ID 170 - HEART FUNCTION IN INFANTS BORN AFTER INTRAUTERINE GROWTH RESTRICTION

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Background:
Intrauterine growth restriction (IUGR) affects cardiac development and later cardiovascular function. We hypothesized that IUGR have impact on the heart function the first days after birth.

Aim:
To assess the impact of IUGR on heart function the first three days after birth in premature and term neonates.

Methods:
In a prospective, observational cohort study of premature and mature neonates with IUGR and a control group with normal prenatal growth and circulation, we carried out serial assessments of systolic and diastolic heart function by echocardiography on day 1, 2 and 3 after birth. For comparisons of heart indices between groups, we adjusted for effects of gestational age (GA), birth weight (BW) and neonatal sex. Since some indexes are dependent on heart size, we adjusted them by dividing by the length of the ventricle septum.

Results:
Mean GA was 34.8 (SD 3.2) vs. 38.6 (2.5) weeks, and BW 1.9 (0.6) vs. 3.2 (0.7) kg in the 28 IUGR neonates and 41 non-IUGR neonates, respectively. Table 1 shows heart function indices in the two groups. Neonates born after IUGR had higher right-heart, left-heart and global excursion of the atrioventricular plane. Contractility in the right lateral wall was higher and diastolic function in the left lateral wall worse following IUGR. Indices related to loading conditions and heart function indices based on cavity measurements did not differ. Heart rate did not differ, mean (SEM) heart rate was 130 (2) vs. 124 (2) /min, p=0.080.

Conclusion:
IUGR neonates exhibited better longitudinal contraction in the left ventricle, right ventricle and globally, higher contractility in the right lateral wall, and worse diastolic function in the left lateral wall first three days after birth. IUGR has impact on heart function first three days after birth.
<table>
<thead>
<tr>
<th></th>
<th>IUGR (n=28)</th>
<th>Non-IUGR (n=41)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indices of contraction (adjusted for heart size)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excursion of the atrioventricular plane (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right-heart</td>
<td>21.3 (0.6)</td>
<td>19.6 (0.5)</td>
<td>0.048</td>
</tr>
<tr>
<td>Left-heart</td>
<td>15.8 (0.4)</td>
<td>14.5 (0.4)</td>
<td>0.048</td>
</tr>
<tr>
<td>Global</td>
<td>19.6 (0.5)</td>
<td>18.1 (0.4)</td>
<td>0.043</td>
</tr>
<tr>
<td><strong>Indices of contractility (adjusted for heart size)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak systolic velocity of the atrioventricular plane (/s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lateral wall</td>
<td>2.16 (0.06)</td>
<td>1.93 (0.05)</td>
<td>0.019</td>
</tr>
<tr>
<td>Left lateral wall</td>
<td>1.25 (0.05)</td>
<td>1.20 (0.04)</td>
<td>0.897</td>
</tr>
<tr>
<td>Global</td>
<td>1.55 (0.04)</td>
<td>1.47 (0.03)</td>
<td>0.116</td>
</tr>
<tr>
<td><strong>Indices of diastolic function</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E/e'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lateral wall</td>
<td>7.0 (0.3)</td>
<td>7.9 (0.3)</td>
<td>0.077</td>
</tr>
<tr>
<td>Left lateral wall</td>
<td>17.1 (1.1)</td>
<td>11.0 (0.9)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Indices of loading condition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial Performance Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lateral wall</td>
<td>0.67 (0.04)</td>
<td>0.64 (0.03)</td>
<td>0.629</td>
</tr>
<tr>
<td>Left lateral wall</td>
<td>0.80 (0.03)</td>
<td>0.74 (0.20)</td>
<td>0.158</td>
</tr>
<tr>
<td><strong>Indices of heart function based on changes in ventricle cavities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fractional area change (Right Ventricle, %) and Shortening Fraction (Left Ventricle, %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right ventricle</td>
<td>26.2 (2.4)</td>
<td>25.4 (1.8)</td>
<td>0.807</td>
</tr>
<tr>
<td>Left ventricle</td>
<td>32.6 (0.9)</td>
<td>31.6 (0.8)</td>
<td>0.469</td>
</tr>
</tbody>
</table>

Heart function indices. Values are estimated marginal means (SEM) for repeated measurements at day 1, 2 and 3 by use of average GA and BW (37 weeks and 2.7 kg)

None declared
ID 236 - EARLY CEREBRAL AUTOREGULATION IN NEONATES WITH CONGENITAL HEART DISEASE

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¹University Medical Center Groningen, Groningen, Netherlands

BACKGROUND:
Delayed brain development in neonates with congenital heart disease (CHD) could lead to impaired cerebral autoregulation (CAR). CAR ensures constant cerebral blood flow despite varying cerebral perfusion pressures. Disturbed CAR may contribute to adverse neurodevelopmental outcomes (NDO). We retrospectively investigated which percentage of time neonates with CHD display disturbed CAR (%dCAR) in the first 72 hours after birth. Secondary outcomes were clinical factors that may influence CAR, NDO, and survival.

METHODS:
We calculated correlation coefficients (cc) between cerebral tissue oxygenation (rcSO2) and mean arterial blood pressure (MABP) for 2 hours per day. Disturbed CAR was defined as a cc of > 0.3. We assessed the effect on %dCAR of clinical parameters (type of CHD, inotropes, ventilatory support, and PCO2). Lastly, we assessed a correlation between %dCAR with signs of ischemia/hypoxia on transcranial ultrasound, NDO (Ages and Stages Questionnaire, Child Behavior Checklist), and mortality.

