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Abstracts

Selected Abstracts of the 12th International Congress of UENPS

EVERYDAY PRACTICAL CHALLENGES IN NEONATOLOGY

KRAKOW (POLAND) · SEPTEMBER 2ND-4TH, 2022

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ABS 1

OUTCOMES OF DIAPHRAGMATIC HERNIA PATIENTS WITH AND WITHOUT FETOSCOPIC ENDOLUMINAL TRACHEAL OCCLUSION (FETO) – A SINGLE-CENTRE RETROSPECTIVE STUDY

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INTRODUCTION
Congenital diaphragmatic hernia (CDH) is one of the most severe birth defects. CDH causes pulmonary hypoplasia and pulmonary hypertension, which result in high neonatal mortality. The aim of this study was to assess the differences in outcomes between neonates with CDH who underwent a fetoscopic endoluminal tracheal occlusion (FETO) procedure versus those who did not.
MATERIAL AND METHODS
A retrospective study was conducted among patients with CDH treated in the Department of Neonatology and Rare Diseases, Medical University of Warsaw, between the years of 2019 and 2022. Data was collected, among others, on the following: gestational age at birth, type of CDH, surgeries, implantation of prosthetic patches, duration of mechanical ventilation, mortality and age at the time of death, if applicable.
RESULTS
We included 96 neonates, 37 preterm and 59 born at term. Median gestational age was 37 weeks. Among the patients, 29 had previously undergone FETO. Seventy-seven patients underwent surgery, including all the children who had previously undergone FETO.
FETO procedure increased the risk of preterm delivery, OR = 2.22 (95% CI: 1.19-3.26). Premature newborns were 5 times more likely to require a prosthetic patch during surgery ($p < 0.001$, OR = 5.2). All of the FETO patients needed prosthetic patches. Patients that needed prosthetic patches had a significantly increased risk of death, OR = 6.91.
Neither the mortality rate nor the duration of mechanical ventilation differed significantly between the groups.
CONCLUSIONS
Multiple studies have suggested that FETO patients have a higher risk of preterm birth compared with non-FETO patients with CDH. Our study seems to reinforce that conclusion, as we observed that FETO patients were at a 2 times greater risk of preterm birth compared with patients who did not undergo the procedure. There were no significant differences between the 2 groups in either mortality rate or duration of mechanical ventilation, showing no clear benefit of conducting the FETO procedure. FETO patients also had an increased risk of requiring a prosthetic patch, which correlated with a high risk of death. In conclusion, our study shows that the FETO procedure, despite its broad use, is not without downsides, which should be considered by physicians making therapeutic decisions.

ABS 2

PROTECTIVE EFFECTS OF CAPSAICIN ON IBOTENATE-INDUCED NEONATAL EXCITOTOXIC BRAIN DAMAGE AND NEUROINFLAMMATION

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INTRODUCTION
Although the pathophysiology of perinatal brain injury (PBI) is complex, excitotoxicity and neuroinflammation come into prominence as common mechanisms causing damage. Capsaicin, which has anti-inflammatory properties, shows its effects by activating TRPV1 receptors, which are widely expressed throughout the body. Therefore, we aimed to investigate the effects of different doses of capsaicin on brain damage, brain mast cells (BMCs) and neuroinflammatory biomarkers in an ibotenate-induced excitotoxic brain injury model in newborn rats.
MATERIAL AND METHODS
P5 Wistar-rats (both sexes) were divided into 8 groups (n = 6 for histopathological examinations, n = 7 for biochemical analyses): naive control, sham-control, ibotenate, ibo+DMSO, ibo+Caps-1, ibo+Caps-2, ibo+Caps-3 and ibo+MK-801 (positive-control). Excitotoxic brain injury was induced by intracerebral injection of glutamatergic agonist ibotenate (10

μg). Groups received intraperitoneally, except for naive control, PBS, 0.1% DMSO, 0.2, 1 and 5 mg/kg cloxyquin and 1 mg/kg MK-801 (NMDA-receptor antagonist) respectively, 30 minutes before ibotenate injection (vehicle for sham-control). Rats were sacrificed after 5 days for histopathological examinations, and after 1 day for biochemical analyses. In coronal brain sections, cortex thickness from the outer layer of the parietal cortex to the depth where axons are located, thickness of white matter in layer with the following axons, and the cysts in the white matter were measured; moreover, BMCs in the sections were evaluated for number and activation. Activin-A, IL-1β , IL-6 and IL-10 levels in brain homogenates were measured using ELISA. Data were compared by one-way ANOVA.

RESULTS

In the ibotenate-induced model group, cortex and white matter thicknesses decreased and white matter lesions occurred, number and activation of BMCs were increased, as well as levels of activin-A, IL-1β and IL-6 in brain tissue were increased ($p < 0.01$), without changing IL-10 level ($p > 0.05$). Capsaicin pretreatment dose-dependently increased the reduced cortex and white matter thickness ($p < 0.05$). It also reduced lesion size, and number and activation of BMCs ($p < 0.05$). It also decreased the increased levels of activin-A, IL-1β and IL-6 in brain tissue ($p < 0.05$). MK-801 prevented all ibotenate-induced changes ($p < 0.01$).

CONCLUSIONS

Capsaicin prevents cortex and white matter damage caused by excitotoxicity, as well as neuroinflammation involving mast cells and inflammatory cytokines. These findings suggest that capsaicin may be a promising therapeutic agent against PBI.

ACKOWLEDGEMENT

Grant-number: 2019.08.23.1433(BAIBU-BAP).

ABS 3

ADJUVANT THERAPY WITH A FRAGMENT OF RECOMBINANT SURFACTANT PROTEIN D IMPROVES LUNG COMPLIANCE AND REDUCES LEVELS OF PRO-INFLAMMATORY CYTOKINES IN VENTILATED PRETERM LAMBS

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INTRODUCTION

Exogenous surfactant therapy has reduced mortality in preterm infants suffering respiratory distress syndrome (RDS); however, bronchopulmonary dysplasia (BPD) still affects up to 40% of infants born < 30 weeks of gestational age, with inflammation playing a key role in the development of BPD. Surfactant protein D (SP-D) has several immunomodulatory functions in the lung. We employed a preterm lamb model of ventilator-associated lung injury to test the hypothesis that a recombinant fragment SP-D (rfhSP-D) is a safe adjuvant to current exogenous surfactant therapy whilst reducing inflammation and may therefore have therapeutic potential in preterm infants.

METHODS

The study was funded by MRC; the University of Western Australia Animal Ethical Committee granted approval. 16 preterm lambs delivered by caesarean section at the gestational age of 124 days. 16 lambs were mechanically ventilated to keep blood gases within preset parameters and received endotracheal surfactant at 10 minutes. Lambs were randomised to either intratracheal (IT) rfhSP-D or control (IT 0.9% saline). Treatment with 24 mg of rfhSP-D or 0.9% saline was administered at 20, 140 and 260 minutes. Lambs were euthanised at 300 minutes. Physiological parameters were measured, and PCR was used to analyse the expression of IL-1β, IL-6, IL-8 and TNF-α.

RESULTS

Intratracheal administration of 24 mg (8 mg/kg) rfhSP-D improved compliance of lungs (ml/H_2O) when compared to the control group ($p = 0.03$). The IT rfhSP-D treated group required lower peak inspiratory pressure requirements compared to the control group. In addition to improved physiological parameters, there was decreased inflammatory cell infiltrate, and the expression of IL-1β and IL-6 was significantly lower in the IT rfhSP-D group ($p = 0.007$ and $p = 0.01$, respectively).

CONCLUSION

IT rfhSP-D in preterm lambs does not affect the action of standard surfactant therapy but is likely to complement it, as seen by the improved lung compliance in the rfhSP-D treated group (**Fig. 1**). rfhSP-D has anti-inflammatory activity, as demonstrated by decreased inflammatory cell recruitment and lower expression of pro-inflammatory cytokines such as IL-6 and IL-1β in the treated group. These results support the use of this rfhSP-D as a therapy in preterm infants at risk of BPD.

