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Antimicrobial Prophylaxis Administration in relation to umbilical cord clamping and the risk of Surgical Site Infection: cohort data at a tertiary health center

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INTRODUCTION: Administration of Surgical Antimicrobial Prophylaxis in CS before incision is supported by majority of guidelines, for prevention of Surgical Site Infections. There are potential concerns about pre-delivery use of antibiotics, as one of the factors that might impact microbiota of the newborns, with potential to influence childhood disease.

MATERIAL AND METHODS: Our aim was to estimate the additional risk of SSI if SAP is given before incision, during CS. This is an ongoing one center, randomized controlled study. We prospectively collected data from patients who delivered by CS, March 2021- February 2022. Patients were given SAP, randomized in two groups: SAP before incision vs. after cord clamping, ACOG guideline. Patients were evaluated on site before discharge, and were assessed by phone interview one month after the procedure. Co-variables as possible risk factors for SSI: age, BMI, ASA score of comorbidity, emergency or elective CS and duration of surgery. Main Outcome Measure was Surgical Site Snfection, classified according to the CDC criteria as either superficial, deep incisional or organ tissue space, served as the primary outcome studied. Statistical analyzes was performed by means of adjusted OR, chi-square test and LR. Significance level was set at < 0.05.

Results: Out of the 329 patients who underwent CS, 224 patients met the inclusion criteria. SAP before incision in 107(47%) and after clamping in 117(52%) patients. Overall 30(13%) SSIs were documented, of which 16(53%) before incision and 14(46%) after clamping. SAP administration after clamping was not significantly associated with an increased SSI rate compared to before incision (OR 0.69, CI 0.18 - 2.6, p=0. 59). Age (OR 1.58, p 0.5) and BMI (OR 1.31, p 0.69) were not found to statistically increase infection rates. Emergency CS and ASA score of 1 or higher increased risk of infection 5 fold and 4.5 fold respectively. Despite the high Odd Ratio of SSI, both were not statistically significant (p0.08; p 0.2). The logistic regression analyzes showed no increased risk of SSI after cord clamping.

Conclusion: There is no increased risk of SSI, if Surgical Antibiotic Prophylaxis is given after umbilical cord clamping.

none declared

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MORTALITY PREDICTION IN OUTBORN INFANTS-SEARCHING FOR THE BEST PREDICTIVE MODEL

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INTRODUCTION. Neonatal transportation of high-risk newborns represents a major predictor of outcome. Early recognition of sick neonates, stabilization before transportation and specialized medical teams can lead to timely intervention and better outcomes. Nevertheless, an ideal scoring system that can accurately predict mortality in outborn neonates has not been established yet. The aim of this study was to develop a reliable score that is fast, accurate, and easy to perform and can predict neonatal mortality in outborn neonates.

MATERIAL AND METHODS. The study included all outborn neonates (n=418) admitted by transfer in a level III regional neonatal unit between January 2015 and December 2021 excluding infants with congenital critical abnormalities (n=15). Medical records were used to collect neonatal characteristics, sick neonatal score (SNS), and time between delivery and admission (AT). These parameters were tested for their association with mortality. A new score called MSNS-AT was developed using gestational age (GA), birth weight (BW,) and AT to improve mortality prediction. The primary outcome of the study was the prediction of all-cause mortality. Univariable and multivariable analysis were conducted.

RESULTS. Out of the 418 infants included, 217 (53.8%) infants were born prematurely, and 20 (4.96%) neonates died before discharge. The non-survivors had lower GA, BW, and SNS scores compared to the survivors ($p < 0.05$). Time to admission was associated with an increased mortality rate in both the whole group and preterm infants ($p < 0.05$). The MSNS-AT score cutoff value of $\leq$ 10 was more precise in predicting mortality than the SNS score (AUC 0.735 vs. 0.775) in the entire group and the preterm infants group (AUC 0.885 vs. 0.810), respectively.

CONCLUSIONS. The MSNS-AT score significantly improved mortality prediction at admission compared to the SNS score, demonstrating its superiority in identifying high-risk neonates who require urgent intervention. These findings suggest that AT is a crucial factor in determining the outcomes of outborn infants. The MSNS-AT score is a fast, accurate, non-invasive, and easy-to-use method that can help healthcare professionals predict mortality in outborn neonates with high precision.