RESULTS:
We included 57 neonates, of which 15 participated in the prospective analysis of NDO. We found %dCAR during 9.3% of the time on day 1 and 4.6% on day 3. Neonates receiving inotropes and/or invasive ventilation had significantly more %dCAR and a lower MABP on day 1 (inotropes OR 19.5, p < 0.001; ventilation OR 5.1, p = 0.03). On day 3, inotropes remained significantly related with %dCAR and MABP. Neonates with transposition of the great arteries (TGA) had significantly more %dCAR. We did not find an association between %dCAR and the other outcome variables.

CONCLUSION:
Neonates with CHD display disturbed CAR during 9.3% of the time during day 1 after birth. %dCAR is significantly related with inotropes, invasive ventilation and TGA. More research is needed to further evaluate this relation between inotropes and TGA and %dCAR, and whether NDO may be affected, using more sensitive tests in a larger population. A distinction should be made between a truly dysfunctional CAR and a MABP below the lower autoregulatory threshold.
None declared
Background:
Various cardiovascular drugs have been used for the treatment of arterial hypotension in critically ill neonates. Nevertheless, there is a paucity of comparative studies of the drugs as a whole.

Methods:
We conducted this systematic review and pairwise meta-analysis of the anti-hypotensive treatments that have been used in neonates in order to evaluate their efficiency and impact on outcome. Electronic databases (Pubmed, Scopus, Cochrane Library) were searched up to February 2021 for potentially relevant articles using pre-defined search strategies. As an extension of the current approach for study-selection, a new method that aims to screen fast and with an excellent accuracy using modern text mining filtering techniques was adopted. We included randomized controlled trials (RCT) investigating the effect of inotropes/pressors/volume therapy and corticosteroids (adjunctive regimen) in hypotensive preterm and term neonates. We extracted data on trial characteristics, participants and outcomes. The primary outcome was the response to treatment while secondary outcomes included neonatal mortality and morbidity.

Results:
19 RCTs involving 736 neonates (gestational age 28.6±1.82 weeks], birthweight (1101±358 g) and 8 treatments were included in the meta-analysis. Most studies involved subjects with early hypotension (1.3±1.4 day of life) associated with prematurity. Pairwise meta-analysis among treatments showed that dopamine was more effective than dobutamine regarding the response to treatment (restoration of hypotension) (7 trials, 286 neonates, odds ratio [OR], 2.64 [95% CI, 1.35 to 5.17]). Comparisons of other treatments were not significant. Moreover, no differences were found among the regimens regarding survival and other secondary outcomes. The overall quality of the evidence per GRADE was moderate to very low, depending on the outcome and comparison.

Conclusion:
In this systematic review and pairwise meta-analysis, only the comparison of dopamine vs. dobutamine provided evidence for effectiveness of treatment, and in favor of dopamine. No safe conclusions could be reached with respect to other treatments due to restricted number of RCTs and heterogeneity among them. This fact warrants the need for future well-designed studies, so that to determine the optimal management of neonatal hypotension in terms of drug selection, underlying disease and maturation.

None
ID 150 - Agreement of Cardiac Output Estimates between Electrical Cardiometry and Transthoracic Echocardiography in Very Preterm Infants

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1INFANT Research Centre, University College Cork, Cork, Ireland, 2Department of Paediatrics & Child Health, University College Cork, Cork, Ireland

Background:
Electrical cardiometry (EC) allows continuous non-invasive objective monitoring of cardiac output (CO) parameters. These include heart rate, estimation of stroke volume (SV), and, by calculation, cardiac output (CO). Our primary aim was to evaluate the agreement of EC with transthoracic echocardiography (TTE) to determine left ventricular (LV) output parameters indexed to body weight (stroke index: SI and cardiac index: CI) in very low gestational age (VLGA) preterm infants within the first two postnatal days.

Methods:
In this prospective observational study at a tertiary neonatal unit we enrolled preterm infants <32 weeks GA after parental informed consent. Exclusion criteria included major congenital anomalies including congenital heart defects (except Patent ductus arteriosus or inter-atrial shunting) and refusal of parental informed consent. The duration of monitoring was up to 48 hours of life. All participants underwent continuous EC (ICON, Osypka Medical) and simultaneous TTE (Vivid, GE) was performed twice within the first 48 hours. TTE measurements were performed offline, blinded to clinical and EC parameters within a 10s timeframe using beat-to-beat EC data. The main outcome parameter calculated was %error of LV output and the pre-defined cut-off for acceptable agreement was set to 42%. Secondary outcome parameters included bias, %bias, limits of agreement and right ventricular (RV) output.

Results:
Thirty-five infants (median (IQR) gestational age 28+6 (24+5 to 30+4) weeks + days, birth weight 890g (723g to 1335g)) were included in the study. Forty-four pairwise LV output measurements met EC signal quality and TTE image quality criteria in 24 participants. The %error was 53% for LV-SI and 54% for LV-CI (see table 1 for results for LV and RV parameters). Whereas the bias was found to be smaller in RV output estimates compared to LV measurements, unacceptable high %error was identified.

Conclusions:
Estimation of cardiac output indices using EC is not interchangeable to TTE in VLGA infants within the first 2 days postnatally. There is a need to adopt and to improve EC algorithms as well as to ultimately derive technology specific reference ranges.