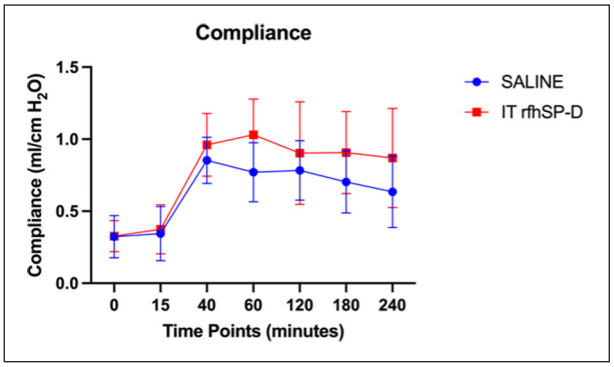

Figure 1 (ABS 3). Lung compliance in ventilated preterm lambs was greater in preterm ventilated lambs treated with exogenous surfactant at 10 minutes followed by 24 mg of recombinant fragment of surfactant protein D (rfhSP-D) administered at 20, 140 and 260 minutes.

ABS 4

DERMAL BILIRUBIN IN CAUCASIAN NEWBORN INFANTS WITHIN THE FIRST 4 DAYS OF LIFE

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INTRODUCTION

Early identification of infants with significant hyperbilirubinemia and their appropriate follow-up are crucial in preventing acute bilirubin encephalopathy and kernicterus spectrum disorders. Transcutaneous bilirubin (TcB) measurements have been proven accurate in jaundice monitoring, reducing unnecessary blood samplings. The type of bilirubinometer, measurement site, and infant's race and postnatal age have to be considered when interpreting TcB results. Data on dermal bilirubin measured by a commonly used JM-105 device in European neonates are missing. The aim of the study was to describe TcB concentrations in Caucasian neonates within the first 96 hours of life.

MATERIAL AND METHODS

The study group included 301 healthy Caucasian newborn infants with gestational ages of 36-41 weeks and birthweights of 2,100-4,630 g. There were 2,977 TcB measurements on the sternum and 2,981 measurements on the forehead performed using the JM-105 bilirubinometer. A total of 25 (8.3%) infants required subsequent phototherapy.

RESULTS

Plots were constructed to show the trends of dermal bilirubin levels over time. The differences between TcB values obtained from the sternum and the forehead gradually increase with increasing postnatal age. TcB profiles of infants who required phototherapy belong to the highest part of the plot, which stands for the high-risk zone to predict significant hyperbilirubinemia (**Fig. 1**).

CONCLUSIONS

TcB plots both for the sternum and forehead of Caucasian newborn infants within the first 4 days of life were developed using the widely used bilirubinometer. Hour-specific bilirubin nomograms are essential for the early identification of infants at risk of bilirubin-induced brain damage. It is necessary to construct the bilirubin concentration curves for homogenous racial population groups using particular noninvasive bilirubinometers.

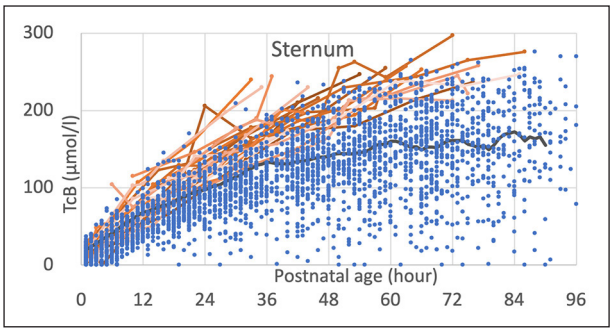

Figure 1 (ABS 4). Dermal bilirubin plot of transcutaneous bilirubin (TcB) concentrations measured on the sternum of Caucasian neonates during the first 4 days of life. The red curves represent profiles of individuals with subsequent phototherapy, the gray curve represents a 6-hour moving average.

ABS 5

PREDICTORS OF ABNORMAL NEUROIMAGING RESULTS IN NEWBORNS WITH CONGENITAL CMV INFECTION (cCMV)

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INTRODUCTION

Neuroimaging is an important part of clinical evaluation in congenital cytomegalovirus infection

(cCMV). An abnormal MRI proves a brain involvement, but this is not a first-line diagnostic tool. There is limited data on the associations between single nucleotide polymorphisms (SNPs) in genes involving the first-line defense mechanism and the risk of brain damage during cCMV.

We aimed to investigate clinical, laboratory, and genetic (SNPs) predictors of abnormal neuroimaging (MRI) in cCMV.

MATERIAL AND METHODS

Neonates with cCMV (positive CMV PCR in urine < 21st day of life) underwent physical, ophthalmologic and hearing evaluation, neuroimaging, viral load measurements, and SNPs genotyping (IL1Brs16944, IL12Brs3212227, IL28Brs12979860, CL2rs1024611, DC-SIGNrs735240, TLR2rs5743708, TLR4rs4986791, TLR9rs352140). A logistic regression analysis was performed.

RESULTS

A total of 153 neonates (GA: 37 ± 2 weeks, BW: 2,714 ± 755 g) with cCMV and the available MRI results (73.9% – abnormal) were analyzed. Abnormal MRI findings, including white matter abnormalities, ventriculomegaly, cystic lesions, calcifications, cortical malformations, and delayed myelinization, were observed in 101 (89.4%), 63 (55.8%), 45 (39.8%), 25 (22.1%), 24 (21.2%) and 23 (20.4%) neonates, respectively. The significant predictors of abnormal MRI are presented in **Tab. 1**. Positive PCR in cerebrospinal fluid has a 100% positive predictive value but a very low negative predictive value (20%).

The results of SNPs were available for 92 participants. The SNP of IL1Brs16944 (G/A) was associated with a reduced risk of ventriculomegaly on MRI (OR = 0.46; 95% CI: 0.22-0.95; p = 0.03). Infants carrying heterozygous (T/C) genotype at IL28Brs12979860 had an increased risk of cystic lesions (OR = 4.97; 95% CI: 1.84-13.43; p = 0.001) and ventriculomegaly on MRI (OR = 2.46; 95% CI: 1.03-5.90; p = 0.04). No other associations between genotyped SNPs and neuroimaging results were found.

CONCLUSIONS

An abnormal brain US, microcephaly, SNHL, hepatosplenomegaly, cholestasis, high viral load, or the positive PCR CMV in CSF increases the risk of abnormal MRI. This is the first study demonstrating two novel associations between the SNPs of IL28B and IL1B and MRI results in cCMV: IL1B polymorphism is associated with the reduced risk of ventriculomegaly, while IL28B polymorphism increases the risk of ventriculomegaly and cystic lesions.

Table 1 (ABS 5). Significant clinical and laboratory predictors of abnormal MRI in infants with congenital cytomegalovirus infection (cCMV).

- Abnormal cranial US (OR = 9.1; 95% CI: 3.8-22.0, p < 0.0001),
- ventriculomegaly (OR = 6.4; 95% CI: 2.1-19.4, p = 0.001),
- cerebral calcification (OR = 4.7; 95% CI: 1.6-14.4, p = 0.006),
- hyperechogenic white matter (OR = 4.0; 95% CI: 1.1-14.0, p = 0.03),
- lenticulostriate vasculopathy (OR = 3.38; 95% CI: 1.5-7.8, p = 0.004),
- cystic lesions (OR = 2.8; 95% CI: 1.3-6.0, p = 0.007),
- microcephaly (OR = 4.7; 95% CI: 1.3-16.4, p = 0.02),
- splenomegaly (OR = 6.3; 95% CI: 1.4-28.0, p = 0.02),
- hepatomegaly (OR = 3.7; 95% CI: 1.0-13.1, p = 0.04),
- cholestasis (OR = 6.8; 95% CI: 2.2-20.7, p < 0.0001),
- abnormal otoacoustic emission at least in 1 ear (OR = 2.7; 95% CI: 1.1-6.3, p = 0.02),
- urine viral load > 10,000,000 copies/ml (OR = 3.8; 95% CI: 1.5-9.2, p = 0.004),
- blood viral load > 10,000 copies/ml (OR = 4.0; 95% CI: 1.6-10.0, p = 0.003).

FUNDING

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ACKNOWLEDGMENT

The results have recently been partially published in *Viruses* (2021;13[9]:783).