None declared

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ANTENATAL RISK STRATIFICATION FOR EXCHANGE TRANSFUSIONS IN HEMOLYTIC DISEASE OF THE FETUS AND NEWBORN: A NATIONAL OBSERVATIONAL STUDY

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Introduction:
Neonates with hemolytic disease of the fetus and newborn (HDFN) may require exchange transfusions (ET) for severe hyperbilirubinemia. We aimed to evaluate if ET could be predicted antenatally using the maximum maternal titer and antibody-dependent cellular-cytotoxicity (ADCC) tests.

Material and Methods:
We performed a multicenter, retrospective, observational cohort study in the Netherlands including data from patients for whom an ET product was ordered between 2011 and 2021. To quantify the risk of an ET, we collected data on the maximum maternal serology tests for cases with an ET for non-ABO HDFN used as numerator, and from all alloimmunized pregnancies used as denominator. Current and past ET use in the Netherlands was assessed through a questionnaire for pediatricians.

Results:
Twenty-four centers participated in this study. These centers ordered a total of 1564 out of t1824 (84%) products. We identified 627 patients for whom an exchange transfusion product was ordered. Of these, 111 (17.7%) neonates received an ET for non-ABO HDFN. Rates of ET increased from 0.9% (5/558) when maximum titers were ≤1:32 to 17.2% (25/151) if titers were 1:256. Rates of ET in D-mediated HDFN increased from 1.1% (9/823) if the maximum ADCC was <50% to 17.9% (69/386) if the ADCC was ≥50%. National questionnaire data shows a 56.1% decline in the number of non-NICU hospitals that perform ET compared to before 2010 from 83.7% (41/49) to 36.7% (18/49).

Conclusions:
Antenatal maternal titers and ADCC tests may be used to determine the postnatal risk for an exchange transfusion in neonates with HDFN and guide caregivers to anticipate severe hyperbilirubinemia and determine the optimal place of birth. Reductions in ET frequency have led to an altered treatment landscape, with fewer hospitals performing this invasive procedure.
Derek. P. de Winter, PhD-program funded by Momenta Pharmaceuticals, Inc., which was acquired by Johnson & Johnson, and is an investigator for a phase 2 trial (NCT03842189) of a new drug for the treatment of HDFN. E.J.T. (Joanne) Verweij is the principal investigator for a phase 2 trial

(NCT03842189) of a new drug for the treatment of HDFN, which is sponsored by Janssen Pharmaceuticals. Enrico Lopriore is a sub-investigator for a phase 2 trial (NCT03842189) of a new drug for the treatment of HDFN, which is sponsored by Janssen Pharmaceuticals.

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THE ROLE OF VESTIBULAR SYSTEM IN PRETERM INFANTS: A COMPREHENSIVE NARRATIVE REVIEW

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Introduction: The development of vestibular sensitivity, the second sensory system to emerge during pregnancy, is crucial for the fetus's sensory growth. It relies on movement to ensure proper maturation, essential for spatial orientation and balance. The vestibular nuclei establish complex connections throughout the brain and contribute to the development of other sensory sensitivities. Understanding the impact of vestibular stimulation is important for preterm infants, as it enables the implementation of interventions that can positively influence their developmental trajectory. This narrative review aims to answer two questions: 1) what is the impact of vestibular stimulation on the development of preterm infants, and 2) which interventions can the healthcare team effectively integrate into their daily clinical routines?

Methods: A narrative review was conducted to identify articles that explore the link between vestibular stimulation and the development of preterm infants, as well as relevant interventions that can stimulate the vestibular system in the daily clinical practice of healthcare professionals.

Results: The autonomic, motor, state, and attention subsystems of the preterm infant, as described by Als in 1982, are significantly influenced by vestibular stimulation. Connections from the vestibular nuclei to various brain regions are crucial for respiratory and cardiac function, evidenced by a decrease in apnea and bradycardia rates when preterm infants are rocked. Motor skills are also enhanced through vestibular stimuli, which strengthen connections to the cerebellum and oculomotor pathways, essential for posture and limb coordination. Connections between vestibular nuclei and brain structures related to sleep regulation also promote sleep quality in preterm infants, with rhythmic oscillations and skin-to-skin care extending sleep duration—a key factor in neurodevelopmental outcomes. Lastly, the vestibular system supports attention subsystem by favoring the vestibulo-ocular reflex, essential for maintaining a stable gaze and potentially contributing to increased smiling and engagement during rocking and hammock use in preterm infants.