Funding: Supported by Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) Project number 420536451
Study registration: Clinical Trials NCT04538079
Table 1: Results for Agreement of Cardiac Parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of patients /paired measurements</th>
<th>mean bias (m)</th>
<th>standard deviation (SD)</th>
<th>limits of agreement m ± 1.96*SD</th>
<th>p-value</th>
<th>%bias</th>
<th>%error</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV</td>
<td>24 / 44</td>
<td>0.32</td>
<td>0.33</td>
<td>-0.33 to 0.97</td>
<td>&lt;.001</td>
<td>26</td>
<td>53</td>
</tr>
<tr>
<td>SI</td>
<td></td>
<td>-0.14</td>
<td>0.56</td>
<td>-1.23 to 0.95</td>
<td>.238</td>
<td>-9</td>
<td>74</td>
</tr>
<tr>
<td>CI</td>
<td></td>
<td>-28.2</td>
<td>90.8</td>
<td>-206.2 to 149.8</td>
<td>.152</td>
<td>-12</td>
<td>78</td>
</tr>
<tr>
<td>RV</td>
<td>19 / 34</td>
<td>-0.07</td>
<td>0.56</td>
<td>-1.23 to 0.95</td>
<td>.238</td>
<td>-9</td>
<td>74</td>
</tr>
<tr>
<td>SI</td>
<td></td>
<td>-0.14</td>
<td>0.56</td>
<td>-1.23 to 0.95</td>
<td>.238</td>
<td>-9</td>
<td>74</td>
</tr>
<tr>
<td>CI</td>
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<td>-28.2</td>
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<td>.152</td>
<td>-12</td>
<td>78</td>
</tr>
</tbody>
</table>

L/RV left/right ventricular, SI stroke volume and CI cardiac output indexed to bodyweight, 1 from random effects model. p<0.05 indicates that mean bias is significantly different to 0.

Osypka Medical (Germany/USA) provided one ICON monitor free of charge. CES received a research scholarship by Deutsche Forschungsgemeinschaft (DFG, German Research Foundation, Project number 420536451).
ID 571 - EVALUATION OF THE DIFFERENT TRANSCUTANEOUS BILIRUBINOMETERS Bilicare™ AND MBJ20® IN NEWBORN JAUNDICE

Doctor Merve Kucukoglu Keser¹, Professor Doctor Evrim Alyamaç Dizdar, Doctor Esra Beşer, Doctor Esin Okman, Professor Doctor Fatma Nur Sarı

¹Ankara City Hospital, Ankara, Turkey

Background:
Transcutaneous bilirubin (TcB) measurement is frequently used in the screening of indirect hyperbiliru-
binemia. In this study, we aimed to compare the TcB values measured by different bilirubinometers in neo-
ates with jaundice.

Methods:
Neonates ≥35 gestational weeks admitted to outpatient clinic with jaundice were included in the study. De-
mographic characteristics and serum total bilirubin (TSB) levels of the patients were recorded. Transcutane-
ous bilirubin were measured at the scaphoid fossa of the ear using BiliCare™ device and at sternum with the
MBJ20® device.

Results:
Totally, 88 infants were included in the study. The median gestational weeks was 38 (37-39) weeks and the
mean birthweight was 3108 ± 490 gr. Mean TcB values measured with the BiliCare™ device was 12.9 ± 2.9
mg/dL while the mean TcB values measured with the MBJ20® device was 14.6 ± 2.8 mg/dL. STB values were
measured as an average of 14.4 ± 2.9 mg/dL. TcB values showed a significant correlation with TSB values (r =
0.772; r = 0.756, p <0.001, respectively). The mean difference between TcB and TSB was 0.124 ± 1.96 mg/dL
for MBJ20® and -1.54 ± 1.94 mg/dL for BiliCare™. The values measured with the MBJ20® device were found
to be more correlated with TSB. When the TSB value was below 14 mg/dL, the values measured with the
BiliCare™ device was found to be more correlated than the values measured above 14 mg/dL.

Conclusion:
TcB measurements provide comfort both for babies and healthcare professionals. It is a practical and inex-
pensive tool for the first evaluation of jaundice. Measurements by MBJ20 bilirubinometer correlate closely
with TSB levels.

None declared
Background:
The screening of critical congenital heart defects by arterial oxygen saturation is a non-invasive strategy that allows detecting the presence of complex and severe heart disease; which would be potentially fatal without timely treatment, medical or surgical, during the neonatal age.
Since 2018 in a fourth-level clinic located in the city of Medellín (1,495 m above sea level), the screening strategy for CCC with pulse oximetry was implemented in healthy newborns. So, this study was designed to describe the results of this strategy and the relationship between the investigation and the results of the echocardiography test as confirmatory of cardiac anatomy.

Objective:
To describe results of the pulse oximetry screening test for critical congenital heart defects in healthy newborns at term or near term over 35 weeks, in a third level of complexity institution from March to August 2018, who were screening at 12-24 hours of age

Methods:
A descriptive and retrospective study was performed based on the review of clinical records.

Results:
866 patients were included, with 50.9% of the male population, and 91.9% of pregnant women lived in urban area. The median gestational age was 38 weeks, and 93% patients had adequate weight for gestational age. Heart murmur was heard in 1.6% (14/866) patients. The first screening test was positive in 20.9% (181) patients. 85% patients underwent a second screening, 56 remained positive, there were 2 cases with moderate pulmonary hypertension and 12 were admitted for a non-cardiac cause, the main reason being risk of sepsis (table). 77 echocardiography were performed, and it was not detected any case of critical congenital heart disease. The most common alterations were foramen ovale and patent ductus arteriosus. No patient died during the hospital stay.