ABS 6

RISK OF NECROTIZING ENTEROCOLITIS AND ENTERAL FEEDING STRATEGY IN THE CHILDREN'S CLINICAL UNIVERSITY HOSPITAL (RIGA, LATVIA) FROM THE 1ST OF JANUARY 2016 TO THE 31ST OF DECEMBER 2020

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INTRODUCTION

Necrotizing enterocolitis (NEC) remains a common problem in neonatology. Early recognition and prompt therapy improved clinical results. The incidence of NEC did not reduce in recent years, which could point to few knowledges of prophylaxis of NEC and large potential of research in the field.

MATERIAL AND METHODS

This is a retrospective study, carried out in preterm infants in NICU from the 1st of January 2016 to the 31st of December 2020.

RESULTS

80 preterm newborns with NEC were treated in the Children's Clinical University Hospital from the 1st of January 2016 to the 31st of December 2020. The mean weight in NEC I group was 969 g, NEC II – 1,026 g, NEC III – 1,062 g. A formula was given to 17.5% of neonates prior to NEC development (NEC I – 5.3%,

NEC II – 14.9%, NEC III – 42.9%). The mean volume of enteral nutrition prior to NEC diagnosis is 35.9 ml/kg (NEC I – 23.7, NEC II – 47.6, NEC III – 36.5), the mean rate of advancement was 4.6 ml/kg/24h (NEC I – 5.0, NEC II – 4.8, NEC III – 4.0). Probiotics were prescribed in 28.6% of cases in dead and 30% in survived patients. The mean time of restarting enteral feedings was 8.3 days (NEC I – 6.9, NEC II – 7.6, NEC III – 10.2). The length of time to achieve full enteral nutrition was, on average, 20.5 days (NEC I – 19.4, NEC II – 17.6, NEC III – 28.7), that is 13.1 days, mean, since a restart.

CONCLUSIONS

The stage of NEC (Bell's criteria) had no correlation with birth weight ($p = 0.462$). The use of formula increased the risk of severe stage of NEC development ($p = 0.007$). The most advanced amount of enteral nutrition prior to NEC increased the possibility of NEC II and III stage development ($p = 0.226$), although the rate of advancement of enteral nutrition had no impact on NEC stage development ($p = 0.781$). The probiotics were not routinely used; there was no trend to more frequent death. It was more time-consuming to achieve full enteral feedings in patients who developed the III stage of NEC ($p = 0.146$). Surgical treatment did not depend on the rate of advancement of enteral feedings after the restart of enteral nutrition ($p = 0.012$).

ABS 7

OUTBREAK OF NOSOCOMIAL SEPSIS IN NICU BY MULTIDRUG-RESISTANT *KLEBSIELLA PNEUMONIAE* – DIAGNOSTIC CHALLENGES

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INTRODUCTION

Nosocomial infections are a serious problem in Neonatal Intensive Care Units (NICU) – they are one of the main causes of morbidity and mortality among preterm newborns.

MATERIAL AND METHODS

We present an outbreak of late-onset sepsis in a tertiary level NICU including 7 cases of culture-proven hospital-acquired sepsis over a period of 2 months. Multidrug-resistant (MDR) *Klebsiella pneumoniae* is the causative agent, susceptible to antibiotic treatment only with carbapenems and polymyxin E. The risk factors, early clinical presentation, laboratory changes, course of infection, treatment, and outcome are evaluated.

RESULTS

The possible routes of transmission of the infection are: venous accesses (central or peripheral) – in 6 patients; mechanical ventilation – in 2 patients; tube feeding – in 3 of the cases. All of the mentioned possibilities are presented in 1 extremely immature patient.

Three of our patients are term infants, admitted and treated in the NICU for congenital infection. The other 4 patients are preterm aged from 25 to 36 gestational weeks.

Early clinical signs include skin color changes, abnormal muscle tone, and respiratory failure. Laboratory tests taken at the time of onset reveal leucopenia and/or thrombocytopenia in half of the cases and usually C-reactive protein remains normal, but in all cases the I/T ratio significantly increases. The clinical course varies from fulminant deterioration (need for mechanical ventilation, blood pressure support, blood products) to easily controlled condition. Treatment with meropenem is started at the time of clinical suspicion of infection, according to the antibiogram of the first cases. MDR *Klebsiella pneumoniae* is isolated from 6 hemocultures, 3 tracheal aspirates, 2 tube tips and 1 central blood line tip. No fatal outcome is observed. No reservoir of infection is found by the health inspectorate.

CONCLUSION

According to our data, main causes for the outbreak of hospital-acquired infection are overcrowding of the NICU, admission of patients from lower-level hospitals, insufficient working staff, especially midwives. Early diagnosis and proper antimicrobial treatment are crucial for a favorable outcome.

ABS 8

PREDICTIVE MARKERS FOR BRONCHO-PULMONARY DYSPLASIA IN NONINVASIVELY OBTAINED AMNIOTIC FLUID IN PRETERM NEONATES

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INTRODUCTION

Bronchopulmonary dysplasia (BPD) is a major outcome of prematurity, associated with disrupted

lung development, intraamniotic inflammation/infection, and postnatal injury. Although BPD predictive models have been researched, there is a scarcity of validated biomarkers that would predict BPD and be expressed early. In this study, we aimed to determine whether 14 biomarkers in noninvasively collected amniotic fluid (AF) are significant in predicting neonatal BPD after preterm premature rupture of membranes (PPROM).

MATERIAL AND METHODS

AF was obtained vaginally less than 48 hours before delivery from 145 women with PPROM at 22-34 weeks of gestation in this prospective cohort study in Vilnius University Hospital Santaros Klinikos. The study was funded by the Research Council of Lithuania. Levels of biomarkers, such as tumor necrosis factor-α (TNF-α), interleukin-10 (IL-10), epidermal growth factor (EGF), aminoterminal pro-B-type natriuretic peptide (NT-proBNP), soluble urokinase plasminogen activator receptor (suPAR), matrix metalloproteinase-8, IL-6, IL-17, surfactant protein A, RANTES, defensins, Toll-like receptors 2 and 4, S100b protein, tumor growth factor-β, were measured in AF by the enzyme-linked immunosorbent assay. The neonatal outcome was BPD, defined as the need for oxygen supplementation or respiratory support at 28 days of postnatal age, 36 weeks of postmenstrual age, or until discharge home. The data were analyzed using R software version R-4.0.5.

RESULTS

Median levels of biomarkers were significantly different in neonates with BPD than infants without BPD for the following: suPAR ($p = 0.02$), NT-proBNP ($p = 0.02$), IL-10 ($p = 0.01$), TNF-α ($p < 0.001$), EGF ($p = 0.002$). Other markers did not differ among these neonates. The best performance of the area under the ROC curve was 0.81 for TNF-α and 0.74 for EGF, and the optimal cut-off values were 96 pg/mL and 35 ng/mL, respectively. In multiple regression analysis, TNF-α > 96 pg/mL and EGF < 35 pg/mL increased the odds of BPD 48.24 (95% CI, 8.09-956.63) and 34.45 times (95% CI, 5.68-665.8), respectively.

CONCLUSION

TNF-α and EGF in noninvasively collected AF are good predictors for BPD in preterm neonates. The noninvasive AF analysis after PPROM may help stratify the neonatal risk for BPD earlier and impact the management strategy.

ABS 9

PRETERM GESTATION AND LOW BIRTH WEIGHT – IMPACT ON RESPIRATORY SYSTEM

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INTRODUCTION

This study was carried out to evaluate short-term respiratory morbidity in late preterm infants compared with full-term low birth weight (LBW) and full-term infants at the age of 9 months at a single center in Georgia.

METHODS

Medical records of infants were assessed in CDC of Iashvili Hospital, Tbilisi, from 2014-2019. The cases were divided into 3 groups by gestational age (GA) and birth weight: 127 late preterm, 345 full-term and 203 full-term LBW infants. We compared late preterm infants and full-term infants considering perinatal characteristics and respiratory morbidities.

RESULTS

Out of 127 late preterm infants, 42.7% had respiratory tract disease. Out of 345 full-term infants, 15% had respiratory tract disease at the age of 12 months. Compared with full-term infants, late preterms presented significantly more respiratory diseases and conditions, such as upper respiratory tract infections ($p < 0.01$), transient tachypnea of the newborn ($p < 0.05$), pneumonia ($p < 0.01$), and wheezing ($p < 0.001$). Full-term LBW infants at the age of 9 months presented a higher incidence of upper respiratory tract infections than full-term infants ($p < 0.01$) and late preterm infants ($p < 0.05$). Congenital infection was the most significant factor affecting the respiratory tract later in infancy in these 2 groups.

