patients with electrical crisis. Seizure burden was positively correlated with s100B (rho=0.54; p=0.004) and OS (rho =0.35; p=0.037).

Pediatric heart surgery is associated with a high risk of intraoperative seizures. Neonates present with a higher seizure burden and overall worse aEEG background patterns which suggests greater cerebral vulnerability of these patients. Total intraoperative seizure burden is related to higher levels of biomarkers and OS which may reflect more cerebral injury.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: None declared
ID: 990

TITLE: AUTOPHAGY IN THE HIPPOCAMPUS AFTER SEVERE HYPOXIC-ISCHEMIC ENCEPHALOPATHY IN TERM HUMAN NEONATES

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CONTENT:

Macro(autophagy), an essential physiological degradation process, has been recently demonstrated to be enhanced and importantly involved in neuronal death (by pharmacological or genetical means) occurring in hypoxic/excitotoxic and apoptotic conditions in in vitro and in vivo rodent models. Moreover, autophagy has been shown to be increased in the thalamus and basal ganglia of died human newborns presenting severe hypoxic-ischemic encephalopathy (HIE). The present study examines whether neuronal autophagy is also enhanced and related to neuronal death processes in the hippocampus of asphyxiated human newborns.

Human hippocampal samples were obtained from at least 10 autopsied human newborns selected retrospectively from death reports of the clinic of Neonatology (Lausanne University Hospital, Switzerland) between 2001-2015. The criteria for selection of HIE cases were: gestational age >36 weeks, diagnosis of perinatal asphyxia (Apgar<5 at 5 minutes, arterial pH<7.0 at 1 hour of life and clinical encephalopathy Sarnat III). The brains of 5 HIE and 5 control (comparable gestational age dead from other conditions such as cardiopathy or diaphragmatic hernia) cases were analyzed. Neuronal autophagy was evaluated on histological sections by immunohistochemistry against autophagosomes (LC3) and lysosomal (LAMP1, cathepsins) markers in different hippocampal regions (CA1, CA3 and dendate gyrus (GD)).

Immunohistochemistry against LC3 and quantification of the number of LC3-positive dots per µm² showed that the number of autophagosomes increased significantly in all the hippocampal regions investigated, i.e. GD (by 9.36 fold), CA1 (by 7.24 fold) and CA3 (by 6.3 fold) in HIE compared to control cases. Since enhanced autophagy flux is associated with an increased presence of autolysosomes, which are larger than lysosomes, the number and size of CATHD- or LAMP1-positive dots were analyzed and quantified. The number and size of CATHD- and LAMP1-positive vesicles were significantly increased in the 3 regions investigated (DG, CA1 and CA3) in HIE compared to control cases. All together, these results suggest that, following severe perinatal asphyxia, human hippocampal neurons display an enhanced autophagic flux in HIE cases.

These results suggest for the first time that autophagy is enhanced in severe HIE in dying hippocampal neurons of human newborns, confirming previous observations on thalamus and basal ganglia. HIE-enhanced autophagy appears to be widely involved in all the brain regions affected by perinatal asphyxia and is then an interesting target for the development of future neuroprotective strategies in such conditions.

IMAGE / TAB:

IMAGE / TAB CAPTION:

COI: none declared