Conclusions:
Most of the neonates presented a negative screening before 18 hours of life; in a lower percentage, screening allowed to detect hypoxemia secondary to a minor cardiac cause or a non-cardiac cause.
Table. Results of the first and second screenings.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>First Screening</th>
<th>Second Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=866</td>
<td>n=155</td>
</tr>
<tr>
<td><strong>Negative Screening (n) (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>685 (79,1)</td>
<td>99 (63,9)</td>
</tr>
<tr>
<td>Female</td>
<td>350 (40,4)</td>
<td>46 (29,7)</td>
</tr>
<tr>
<td><strong>Time of screening (n) (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12 hours</td>
<td>120 (13,9)</td>
<td>NA</td>
</tr>
<tr>
<td>12-18 hours</td>
<td>336 (38,8)</td>
<td>NA</td>
</tr>
<tr>
<td>&gt;18 hours</td>
<td>229 (26,4)</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Positive Screening (n) (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>181 (20,9)</td>
<td>56 (36,1)</td>
</tr>
<tr>
<td>Female</td>
<td>91 (10,5)</td>
<td>31 (20)</td>
</tr>
<tr>
<td><strong>Time of screening (n) (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12 hours</td>
<td>39 (4,5)</td>
<td>NA</td>
</tr>
<tr>
<td>12-18 hours</td>
<td>98 (11,3)</td>
<td>NA</td>
</tr>
<tr>
<td>&gt;18 hours</td>
<td>44 (5,1)</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Not done (n) (%)</strong></td>
<td>NA</td>
<td>26 (16,8)*</td>
</tr>
</tbody>
</table>

NA: not applicable

* 26 patients who had a first positive screening did not undergo the second, because they had some other indication for performing postnatal echocardiography, such as prenatal cardiac ultrasound abnormalities, a first-degree family history with a critical congenital heart defect (CCC), or had a heart murmur at birth. These patients had findings such as patent ductus arteriosus and patent foramen ovale, but no CCC

None declared
ID 148 - COMPARISON OF POST NATAL CARDIAC FUNCTION BETWEEN GROWTH RESTRICTED AND APPROPRIATE FOR GESTATIONAL AGE TERM NEWBORN

Doctor Simona Puzone1, Doctor Elisabetta Caredda1, Doctor Umberto Pugliese2, Doctor Francesca Galdo1, Doctor Giuseppina Campana1, Doctor Francesca Gicchino1, Mr Marco Averga1, Mrs Anna Esposito1, Mrs Anna Capuano1, Professor Carlo Capristo1, Phd Paolo Montaldo1,2

1University Of Campania Luigi Vanvitelli, Naples, Italy, 2Division of Brain Sciences, Centre for Perinatal Neuroscience, Imperial College London, London, UK

Background:
Intrauterine Growth Restriction (IUGR) is responsible of chronic intrauterine hypoxia, which in turn can affect prenatal hemodynamics, thus causing structural and functional changes of circulation.

Only few studies examined the early signs of cardiovascular disturbances in IUGR newborns, limiting the possibility for a prompt identification and prevention.

Methods.
In this prospective case-control study 105 IUGR term infants and 105 age/gender-matched controls were recruited.

The echocardiographic assessment was performed at 6, 24, 48 and 72 hours of age using GE Logiq 7 (General Electric, USA) with 3-9 MHz transducer. Left Ventricular Cardiac Output (LVCO), Right Ventricular Cardiac Output (RVCO) and superior vena cava (SVC) flow were calculated.

Results
The SVC flow at 6 and 24 hours after birth were significantly higher in IUGR than in the control infants (134±61 ml/kg/min versus 89±30, 6 hours p=0.02; 115±39 ml/kg/min versus 80±31 ml/kg/min, 24 hours p=0.0001). LVCO was significantly lower in IUGR than in control infants at 6 and 24 hours after birth (188±88 ml/kg/min versus 245±49 ml/kg/min, 6 hours p=0.03; 192±62 ml/kg/min versus 251±40 ml/kg/min at 24 hours, p=0.004).

Conclusion
Our study shows that IUGR infants had a high SVC flow, which may reflect an increased cerebral oxygen delivery in order to preserve brain blood flow. LVCO was significantly lower at 6 and 24 hours of life in IUGR infants versus control group.

These data suggest that chronic intrauterine hypoxia and prenatal haemodynamic disturbances may cause functional changes in circulation of IUGR infants, which persist postnatally and lead to a preferential redistribution of blood flow to the brain. This pattern of altered brain blood flow may suggest a higher vulnerability in the brain growth and later neurodevelopment in IUGR neonates.

Table 1. Echocardiography and Doppler measurements in IUGR and control neonates at the different time points.

<table>
<thead>
<tr>
<th></th>
<th>6 hours</th>
<th>24 hours</th>
<th>48 hours</th>
<th>72 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Controls</td>
<td>IUGR</td>
<td>Controls</td>
<td>IUGR</td>
</tr>
<tr>
<td>SVC (ml/kg/min)</td>
<td>89(30)</td>
<td>134(61)</td>
<td>0.02</td>
<td>80(31)</td>
</tr>
<tr>
<td>LVCO (ml/kg/min)</td>
<td>245(40)</td>
<td>188(98)</td>
<td>0.03</td>
<td>251(40)</td>
</tr>
<tr>
<td>RVCO (ml/kg/min)</td>
<td>212(76)</td>
<td>207(85)</td>
<td>0.06</td>
<td>232(78)</td>
</tr>
<tr>
<td>Presence of patent ductus arteriosus</td>
<td>94(89)</td>
<td>97(92)</td>
<td>0.63</td>
<td>49(47)</td>
</tr>
</tbody>
</table>

Table 1. Echocardiography and Doppler measurements in IUGR and control neonates at the different time points.

none declared
ID 166 - UTILITY OF CORD BLOOD DIRECT COOMBS TESTING (CB-DCT) IN INFANTS BORN TO RHEUSUS-NEGATIVE MOTHERS IN THE PREDICTION OF SIGNIFICANT HYPERBILIRUBINAEMIA REQUIRING PHOTOTHERAPY