CONCLUSION

Late preterm infants are more likely to develop respiratory system illnesses than full-term infants. LBW full-term infants are more prone to respiratory diseases than peers born with gestational age-appropriate weight. LBW and late preterm infants' morbidity with respiratory system diseases was associated with congenital infections.

ABS 10

ASSESSMENT OF PAIN AND DISCOMFORT DURING LESS INVASIVE SURFACTANT

ADMINISTRATION (LISA) UNDER NON-PHARMACOLOGICAL ANALGESIA

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INTRODUCTION

The European consensus guidelines on the management of respiratory distress syndrome (RDS) recommend less invasive surfactant administration (LISA) as the optimal method for surfactant administration; however, there is no consensus on whether or not sedation should be used routinely during LISA. This study aims to analyze if and to what extent pain and discomfort occur in preterm infants during LISA when non-pharmacological methods of analgesia are used.

MATERIAL AND METHODS

Inborn preterm infants ≤ 34^{+0} weeks of gestation with RDS and the need for surfactant replacement were included in the study. Discomfort before, during (laryngoscopy and surfactant delivery) and after the procedure was assessed using the COMFORTneo score for each procedure by 2 independent observers on video-recorded procedures. Non-pharmacological measures consisted of administration of oral sucrose and non-nutritive sucking before, swaddling, facilitated tucking and reduction of sensorial input during the procedure.

RESULTS

105 infants have been included in the study with a median gestational age of 27 weeks (range 22-33 weeks) and a median birth weight of 910 g (range 400-2,555 g). All infants received LISA within 36 hours after birth. Before and after LISA, the COMFORTneo score was < 16 (indicating no acute stress or pain) in 85% and 91% of infants, respectively. During laryngoscopy and surfactant administration, 77% of infants stayed with their score < 16, 61% even within the desired comfort zone of a score < 14. Desaturations were found in 16% of infants, and 2% needed positive pressure ventilation (PPV) during or after the procedure. In comparable data using propofol as sedative for LISA, 56% [1] and 76% [2] showed a comfort score < 14 during the procedure; 93% [2] and 100% of infants [1] needed PPV during or after the procedure.

CONCLUSIONS

Non-pharmacological measures seem to be sufficient to control acute stress/pain during LISA and provide a much lower risk for respiratory complications.

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ABS 11

A NOVEL POINT-OF-CARE ULTRASOUND APPROACH FOR THE DETERMINATION OF ENDOTRACHEAL TUBE DEPTH IN NEONATES

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INTRODUCTION

Endotracheal tube (ETT) placement in neonates is challenging and currently requires chest radiography (CXR) [1, 2]. Ultrasound (US) was suggested to be safe and reliable for confirming the ETT position. Previous studies demonstrated a strong correlation between the ETT to right pulmonary artery (RPA) distance on US, and the ETT-carina distance on CXR [3-6]. We assessed the reliability of a novel US method for the determination of ETT position in neonates, based on interpreting the ETT to RPA distance according to the estimated tracheal length for the infants' weight.

METHODS

Data from 180 autopsies of foetuses and infants, collected for a previous study [7], demonstrated a strong correlation between infants' weight and tracheal length. The data was analysed to allow the estimation of tracheal length for different

weight groups. Then, a prospective study was conducted on 33 intubated newborns. In each US study, 3 separate measurements of the ETT to RPA distance were obtained. Correct ETT position was defined if ETT to RPA distance was 25-75% of the estimated tracheal length for weight. A transverse scan of the trachea and cine clips of the right and left pleuras and the diaphragm were obtained. US studies were compared to CXR. A correct ETT position on CXR was defined as T1-T3 vertebrae [1, 8].

RESULTS

42 image pairs were obtained. US correctly identified 24/24 cases of correctly positioned ETT, 10/13 cases of deeply positioned ETT, and 4/5 cases of highly positioned ETT, with a strong correlation between US and CXR ($\chi^2[4] = 61.24$, $p < 0.001$), sensitivity 100%, specificity 78%, NPV 100% and PPV 86%. ETT-RPA distance in US strongly correlated to ETT-carina distance in CXR ($r = 0.826$, $p < 0.001$). Inability or difficulty to identify the ETT tip correlated with ETT malposition ($\chi^2[4] = 18.3$, $p < 0.001$), with 100% sensitivity, 22% specificity, 100% NPV and 63% PPV. The 3 measurements were highly reproducible ($r = 0.959$-0.967, $p < 0.001$). No significant correlation was found between CXR and ETT in tracheal transverse scan, pleural sliding, or diaphragmatic movement.

CONCLUSIONS

US is a rapid and reliable method for confirmation of ETT position neonates (**Fig. 1**). Further studies are needed to assess the trainability and the applicability of incorporating this method in routine use in NICUs.

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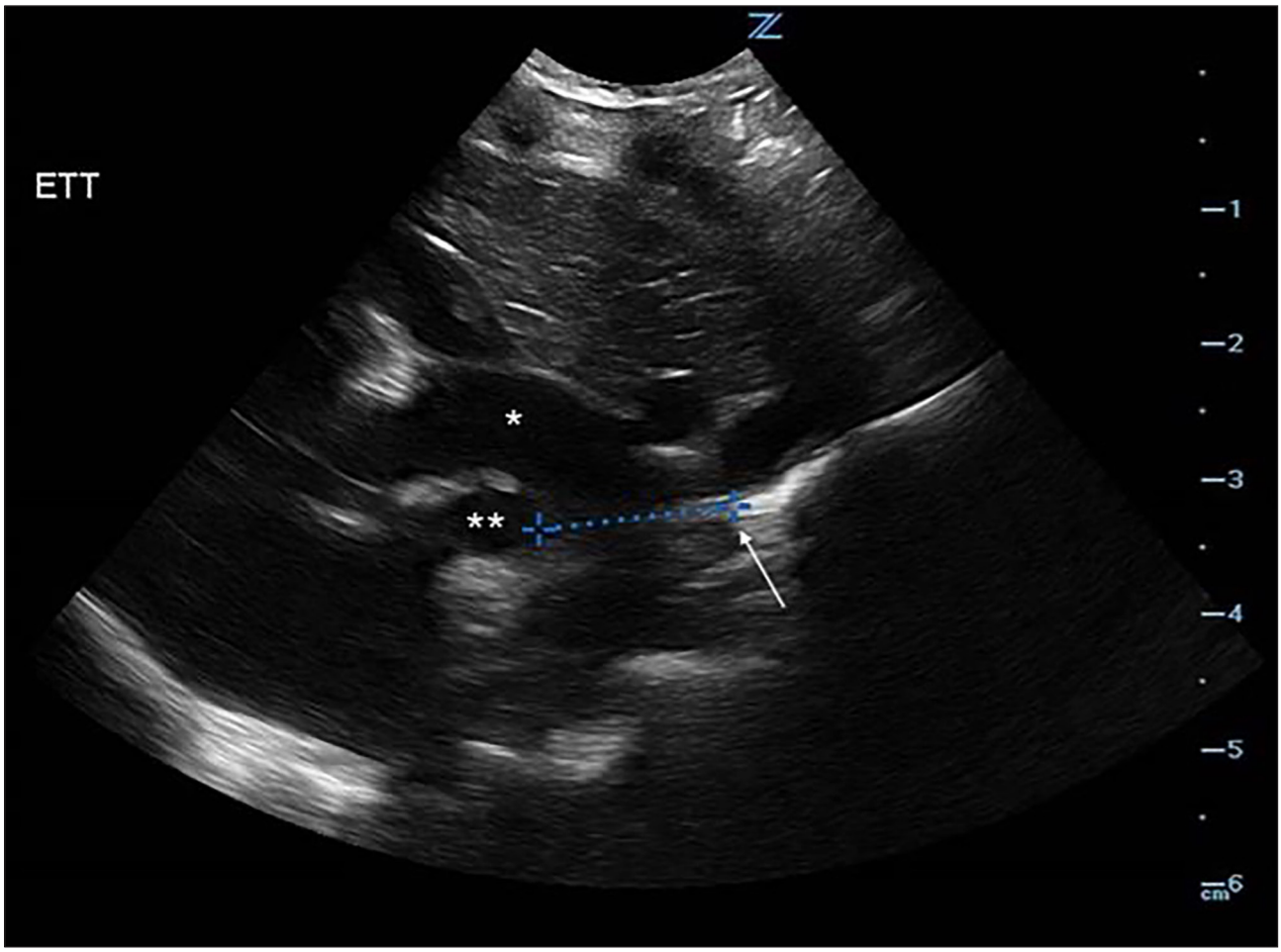

Figure 1 (ABS 11). Demonstration of the endotracheal tube (ETT) tip in parasternal ultrasound (US) scan and measurement of its distance from the right pulmonary artery (RPA) using an electronic calliper.
Asterisk: aortic arch; double asterisk: RPA; white arrow: ETT tip.