Conclusion: The development of the vestibular system in the preterm infant is intricate, involving many neural pathways and functions. Interventions such as rocking and skin-to-skin contact either by parents or caregivers, in addition to educating parents on the importance of mobilizing their infants should be encouraged in the NICU.
None declared

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UNVEILING THE HIDDEN PATHWAYS: EXPLORING THE ROLE OF UMBILICAL CORD BLOOD AUTOPHAGY IN NEONATAL MORTALITY AND MORBIDITIES

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Introduction:
Autophagy, a highly regulated cellular process, plays a critical role in maintaining cellular homeostasis by degrading and recycling damaged organelles and proteins. Dysregulation of autophagy has been implicated in various pathological conditions, including neonatal morbidities and mortality. Despite its importance, the role of autophagy in umbilical cord blood and its impact on neonatal outcomes remain poorly understood. This study aims to fill this gap by investigating the relationship between umbilical cord blood autophagy, specifically assessed through Beclin-1 levels, and various neonatal outcomes.

Material and Methods:
This prospective observational cohort study included 47 premature infants recruited from different hospitals. Maternal and neonatal characteristics were recorded, including gestational diabetes, gestational hypertension, and other relevant factors. Umbilical cord blood samples were collected at birth and analyzed for Beclin-1 levels using western blot analysis. Protein isolation techniques were employed to extract Beclin-1 from the cord blood samples, followed by quantitative analysis to determine its levels. Statistical analyses were performed to compare Beclin-1 levels among different patient groups and to assess associations with neonatal morbidities and mortality.

Results:
The study found that Beclin-1 levels in umbilical cord blood did not significantly differ between infants born to mothers with and without gestational diabetes or hypertension. However, infants diagnosed with respiratory distress syndrome (RDS) and hemodynamically significant patent ductus arteriosus (hsPDA) exhibited significantly lower Beclin-1 levels compared to those without these morbidities. Furthermore, infants who experienced mortality or adverse composite outcomes demonstrated significantly reduced Beclin-1 levels, indicating a potential association between impaired autophagy and adverse neonatal outcomes.

Conclusion:

Neonatal Morbidities and Mortality		Beclin-1/β-Actin *	p-value
RDS	Positive (n=28)	0,68 ± 0,69	**0,02**
	Negative (n=19)	1.05 ± 0.67	
hsPDA	Positive (n=11)	0.48 ± 0.46	**0,01**
	Negative (n=33)	0.99 ± 0.74	
IVH* (>Stage 2)	Positive (n=7)	0,45 (0,14-1,27)	0,52
	Negative (n=40)	0,64 (0,01-2,93)	
PVL	Positive (n=1)	0,14	N/A
	Negative (n=40)	1.62 ± 2.12	
Early sepsis*	Positive (n=13)	0.64 ± 0.57	0,09
	Negative (n=31)	0.95 ± 0.76	
Late sepsis*	Positive (n=7)	0,32 (0,06-2,11)	0,14
	Negative (n=35)	0,87 (0,01-2,93)	
NEC* (>Stage 2)	Positive (n=4)	0,55 (0,06-0,71)	0,36
	Negative (n=39)	0,82 (0,01-2,91)	
BPD* (Medium-heavy)	Positive (n=5)	0,64 (0,14-1,13)	0,51
	Negative (n=35)	0,82 (0,01-2,93)	
ROP (Requiring treatment)	Positive (n=3)	0,64 (0,18-0,71)	N/A
	Negative (n=37)	0,87 (0,01-2,93)	
Mortality	Positive (n=9)	0.40 ± 0.22	**0,04**
	Negative (n=38)	0.93 ± 0.74	
Composite outcome	Positive (n=19)	0.58 ± 0.42	**0,04**
	Negative (n=28)	1.00 ± 0.80	

* Values are given as mean±standard deviation. ** Value given in median (minimum, maximum). Mann-Whitney U test was applied. # RDS: Respiratory distress syndrome, hsPDA: hemodynamically significant patent ductus arteriosus, IVH: Intraventricular hemorrhage, PVL: Periventricular leukomalacia, NEC: Necrotizing enterocolitis, BPD: Bronchopulmonary dysplasia, ROP: Retinopathy of prematurity ## Composite outcome: IVC (>stage 2), hemodynamically significant PDA, surgical NEC, cystic PVL, any of the moderate-to-severe BPD and/or mortality.