Doctor Niamh Conlon¹, Mr John O'Loughlin¹, Professor Naomi McCallion¹
¹Rotunda Hospital, Dublin, Ireland

BACKGROUND:
Historically, protocols in maternity units worldwide have included collection of cord blood for CB-DCT and blood grouping in all infants born to Rhesus-negative mothers. The aim of this practice is to identify infants at risk of Haemolytic Disease of the Newborn (HDN). However, the introduction of routine antenatal anti-D prophylaxis (RAADP) has led to a significant number of false positive results and previous research has found positive DCT to be poorly predictive of subsequent hyperbilirubinaemia. Currently all babies born to Rhesus-negative mothers in our unit undergo cord blood sampling for infant blood grouping and DCT. This study aims to investigate the utility of this practice in the identification and management of neonatal hyperbilirubinaemia.

METHODS:
Retrospective chart review of all babies born to Rhesus-negative mothers over a 10 month period (January – October 2020). Hospital In-Patient Enquiry (HIPE) data relating to phototherapy and laboratory reports recording RAADP administration were also reviewed. Primary outcome was predictive value of positive CB-DCT for hyperbilirubinaemia requiring phototherapy.

RESULTS:
Incidence of positive CB-DCT was 10% (93/933). Six CB-DCT-positive babies required phototherapy (6/93, 6.4%); 3 of whom were premature (gestation less than 37 weeks). Antenatal diagnosis of HDN prompted premature delivery in 2 cases. Laboratory notification of positive-CB-DCT result prompted serum bilirubin (SBR) measurement in 3 of the 4 remaining cases with one initial SBR plotting above phototherapy threshold. The incidence of phototherapy amongst CB-DCT-negative babies was 4.3% (36/840; 53% were premature). No babies required an exchange transfusion in addition to phototherapy. Median age at commencement of phototherapy for CB-DCT positive vs CB-DCT negative babies was 13hrs (range 0-77hrs) and 41hrs (range 8-179hrs), respectively.

CONCLUSION:
The positive predictive value (PPV) of a positive CB-DCT for requirement of phototherapy in infants born to Rhesus-negative mothers who received RAADP in pregnancy is 6.4%. This cohort represents only 1.4% of all infants requiring phototherapy during this period. Our data supports previous research indicating low PPV of CB-DCT in the prediction of significant neonatal hyperbilirubinaemia and the need to move towards focused cord blood testing based on the presence of maternal immune, indirect antibody test (IAT) reactive cell antibody, in line with international guidance.

None declared
ID 98 - SUBGALEAL HAEMORRHAGE IN A NEONATE AS THE FIRST MANIFESTATION OF FACTOR XIII DEFICIENCY

Doctor Emmanuel Samonakis¹, Doctor Emmanouil Chatzakis¹, Doctor Maria Tsirigotaki¹, Doctor Maria Poly-chronaki¹, Doctor Georgios Ntoulios¹, Doctor Marina Koropouli¹
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Background:
Subgaleal haemorrhage (SGH) is an accumulation of blood within the subgaleal space, between the galea aponeurotica and the periosteum, which often occurs as a complication of vacuum assisted delivery. On the other hand, factor XIII deficiency is a hereditary bleeding disorder associated with considerable morbidity and mortality, mainly manifesting as umbilical cord bleeding in the neonatal period.

Case report:
We describe the case of a term male infant, born by vacuum-assisted vaginal delivery, who was admitted to neonatal intensive care unit at 40 hours of life with severe anemia secondary to SGH. Routine coagulation screening tests were within normal range and he was supported successfully with packed red blood cell transfusion. During recovery, the infant was stable without further signs of bleeding and was discharged after 5 days of observation. Two days post discharge he was readmitted due to severe umbilical cord bleeding unresponsive to haemostatic gelatin sponge and surgical suture. Due to high suspicion of underlying coagulopathy, factor levels were obtained and revealed low Factor XIII activity (4.9%) confirming factor FXIII deficiency. A single dose of fresh frozen plasma was administered with cessation of any bleeding events and he was scheduled to receive FXIII concentrate monthly. Parents were further investigated and heterozygous carrier status was confirmed for both. Their common origin from a small rural region predisposes to increased risk of autosomal recessive mutations.

Conclusion:
FXIII deficiency manifested with SGH is an unusual event and, to our knowledge, this is the first documented case in the neonatal period. Although rare, factor XIII deficiency can present in early life with a spectrum of manifestations including severe bleeding commonly from the umbilical cord and rarely from other sites. Early diagnosis is crucial in order to prevent bleeding consequences, including a life-threatening intracranial haemorrhage, reported in about 30%. We suggest a higher rate of suspicion in cases of SGH because the normality of the routine coagulation tests does not rule out the diagnosis of FXIII deficiency.
Background.
The severe course of neonatal shock is one of the main factors contributing to damage to the central nervous system, the formation of infantile cerebral palsy, and in some cases can be fatal. Despite the advances in diagnostics achieved recently with the use of functional echocardiography and other methods, at present, the possibilities for predicting the development of shock in newborns are sharply limited. The aim of the study was to determine the concentration of β-arrestin-2 in preterm infants on the 1st day of life with arterial hypotension.

Methods.
We examined 82 preterm infants (weight <1500 grams, gestational age <32 weeks), which were divided into groups depending on the presence of arterial hypotension: Group I – 32 preterm infants with arterial hypotension; Group II – 50 preterm infants without arterial hypotension. Determination of the concentration of β-arrestin-2 in the blood serum was carried out by the enzyme immunoassay.