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ABS 12

END-OF-LIFE CARE PRACTICES ACROSS PORTUGUESE NEONATAL UNITS

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INTRODUCTION

In end-of-life care (EOLC), the goal is the comfort of the patient, which can be a difficult decision especially in intensive care. Death is a common reality in Neonatal Intensive Care Units (NICU) since this is the pediatric group with the highest mortality rate. In Portugal, efforts have been made in order to improve EOLC, with the creation of specific pediatric/neonatal palliative care teams. Despite this effort, few studies and guidelines have been published worldwide, leading to a major variability in clinical practice. The goal of this study was to verify EOLC practices among Portuguese NICUs.

MATERIAL AND METHODS

An anonymous survey was elaborated and sent to every Portuguese NICU coordinator. The survey was available online in Google Forms® and was constituted by 27 questions. The answers were kept in an anonymous database, and the statistical analysis was made using SPSS® 28.0.

RESULTS

This survey was answered by 23/40 NICU, 16 level III-IV and 7 level II. The average number of admissions per year was 282 [112-500], with an average of 33 very low birth weight newborns [3-70]. Only 47.8% of the Units have a pediatric/neonatal palliative care team, and only 21.7% offer EOLC training. The life-sustaining medical interventions acceptable to be withdrawn are presented in **Fig. 1**. The pain scale most commonly used was EDIN (52.2%). The most frequent drug administration route was intravenous, followed by oral and nasal.

In a scenario of EOLC due to major complex malformations at birth, 7 Units replied that no drugs were administrated, while 13 did the same in cases of prematurity below the limit of viability. In 17 Units, a better control of pain and agitation in EOLC was achieved in the NICU.

The administration of high-dose opioids/benzodiazepines was believed to be justified for pain control despite the risk of respiratory depression by 87%.

CONCLUSION

This study showed the great variability in EOLC in Portugal, and all Units stated the need for more training and education on the subject. A similar European study could be useful to verify practices among different countries and establish the need for European guidelines.

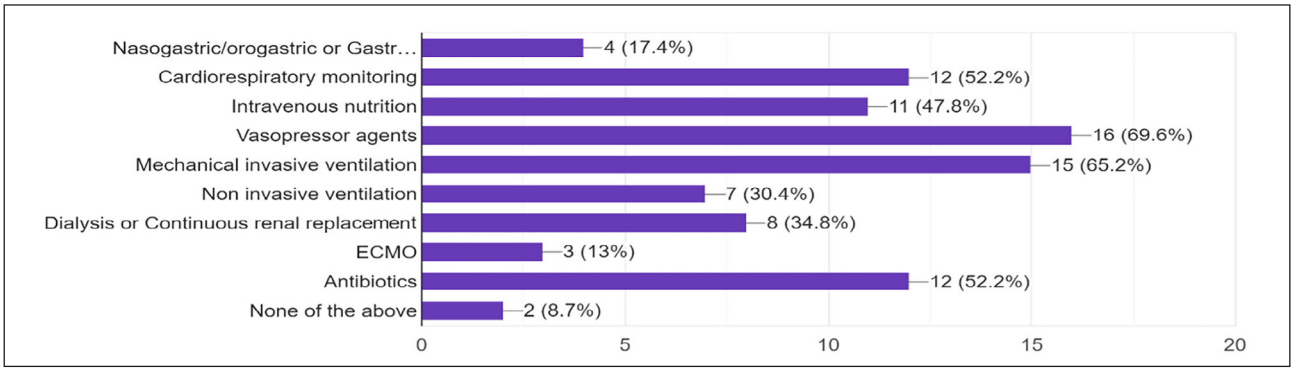

Figure 1 (ABS 12). Answer to the question: "In patients in end-of-life care (EOLC) which of the following life-sustaining medical interventions is/are generally acceptable to withdraw in your Neonatal Intensive Care Units (NICUs)?".

ABS 13

LIMOSILACTOBACILLUS REUTERI DSM 17938 IN THE PREVENTION OF FUNCTIONAL GASTROINTESTINAL DISORDERS IN NEONATES TREATED WITH ANTIBIOTICS: A RANDOMIZED CONTROLLED TRIAL

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INTRODUCTION

Postnatal antibiotic exposure influences early microbial colonization of the gut. Gut dysbiosis has been linked to functional gastrointestinal disorders (FGID), especially infantile colic. The aim of the study was to determine the prophylactic effect of probiotic supplementation during and after the treatment with antibiotics on the development of the FGID and daily crying time, and to evaluate its effect on the gut microbiota.

MATERIAL AND METHODS

This randomized, double-blind study involved 89 term neonates who received treatment with antibiotics for at least 5 days during the first 21 days of life. At the beginning of the treatment, neonates were randomly assigned to receive either a probiotic (*Limosilactobacillus reuteri DSM 17938*) or placebo for 6 weeks. Four, 8 weeks, and 6 months after enrollment, parents completed the Infant Gastrointestinal Symptom Questionnaire (IGSQ) and reported daily crying time. Stool samples were collected 6 weeks and 12 months after the beginning of the treatment. Total isolated DNA from stool samples was used for 16S amplicon metagenomic sequencing targeting the V3V4 variable region of 16S rRNA gene.

RESULTS

At all 3 time points of evaluation, the probiotic group had lower IGSQ scores and daily crying time, but the difference between the groups was not statistically significant. The proportion of infants with an IGSQ score > 30 (the score suggesting the presence of clinically meaningful digestive distress) was higher in the control group, but the difference was statistically significant only 8 weeks after the beginning of treatment.

Comparison of fecal bacterial communities revealed no statistically significant differences between the groups in alpha or beta diversity. A statistically significant increase was observed only in the abundance of *Limosilactobacillus* in the probiotic group, most likely representing the probiotic strain used in the study.

CONCLUSION

The supplementation with *L. reuteri DSM 17938* during and after the treatment with antibiotics in term neonates reduced the prevalence of FGID 8 weeks after the beginning of treatment. Despite short daily crying time in all infants, there was a trend toward lower daily crying time in the probiotic group (**Tab. 1**). Probiotic supplementation effect on the bacterial composition of the gut microbiome was not observed.

Table 1 (ABS 13). Infant Gastrointestinal Symptom Questionnaire (IGSQ) score, IGSQ score > 30 (children with possible clinically meaningful digestive distress), and daily crying for study and control groups at 4, 8 weeks, and 6 months after enrollment in the study.

	Probiotic (n = 44)	Placebo (n = 45)	p -value
IGSQ score at 4 weeks, mean (SD)	26.9 (7.8)	29.7 (8.1)	0.112 [c]
IGSQ score at 8 weeks, mean (SD)	24.2 (7.6)	25.8 (8.2)	0.368 [c]
IGSQ score at 6 months, mean (SD)	17.6 (3.3)	19.8 (6.4)	0.051 [c]
IGSQ score > 30 at 4 weeks, n (%)	12 (27.3)	18 (41.9) [a]	0.180 [d]
IGSQ score > 30 at 8 weeks, n (%)	0	6 (13.3)	**0.026** [d]
IGSQ score > 30 at 6 months, n (%)	7 (15.9)	10 (22.7) [b]	0.418 [d]
Daily crying at 4 weeks (min), mean (SD)	27 (40)	32 (42)	0.8 [c]
Daily crying at 8 weeks (min), mean (SD)	22 (39)	33 (42)	0.3 [c]
Daily crying at 6 months (min), mean (SD)	11 (10)	15 (21)	0.57 [c]

IGSQ: Infant Gastrointestinal Symptom Questionnaire; min: minutes; SD: standard deviation.
[a] n (18/43), [b] n (10/44), [c] t test; [d] Chi-square tests.