This study provides valuable insights into the relationship between umbilical cord blood autophagy, as indicated by Beclin-1 levels, and neonatal outcomes. While no significant differences were observed based on maternal conditions, lower autophagy levels were associated with specific neonatal morbidities and increased mortality risk. These findings highlight the potential importance of autophagy in neonatal health and underscore the need for further research to elucidate its mechanisms and potential therapeutic interventions. Understanding the role of autophagy in neonatal morbidities is essential for developing targeted strategies to improve neonatal outcomes and reduce mortality rates.

None declared

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ROUTINE INTRA-TRACHEAL ADMINISTRATION OF BUDESONIDE (B)/SURFACTANT (S) TO PREVENT BRONCHOPULMONARY DYSPLASIA (BPD) IN VLBW INFANT: A Double-Blind Trial

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Introduction: Surfactant can be used as an effective vehicle for budesonide delivery in preterm with severe RDS Whether this therapy could be routinely applied to infant who failed to NCPAP shortly after birth(<4 hrs) is not known.

Methods and Materials: Entry criteria: 1) BW<1500 g and GA: <32 wks, 2) required intubation at birth or failure to NCPAP within 4 hrs after birth, defined as any one of the followings, a) FIO2>0.3 with CPAP pressure > 5 cmH2O b) severe retraction, c) apnea, d) PCO2 > 60 mmHg. Exclusion criteria: 1) lethal cardiopulmonary status or 2) severe congenital anomalies. The incidence of BPD or death (primary outcome) among the infant enrolled was about 60% based on Taiwan NN. We expected that following S/B therapy, the primary outcome will decrease to 40 %, allowing for a 5% type I error and 10 % for type II error, 139 in each group would be needed; 160 in each group would be a safe target for each group. . A randomized number, stratified by BW, hospital, was made for assignment to control group (C) (Poractant alfa + saline) or to budesonide treated group (T) (poractant alfa + budesonide). C vs T Gr, 1st dose : (S 200 mg or 2.5 ml/kg +saline1.0 ml/kg) vs (S 200 mg or 2.5 ml/kg + B 0.25 mg or 1.0 ml/kg), 2nd dose, (S 100 mg or 1.25 ml/kg + saline 1.0 ml/kg) vs (S 100 mg or 1.25 ml/kg + B 0.25 mg or 1.0 ml/kg), 3rd dose (S 80 mg or 1.0 ml/kg +0.6 ml saline/kg) vs (S 80 mg or 1.0 ml/kg +B 0.15 mg or 0.6 ml/kg) The dose was given q.12.hr,for a maximum of 3 doses unless the infant was extubated. Ten tertiary NICUs participated the study. Double blind vial was designed by an independent pharmaceutical company and statistician.

Results

	BPD/death	BPD	Death	IMV duration (d)	O2 duration (d)
C (153)	96	83	14	22.9±39.6	34.1±27.2
T (157)	66	52	13	14.3±19.8	25.6±24.5
p	<0.001	<0.001	--	0.024	0.004

Infant in the T gr. was associated with 1) elevated BP (syst. dist. and mean) on d 2 to d 7 and 2) transient high glucose on d-7, 3) less incidence of IVH and ROP 4) less payment for initial hospitalization.
Follow up Studies at 2 -3 Yrs Corrected age:
209 infants (85% of survivals)were followed for physical growth, neurological exams and Bailey test(III)—no significant difference between the groups in socioeconomic background, in BW, Length and head circumference. In neuro-examins and in hearing and visual exams. Treated group

tended to have higher motor and cognitive scales than the control group, particularly in infants with birth wt. <750 gram and with BPD.

Conclusions: Early intra-tracheal curosurf/budesonide significantly reduce BPD/death and BPD and associated with lower IVH and ROP. This therapy is cost-effective and cost-beneficial. The total dosage of corticosteroid was much lower than that of the dosage given by systemic or inhaled administration. Budesonide can be used as an adjunct therapy to surfactant in preterm infant with RDS. (Clin Trial NCT03275415)(Supported by Chiesi Farmarceutici S.p.A.)