Results.
The concentration of β-arrestin-2 in the 1st day of life in preterm infants of the I group was 0.884 [0.736; 1.022] ng / ml; in the second – 0.679 [0.517; 0.972] ng / ml (p=0.004). The concentration of β-arrestin-2 on the 1st day of life of preterm infants of group I (with arterial hypotension) did not statistically differ between subgroups with different gestational age (p>0.05). The concentration of β-arrestin-2 significantly correlated with FiO2 max during respiratory support in the delivery room (r=0.449; p=0.003); NEOMOD score at 1 day of life (r=0.562; p<0.001); MAP (r=0.405; p=0.007); the assessment of the pain level according to the EDIN6 scale (r=0.441; p=0.006). It is possible that increased expression of β-arrestin-2 proteins during the development of neonatal shock in preterm infants is associated with primary damage to cardiomyocytes with subsequent degradation of their cell membranes, which leads to the progression of hemodynamic disorders and secondary damage to the myocardium with further formation of a vicious circle.

Conclusion.
Revealed significant differences in the concentration of β-arrestin-2 in preterm infants with and without arterial hypotension on the 1st day of life. Further research is required in this direction. Andreev A.V. receives financial support from the Russian Foundation for Basic Research within the framework of research project №19-315-90074.
ID 257 - THE EFFECT OF INSULIN-LIKE PROTEINS ON THE FORMATION OF EARLY ANEMIA IN PREMATURE INFANTS

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RELEVANCE
Nursing children born prematurely is one of the primary goals of modern medicine. In this group of newborns, the perinatal period is complicated by various pathologies, one of which is early anemia of prematurity. Many studies are devoted to the study of indicators that affect the state of erythropoiesis of newborns, including insulin-like proteins. Insulin-like growth factor-1 (IGF-1) has receptors in progenitors and in mature red blood cells. It stimulates the proliferation and differentiation of progenitor cells. The aim of our study was to evaluate the role of insulin-like growth factor-1 (IGF-1) and theprotein-3, which binds insulin-like growth factor (IGFBP-3) in the formation of early anemia in premature infants.

MATERIALS
A total of 129 newborns with a birth weight of less than 1500 g and a gestational age of 24-33 weeks were examined. The content of IGF-1 and IGFBP-3 in venous blood on 3-5 days day of life was determined. Two groups were formed: group I - 89 newborns diagnosed with early anemia of prematurity and group II - 26 newborns without anemia.

RESULTS
The rate of early anemia in preterm infants in our study was 77.3 %. In the group of children with early anemia of preterm infants, the content of IGF-1 was significantly lower than in the group of children without anemia, p=0.04. Also, the indicators of IGFBP-3 were lower in the I group of children, compared with the II group of children, p=0.0001.

A method for predicting early anemia in preterm infants has been developed, based on the study of IGFBP-3 ≤ 0.766 mcg/ml, early anemia in preterm infants is predicted with an accuracy of 83.6%; sensitivity – 90.4%; specificity-60.0%. Patent № 2699657 Method for predicting the risk of early anemia in premature infants.

CONCLUSIONS
It was found that the low content of IGF-1 and IGFBP-3 in the venous blood of premature newborns on 3-5 days of life is associated with the development of early anemia in premature infants. If the content of IGFBP-3 ≤ 0.766 mcg/ml on 3-5 days of life, the formation of early anemia in premature infants is predicted.
ID 333 - SURVEY ON THE IMPACT OF VIRTUAL REGIONAL ‘SHARED LEARNING’ SESSIONS IN NEONATAL CARDIOLOGY

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In memory of Dr Shree Vishna Rasiah (1971-2020), an inspirational colleague

BACKGROUND

Neonatologist-performed echocardiography is a useful tool for managing sick neonates and those with congenital heart disease and rhythm abnormalities. With the recognition of the need for peer review of echocardiograms and shared learning, a virtual platform in the West Midlands Region was launched to enable this learning. All neonatal units were invited to lead the sessions on a rotational basis. These sessions were inspired by the late Dr. Visha Rasiah who was very passionate about teaching echocardiography skills. We performed a survey to assess the impact of these sessions on the participants’ learning and identify areas of improvement.

METHODS

The hour-long sessions commenced on a fortnightly basis in June 2020 via virtual platforms. Participants included neonatologists, paediatricians and junior doctors in paediatrics with cardiology interest. The discussions included clinical cases with echocardiograms, radiographs and/or electrocardiograms and best practice topics like management of neonatal hypotension, PDA etc. Learning points were shared on the shared WhatsApp group. We conducted an online survey in January-February 2021, using a questionnaire, which included mixed MCQ [scale 1(poor)-5(excellent)] and free text.

RESULTS

Of the 25 responses, 56% were neonatologists, 12% paediatricians and 28% paediatric trainees/fellows. Their experience varied greatly from performing none up to 50 echocardiograms a month. All participants rated the educational value of sessions 4 (very good) and 5 (excellent). The impact of the sessions on professional development was rated by participants as 4 and 5 by 95% for ‘improving cardiology knowledge’, 71% for ‘improving echocardiography skill knowledge’ and 79% for ‘improving diagnostic ability’. This educational platform was rated 4/5 by 77% of the raters as ‘motivational for seniors teaching juniors’ and 96% for ‘networking with colleagues’. The free text suggestions included more sessions on echocardiogram images and focused views. Suggested topics included rhythm abnormalities, morphology correlation and maintaining the balance between rare and common conditions. All participants wanted case-based discussions to continue.

CONCLUSION

This virtual platform for shared learning has been fed back positively as an opportunity to acquire further knowledge and skills in neonatal cardiology, allow peer review and enable networking.