ABS 14

ANTENATAL STEROID TREATMENT AND BRAIN DEVELOPMENT IN VLBW INFANTS

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INTRODUCTION

Antenatal corticosteroids are widely used in pregnancies with a risk of preterm birth as they decrease perinatal deaths and respiratory distress syndrome; however, there is still debate in the literature about their role in brain development. Magnetic resonance imaging (MRI) performed at term-equivalent age can be a valid instrument to unveil it, while long-term follow-up can provide additional information. The aim of this study was to define the effect of a complete antenatal steroid course (ASC) on prematurity-related brain lesions, brain growth and neurodevelopmental outcome at 3 years of age in a modern cohort of very low birth weight (VLBW) infants.

MATERIALS AND METHODS

All VLBW patients admitted to our Neonatal Intensive Care Units (NICU) from January 2012 to September 2017 that have performed brain MRI at term-equivalent age were included, and their clinical data were registered. MRI scans were reviewed to identify white matter lesions (WML), intraventricular hemorrhage (IVH), and cerebellar hemorrhage (CBH). Linear measurements of brain size (biparietal width [BPW] and trans-cerebellar diameter [TCD]) were carried out, and the total maturation score (TMS) was calculated. Frequency of prematurity brain lesions, brain metrics and values of the Griffiths Scale at 3 years of age were compared between patients with and without a complete ASC.

RESULTS

Out of 389 patients, 295 (76%) received a complete ASC. In univariate analysis, there was an association between a complete ASC and lower frequency of IVH (23% vs. 37%, OR = 0.5 [0.3; 0.82], p = 0.008), bigger TCD (51.4 mm vs. 49.4 mm, p = 0.027) and lower frequency of pathologic DQ score at 3 years (15.2% vs. 26.8%, p = 0.04). We have observed a non-significant trend for lower frequency of WML (18.6% vs. 25.5%, p = 0.15). No correlations were observed between ASC and TMS. In multivariate analysis, a complete ASC remained significantly associated with lower rates of IVH (OR = 0.56 [0.33; 0.95], p = 0.0327) and bigger TCD (β = 1.56 [0.12; 3.0], p = 0.034), while the association with DQ scores at 3 years of age was not significant (OR = 0.5 [0.25; 1.02], p = 0.0554).

CONCLUSIONS

A complete ASC can be beneficial for brain development as it is associated with lower rates of IVH and bigger cerebellum. A trend for positive effects on neurodevelopment at 3 years of age requires further studies.

ABS 15

FACTORS AFFECTING THE DURATION OF MECHANICAL VENTILATION IN VERY LOW BIRTH WEIGHT INFANTS

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INTRODUCTION

Invasive mechanical ventilation (MV) remains a widely used respiratory support for the sickest very-low-birth-weight (VLBW) infants. However, prolonged exposure to this invasive treatment can be associated with adverse outcomes. It is essential to establish the factors which influence the duration of MV. The study aimed to determine the factors affecting the duration of MV in VLBW infants.

MATERIALS AND METHODS

Data obtained from a prospectively created computer database were used in a retrospective cohort study. The database included information about 1,086 VLBW infants < 32 weeks of gestation who were intubated and mechanically ventilated at any time during their hospital stay at Lviv Regional Clinical Hospital between January 2010 and December 2020.

RESULTS

The infants had a mean (SD) gestational age of 27.6 (2.2) weeks and birth weight of 1,007 (262) g. 43% of them were delivered by cesarean section, 26% from multiple pregnancies, 58% were intubated and ventilated at birth, and 49% were treated with surfactant. Severe intraventricular hemorrhages

(IVH) occurred in 179 (16%), periventricular leukomalacia (PVL) in 60 (6%), bronchopulmonary dysplasia (BPD) in 135 (12%), and necrotizing enterocolitis (NEC) in 41 (4%) infants. In 49 (5%) cases, the BPD was severe. 678 (62%) patients survived until discharge. The median (IQR) duration of endotracheal MV was 47 (10-103) hours. BPD (rS = 0.32, $p < 0.05$), severe BPD (rS = 0.418, $p < 0.05$), pneumothorax (rS = 0.06, p = 0.05), severe IVH (rS = 0.255, $p < 0.05$), PVL (rS = 0.15, $p < 0.05$), sepsis (rS = 0.087, $p < 0.05$), NEC (rS = 0.088, $p < 0.05$), antibiotic therapy duration (rS = 0.168, $p < 0.05$), and smaller gestational age (rS = -0.118, $p < 0.05$) were reliably associated with longer duration of MV in VLBW infants. Based on a one-way analysis of covariance, only severe BPD ($F = 20.898$, $p < 0.0001$) and PVL ($F = 5.989$, $p < 0.05$) significantly and independently increased the duration of MV.

CONCLUSIONS

Severe lung injury and brain injury are the main factors affecting the duration of MV in our 10-year cohort of VLBW infants.

ABS 16

THE CORRELATION BETWEEN THE PATHOLOGICAL UMBILICAL ARTERY DOPPLER FINDINGS AND NEONATAL MORBIDITY OF PRETERM NEWBORNS WITH INTRAUTERINE GROWTH RESTRICTION

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INTRODUCTION

Uteroplacental insufficiency is one of the leading causes of intrauterine growth restriction (IUGR) and premature birth. The umbilical artery Doppler assessment (DUA) is a standard non-invasive method for detecting placental insufficiency.

MATERIALS AND METHODS

This retrospective study was conducted in a tertiary-care University Clinic during the period 01.01.2012-30.11.2015. It included 120 singleton preterm newborns with gestation age (GA) from $27^{0/7}$ to $36^{6/7}$ who weighed less than 1,800 g at birth and less than the 10th percentile according to WHO. There were 60 newborns with pathological DUA and 60 newborns with normal fetal DUA. The newborns were evaluated in terms of morbidity and mortality.

RESULTS

In the group with pathological DUA, the prevalence of mothers with hypertension and pre-eclampsia was significantly higher, as well as anhydramnios and C-section delivery, in comparison to the group with a normal DUA, in which the prevalence of mothers' urogenital infections prior to the birth was higher.

In the group with pathological DUA, the mean GA was 32.19 weeks, the mean birth weight was 1,199 g, Apgar score at the 1st and 5th minute was lower, while in the group with normal DUA, the mean GA was 33.66 weeks, the mean birth weight was 1,462 g ($p < 0.05$). In the pathological DUA group, there were significantly more admissions to the Neonatal Intensive Care Unit (NICU), mechanical ventilation, endotracheal intubation and surfactant therapy.

In the group of newborns of less than 32 weeks of GA with a pathological DUA finding, there was a statistically higher ($p < 0.05$) incidence of transfer to the NICU and therapy, intubation, application of surfactants, pulmonary hemorrhage and retinopathy of prematurity. In the group of newborns with a normal DUA, there was a statistically higher incidence of sepsis, necrotizing enterocolitis, and bronchopulmonary dysplasia.

CONCLUSION

The results of the study indicate that the rate of neonatal morbidity of IUGR newborns with pathological DUA is higher, particularly in the group of newborns of less than 32 weeks of GA (**Fig. 1**).

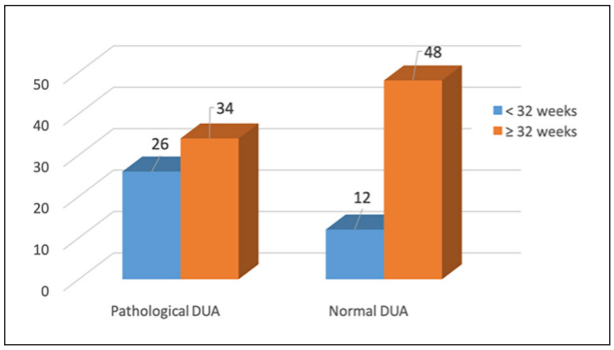

Figure 1 (ABS 16). Distribution of newborns according to gestation age (GA) and Doppler assessment (DUA) findings ($\chi^2 = 6.508$, DF = 1, $p = 0.011$).