None declared
Background:
Arterial catheterization is frequently performed in neonatal intensive care units with an inherent risk of peripheral ischemic injury, especially in preterm infants. The treatment options following vascular damage involve invasive and non-invasive modalities. The primary objective of this systematic review was to evaluate the evidence of the use of topical nitroglycerine (TNG) either alone or as adjunctive therapy and develop an approach to the treatment of catheter induced ischemia in infants. Figure(1)

Methods:
A comprehensive search was conducted of available databases for relevant articles that involved the treatment of peripheral tissue ischemia in neonates with the use of TNG. Citations were restricted to human subjects.

Results:
One hundred and four articles were identified, and twenty-seven case reports and case series were compatible with the inclusion and exclusion criteria. Sixty-eight infants out of the 76 published cases (89%) experienced a favorable outcome and 79% (n=60) demonstrated complete recovery with the topical application of TNG to the ischemic site.

Conclusion:
TNG is a favorable option for the treatment of peripheral ischemia after standard conservative measures have failed. However, due to the absence of robust evidence for this therapeutic modality, there are no uniform guidelines regarding the frequency, duration, and safety of TNG use. Planning the management of peripheral ischemia in neonates with TNG should be a multidisciplinary decision that includes close surveillance of blood pressure, methemoglobin levels, and follow up cranial ultrasound.

Fig. An approach to the treatment of peripheral ischemia in infants with topical nitroglycerine

Clinical signs of peripheral ischemia following catheter insertion:
- Cold, pale, poorly perfused extremities
- Poor/absent regional pulses
- Blanched, mottled skin
- Peripheral cyanosis
- Early signs of skin necrosis

Doctor Rafat Mosalli, Professor Bosco Paes
1Umm Alqura University, Makkah, Saudi Arabia, 2International medical center, Jeddah, Saudi Arabia
Topical nitroglycerine ointment or patch (0.1-2.5mg/kg/day). Use spray if ointment/patch not available (0.4 mg/spray) at a dose of 2 mg/kg/day until ischemic changes resolve. Observe the following:
- Frequent heart rate and blood pressure monitoring
- Daily methemoglobin level, platelet count
- Baseline cranial ultrasound and then weekly based on gestational age.

Referral to tertiary care service. Multidisciplinary team decision should be made to use anticoagulation or thrombolysis for occlusive, progressive vessel thrombus after evaluating the benefits versus harm due to the potential risk of intraventricular hemorrhage in preterm neonates. Early surgical referral for assessment and subsequent treatment of progressive, unresponsive, ischemia.
ID 390 - CONTINUOUS MONITORING OF THE MICROCIRCULATION USING DYNAMIC LIGHT SCATTERING TECHNOLOGY IN INFANTS

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BACKGROUND
The microcirculation holds valuable information on the condition of a patient and the impact of treatment strategies. Currently, continuous monitoring of the microcirculation is not possible, limiting clinical decision making primarily to macrocirculatory parameters. Using the miniaturized dynamic light scattering (DLS) sensor technology, this study investigated the ability of the DLS sensor to continuously monitor the skin microcirculation and the relation to the macrocirculation.

METHODS
In this prospective observational cohort study stable infants with a gestational age (GA) above 26 weeks and electrocardiography (ECG) heart rate monitoring, admitted to a NICU, were eligible for inclusion. Measurements were performed with a DLS sensor (Elfi-Tech Ltd., Rehovot, Israel) placed sequentially at the forehead, thorax, abdomen and upper and lower extremities. Stable measurements were included for analyses. The total blood flow (TBF) and relative blood velocity (RBV) parameters were compared between measurement locations. RBV was related to ECG heart rate, GA at the time of measurement and the measurement locations using a linear mixed model. Bradycardic events were associated with changes in the relative hemodynamic indexes (relHIs), which indicate the distribution of blood flow in the microcirculatory blood vessels.

RESULTS
A total of 31 infants with a GA of 30 3/7 (27 4/7 – 31 6/7) weeks at measurements were included for analyses. TBF measurements at the forehead were significantly lower when compared to measurements at other locations. Significant relations were found between RBV and the heart rate, GA at the time of measurement and the measurement location. With an increasing GA at the time of measurement the RBV showed an increase with low and high heart rates. RelHIs showed earlier changes of bradycardia than the ECG heart rate, the median (IQR) change was reported 22.0 (13.5 – 27.0) s before the onset of bradycardia. When compared to a period without bradycardia, the standard deviation of the relHIs were significantly higher during a bradycardic event.

CONCLUSION
This study shows the feasibility of the DLS technology for non-invasive and continuous monitoring of the microcirculation. This technology enables measurement of currently unavailable parameters such as TBF, RBV and relHIs, allowing early detection of hemodynamic events.

Dr. Fine is the CEO of Elfi-Tech Ltd. and holds several patents on the investigated technology. The other authors have no conflict of interest to declare.
ID 513 - REDUCTION IN BLOOD SAMPLING IN EXTREMELY LOW BIRTHWEIGHT INFANTS IN THE NEONATAL INTENSIVE CARE UNIT BETWEEN 2010 AND 2020

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Background:
Blood sampling in critically unwell neonates can account for up to 60% of their total blood volume. Samples are often done ‘routinely’ to guide ventilatory and electrolyte management. Over the last decade, our unit has noted an increased use of early non-invasive ventilation and a reduction in overall ventilator days. We also now follow a strict policy of performing only ‘essential’ blood tests to reduce blood loss and stress to babies. We wanted to see if these changes were paralleled with a reduction in blood sampling for laboratory testing analysis.

Methods:
Retrospective collection of data on the 25 smallest extremely low birth weight babies (ELBW) in 2010 and 2020 using the hospital and laboratory information systems to identify when these babies had blood sampling for laboratory testing.

Results:
The median birth weight of babies was 740g vs 615g, 2010 vs 2020, p<.001). Median gestation 27+4 vs 25+2 weeks, 2010 vs 2020, p =.005). The median length of neonatal stay was also longer in 2010 (61 vs 41 days) but this was not significant (p=.168).

The frequency of laboratory sampling decreased in the 2020 cohort compared to the 2010 cohort. This difference was most significant in the first week of admission to the neonatal unit, when the 2010 cohort underwent an average of 3.4 tests per baby per day vs 1.6 tests in 2020. The mean blood volume drawn per day in the first week was 1ml vs 0.5ml (2010 vs 2020). The mean blood volume drawn per day in the neonatal unit overall was 0.4ml vs 0.2ml. Using the median NICU length of stay for each time period volumes taken were 22ml vs 7.5ml (2010 vs 2020).

Conclusion:
There was a clinically and statistically significant reduction in the frequency of blood sampling for laboratory testing in EBLW infants in our NICU between 2010 and 2020. Despite being smaller and more premature babies in the later cohort had less samples taken. Removing ‘routine’ sampling for babies and replacing with a targeted lower frequency and volume approach has been effective in our neonatal unit.

None declared
ID 531 - PERINATAL MANAGEMENT OF CONGENITAL COMPLETE ATRIOVENTRICULAR BLOCK. EXPERIENCE IN A TERTIARY CENTER
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BACKGROUND
Complete congenital atrioventricular block (CCAVB) is a rare disorder. It is considered a high risk congenital heart disease because it is associated with an increased risk of perinatal mortality and morbidity. These patients may require immediate delivery room (DR) intervention. Although risk stratification for the delivery of fetuses with congenital heart disease has been reported, there are limited data about delivery room and early neonatal period management of these patients.

METHODS
We reviewed perinatal management of 14 newborns with CCAVB born between 2009-2020. Fetal and neonatal data collection were analyzed, including delivery room and neonatal intensive care management.

RESULTS
85.7% (12/14) of the patients were diagnosed in utero and born in our institution. 10 cases were isolated (90% secondary to maternal autoantibodies) and 4 were associated with congenital heart disease (CHD). 55.5% (5/9) of pregnant women with immune CCAVB were asymptomatic. Median gestational age (GA) at fetal diagnosis was 20.7 weeks (IQR 20-25.7). Median ventricular rate in utero was 51.5 bpm (IQR 50-65). 55.5% of mothers received dexamethasone during pregnancy. 4/10 cases of isolated AVB developed hemodynamic compromise in fetal echocardiography. The median delivery was 36 weeks GA (IQR 34.7-37.5) and birth weight of 2475 gr (IQR 2200-2880 gr), with a prematurity rate of 64.2%. Caesarean rate of 92.8%. Median heart rates at birth was 47.5 bpm (IQR 45-65). DR management: 14.2% (2/14) of babies needed ventilation (IPPV), 7.1% (1/14) needed intubation and 14.2% needed intubation and hemodynamic stabilization with temporary pacing and medical chronotrope. Stabilization in the first 24 hours of life: 28.5% needed invasive mechanical ventilation, 35.6% needed inotropics, one patient (7%) needed ECMO procedure and 28.4% of babies needed pacemaker. Neonatal admission: 64.3% (9/14) needed pacemaker implantation with a median age of 8 days of life (IQR 0-9). There was only one death (preterm baby with complex CHD).

CONCLUSION
CCAVB is a high risk congenital heart disease. These patients may require immediate, multidisciplinary and specialized DR and neonatal interventions such as pacing or ECMO procedure. Specialized level of care is essential in order to improved the survival of these babies.
None declared
Background
Complete congenital atrioventricular block (CCAVB) is a rare disorder. It may occur in isolation (90% due to the transplacental passage of maternal anti-Ro/SSA and/or anti-La/SSB auto-antibodies) or in the context of a congenital heart disease (CHD). These patients require close and multidisciplinary follow-up due to CCAVB holds a significantly different prognosis with an increased risk of mortality and morbidity.

Methods:
We reviewed the outcome of 14 newborns with CCAVB admitted and followed up at our hospital between 2009 and 2020.

Results:
12/14 (85.7%) patients were diagnosed in utero and born in our hospital. 10 cases were isolated (90% secondary to maternal autoantibodies) and 4 were associated with CHD. 64.2% were preterm babies. In the first 24 hours of life, 6 patients (42.8%) needed hemodynamic stabilization including inotropic treatment, ECMO or pacemaker implantation. During neonatal admission, 9 patients (64.3%) needed pacemaker implantation, with a median age of 8 days of life (IQR 0-9) and there were only one death (preterm baby with CHD). After neonatal period, all patients (92.3%) needed pacemaker except one who is currently 6 months of age. 5 patients (38.4%) developed dilated cardiomyopathy and 2 patients (15.3%) needed cardiac transplantation (at 3 and 6 months of age). 3 patients (23%) have developed neurological morbidity: 2 severe psychomotor retardation and 1 patient with cerebral ischemic stroke. 2 patients (15.4%) still need respiratory support at home (both with CHD). 2 patients (15.4%) died secondary to arrhythmia and sudden death (at 3 and 8 years old).

Conclusion
CCAVB is a high risk congenital heart disease. Perinatal management and pacemaker implantation have improved outcome of CCAVB. However, there is still a high risk of mortality and morbidity, and these patients require a multidisciplinary and specialized follow-up.

none declared