ABS 17

INTRATRACHEAL ADMINISTRATION OF SURFACTANT COMBINED WITH BUDESONIDE TO PREVENT BRONCHOPULMONARY DYSPLASIA IN VERY LOW BIRTH WEIGHT PREMATURE NEWBORN

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INTRODUCTION

Bronchopulmonary dysplasia (BPD) is one of the most important sequelae of mechanical ventilation in prematurity. According to the degree of severity, it is associated with prolonged hospitalizations, nutritional and neurodevelopmental abnormalities, and even death due to chronic cardiopulmonary insufficiency. It occurs in 25-40% of preterm infants < 32 weeks of gestational age. Systemic corticosteroids have been used as preventives of BPD. They have been related to potential adverse effects, such as infant cerebral palsy. Pulmonary inflammation plays a crucial role in this pathogenesis, and glucocorticoids such as intratracheal budesonide are a potential therapy to prevent BPD.

OBJECTIVE

We aimed to explore the clinical efficacy of intratracheal instillation of pulmonary surfactant (PS) Curosurf® 240 mg/3 ml combined with budesonide (Pulmicort® 250 mg/2 ml) for preventing BPD. Very low birth weight infants and < 34 weeks who developed neonatal respiratory distress syndrome (NRDS) (grade I-IV) who were also suffering from intrauterine infection were randomly assigned into a PS + budesonide group and a PS alone group; we excluded the ones who did not receive surfactant replacement therapy or received late (24 hours). The changes were compared between the 2 groups in arterial blood gas indexes, oxygenation index (OI), PH, Sat, carbon dioxide (CO_2), HCO_3, duration of mechanical ventilation, duration of oxygen supplementation, days of mechanical ventilation (shorter duration), thorax chest changes.

RESULTS

Compared with the PS alone group, the PS + budesonide group had a shorter duration of mechanical ventilation (M. 3 days) and oxygen supplementation ($p < 0.05$). On the 1st-2nd day after treatment, the PS + budesonide group had a higher PH value of arterial blood gas and OI and a lower CO_2 partial pressure compared with the PS alone group ($p < 0.05$). There were no significant differences ($p = 0.46$) in the mortality rate at 34 weeks of age (the PS alone group mortality was 53.3% vs. 46.7%) and in the incidence of other complications except BPD between the 2 groups ($p < 0.05$), and a higher mortality in the group with no surfactant replacement.

CONCLUSIONS

Intratracheal instillation of PS + budesonide can effectively reduce the days of mechanical ventilation and, in consequence, the incidence of BPD in premature infants with NRDS.

ABS 18

CLINICAL OUTCOMES OF VERY LOW BIRTH WEIGHT INFANTS AFTER IMPLEMENTATION OF A FAMILY INTEGRATED CARE CLINICAL PATHWAY – A MATCHED CASE-CONTROL STUDY

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INTRODUCTION

The highly technical setting of a modern Neonatal Intensive Care Unit (NICU) causes physical and emotional separation of infants and their parents. Different optimized care models have been proposed to reduce this separation and mitigate the impact of prematurity for the whole family. Prominent examples of such interventions in the setting of the NICU are Family Centered and Family Integrated Care models. Here, we aim to evaluate a Family Integrated Care intervention for preterm very low birth weight (VLBW) infants in a Bavarian NICU.

MATERIAL AND METHODS

NeoPAss, a Family Integrated Care clinical pathway, that structures interdisciplinary care processes from the prenatal period to aftercare guided by a case management, was implemented at our NICU. Key elements of the program include free access for the parents to their newborn at the NICU, early Kangaroo Mother Care and a parental empowerment program. In a case-control study, outcomes of VLBW infants were

compared to matched controls from other Bavarian NICUs at a baseline period of standard care (111 infants in 2008-2012) and after the implementation of NeoPAss (170 infants in 2014-2017).

RESULTS

In the baseline period, length of stay, weight gain and infant complications did not differ between intervention and control group, except for a significantly lower rate of bronchopulmonary dysplasia (7.2% vs. 19.8%, p = 0.009). After the implementation of NeoPAss, there was a significant reduction in length of stay in the intervention group in preterm infants with 28 to 32 weeks' gestational age (47.5 vs. 51.1 days, p = 0.047) and ≤ 28 weeks' gestational age (79.4 vs. 91.8 days, p = 0.007). Infants were discharged with significantly less weight (mean 2,351 g vs. 2,539 g, p = 0.013). Rates of infant complications were lower compared to the baseline period, but similar to controls. However, we observed a significant decline in the rate of late-onset sepsis (2.5% vs. 10.7%, p = 0.005) (**Fig. 1**).

CONCLUSION

The implementation of the Family Integrated Care clinical pathway NeoPAss was safe and associated with clinical benefits. The utilization of secondary data as matched controls can be useful to evaluate multidimensional interventions.

ABS 19

ABNORMAL RETINAL VASCULAR MORPHOLOGY IN PRETERM NEONATES WITH INTRAUTERINE GROWTH RESTRICTION

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INTRODUCTION

Infants with intrauterine growth restriction (IUGR) are prone to the development of later cardiovascular disorders, metabolic syndrome, hypertension, insulin resistance, or atherosclerosis. Besides, retinal vascularization during the neonatal period could reflect the generalized status of vasculopathy.

We hypothesized that IUGR neonates would present early retinal vascular disorders; therefore, the aim of the current study was to evaluate the potential difference in the vascularization of the retina between IUGR and non-IUGR neonates.

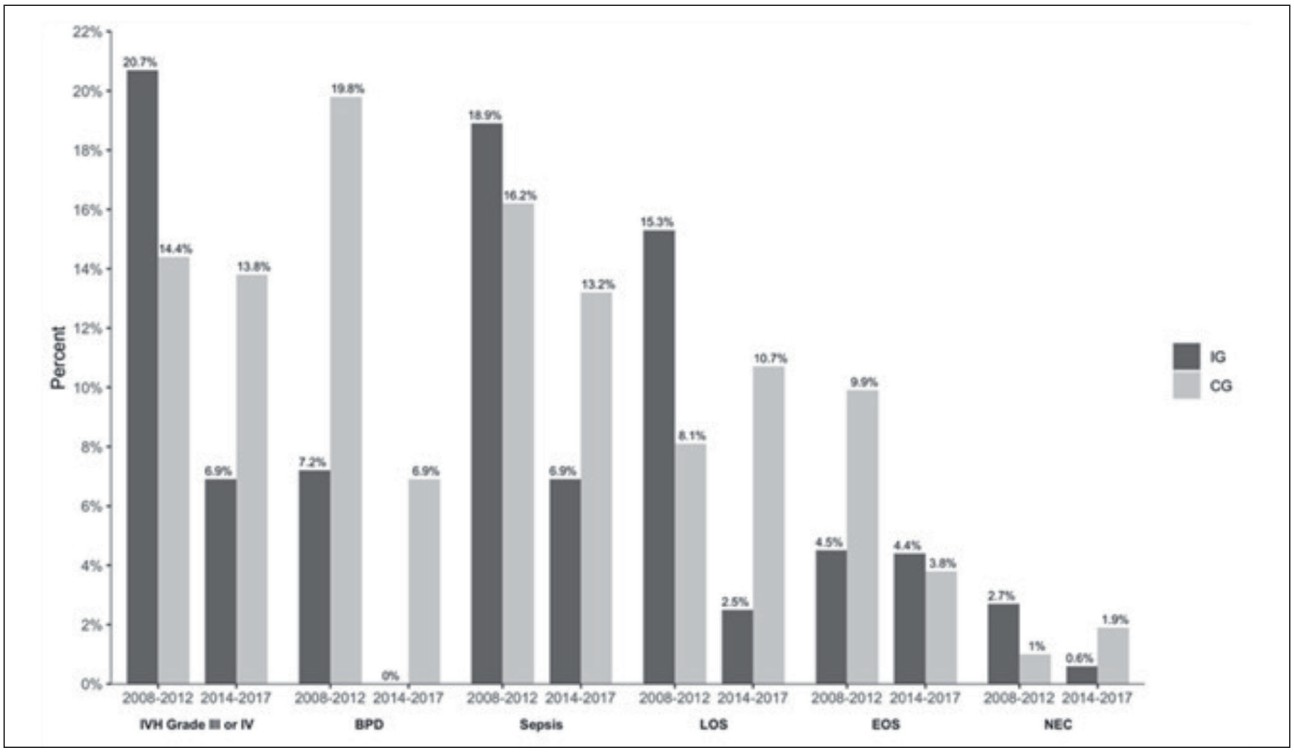

Figure 1 (ABS 18). Rates of infant complications for the intervention group and the control group before and after the implementation of the Family Integrated Care clinical pathway NeoPAss.

BPD: bronchopulmonary dysplasia; CG: control group; EOS: early-onset sepsis; IG: intervention group; IVH: intraventricular hemorrhage; LOS: late-onset sepsis; NEC: necrotizing enterocolitis.

MATERIALS AND METHODS
A prospective study was conducted, enrolling 50 neonates of 30-35 weeks' gestation: 25 IUGR and 25 controls. We performed digital photography of each neonatal eye retina during the first 2 postnatal weeks. In each eye, we evaluated the arterial and venous tortuosity index and the vascular branching points (in the optic disc with a radius of 3.0 mm). We also performed a cranial ultrasound evaluating the pulsatility index and resistive index in the anterior cerebral artery.
RESULTS
IUGR as compared to non-IUGR infants presented a significantly higher arterial tortuosity index (1.079 ± 0.029 vs. 1.036 ± 0.015, $p < 0.001$), a significantly higher venous tortuosity index (1.101 ± 0.041 vs. 1.053 ± 0.024, $p < 0.001$), and significantly lower vascular branching points (a median of 8 [6-11] vs. 12 [11-14], $p < 0.001$). We found a significant correlation between the vascular tortuosity indexes and birth weight, hematocrit, and hemoglobin. IUGR status was significantly correlated, after adjusting for gestational diabetes, hypertension, and *in vitro* fertilization, with the atrial tortuosity index (OR = 1.04, $p < 0.001$, 95% CI 1.02-1.06), with the venous tortuosity index (OR = 1.05, $p < 0.001$, 95% CI 1.02-1.07), or the vascular branching points (OR = 0.31, $p < 0.001$, 95% CI 0.19-0.46).
CONCLUSIONS
IUGR infants had a different retinal vascular morphology compared to non-IUGR counterparts, in terms of significantly higher arterial and venous tortuosity indexes, and significantly lower venous branching points. Moreover, IUGR status was associated with a higher arterial and venous tortuosity index and lower branching points, after adjusting for perinatal factors. Genetic or epigenetic factors in IUGR neonates might be related to their abnormal vascular architecture. Besides, the increased vessel tortuosity reflects the adverse events during the intrauterine period, including chronic hypoxia and nutritional deprivation.

ABS 20

ASSOCIATION BETWEEN BREASTFEEDING DURATION, MATERNAL SOCIOECONOMIC STATUS AND INFANT WEIGHT GAIN

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INTRODUCTION
Nutrition during infancy is a major contributor to growth rate. WHO recommendations to initiate breastfeeding within the first hour of birth, exclusively breastfeed in the first 6 months and continue breastfeeding up to 2 years of age are rarely followed. Maternal socioeconomic status (SES) may also play a major role in growth patterns and mediate the association between breastfeeding and infant's growth. The aim of this study was to identify the patterns of breastfeeding and infants' growth in weight in Dalmatia, Croatia, and investigate their association with maternal SES.
MATERIALS AND METHODS
Data from Croatian Islands' Birth Cohort Study (CRIBS) was used. Participants were infant-mother pairs from Dalmatia, Croatia. Statistical analysis was done using SPSS® Statistics 25.0. and WHO Anthro software 3.2.2. Differences between groups were tested using Fisher's exact test and Student's t-test. The significance and strength of individual associations between weight gain (WG) (0-6 months) and weight for age Z score (WAZ) at 6 months with independent variables were tested by conducting simple linear regression (breastfeeding duration) and Spearman's correlation (extended breastfeeding [EBF], average monthly household income, maternal education, employment and number of household members).
RESULTS
There were no significant differences in gender distribution with regards to location, breastfeeding duration, EBF duration and delivery mode. However, a significant difference ($p < 0.05$) between genders in weight at 6 months has been recorded. Although there was no significant association of breastfeeding duration with WG (0-6 months) and WAZ at 6 months, monthly household income was associated with both and maternal education with WAZ at 6 months. There was also a statistically significant difference ($p < 0.05$) between women from the mainland and from the islands in average monthly household income and EBF duration.
CONCLUSION
Maternal SES is a strong predictor of infant WG in the child's first months in Dalmatia, Croatia, and mothers from the islands breastfeed their infants exclusively for a longer period of time.

ABS 21

SUDDEN INFANT DEATH SYNDROME – LINK WITH MATERNAL KNOWLEDGE

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INTRODUCTION

To investigate maternal knowledge related to infant care practices among a Romanian population that might suggest possible risk factors contributing to sudden infant death syndrome.

MATERIAL AND METHODS

A prospective, questionnaire-based study included a random sample of 100 mothers who were admitted for delivery into a Romanian academic, public, secondary-level Maternity Unit. Five sets of questions revealed information on family network and environment, maternal knowledge, previous experience and information source on infant care, and infant sleeping positioning practices.

RESULTS

Four out of 10 mothers had an academic degree, 6 out of 10 mothers were married, and half of the mothers lived in rural areas. Less than a quarter declared low attendance to antenatal pregnancy care, and for half of the mothers the mode of delivery was cesarean section. 34% of mothers reported insufficient knowledge according to safe sleep practices of infants and optimal temperature range in the baby's bedroom.

CONCLUSIONS

Healthcare professionals should act and notify families of the risky behaviors that can cause sudden infant death syndrome and plan appropriate nursing care.

ABS 22

PARENTAL PARTICIPATION IN THEIR INFANTS' PROCEDURAL PAIN ALLEVIATION WITH NON-PHARMACOLOGICAL METHODS IN ESTONIA

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INTRODUCTION

Parents are important partners in the Neonatal Intensive Care Unit (NICU), collaborating with staff in caregiving and decision-making for their infant. Intensive care for infants incorporates a variety of painful procedures in hospitals and these painful procedures are recognised to result in painful memories and low pain threshold in the future. Therefore, procedural pain prevention, parental involvement and guidance to parents should be the first choice in Neonatal Units. Non-pharmacological methods of pain management were found effective in neonatal care during painful procedures. To extend, parents' use of non-pharmacologic methods during their infants' procedural pain management should be well guided and supported by nurses, and hence interactions between parents and nursing staff should increase.

MATERIAL AND METHODS

A descriptive cross-sectional survey study was carried out during 2019-2020 in the 4 Estonian hospitals. Data was collected by using a validated questionnaire. Altogether 280 questionnaires were distributed to parents and, finally, 189 of them were included in the study. The data was analyzed using descriptive and analytical statistics. Analysis of open-ended questions was followed by principles of inductive content analysis (**Tab. 1**).

RESULTS

Over half (58%) of the parents said that they want to be involved in the alleviation of their infant's pain, and only 5% of the parents did not want to be involved at all. More than half of the parents in this study reported non-pharmacological methods, such as comfortable positioning (62%) and holding infants (61%) pain alleviation methods. While studying a correlation between the parents' use of non-pharmacological methods and their guidance, we found a correlation among all non-pharmacological methods.

CONCLUSION

The parents wanted to be more involved in their infant's daily care, but they were advised not to take part in painful procedures and the infant's daily care for a variety of reasons. Many demographic factors of the participants were related to the use of non-pharmacological pain alleviation methods and guidance to parents. Therefore, the relevant Departments should pay more attention to the principles of family-centred nursing, guide and involve parents as partners.

Table 1 (ABS 22). The parents' use of non-pharmacological pain alleviation methods and guidance to parents to use the methods in alleviating the pain of the procedure.

Items of non-pharmacological pain alleviation methods	Parents use of non-pharmacological methods			Guidance to parents to use non-pharmacological methods			Spearman's ρ
	Not at all/ very seldom, f (%)	Sometimes, f (%)	Always/ nearly always, f (%)	Not at all/ very seldom, f (%)	Sometimes, f (%)	Always/ nearly always, f (%)	
I offer non-nutritive sucking	103 (55)	50 (28)	30 (16)	113 (60)	47 (25)	25 (13)	0.555
I offer glucose + non-nutritive sucking	174 (92)	8 (4)	2 (1)	144 (76)	30 (16)	11 (6)	0.285
I offer glucose	170 (90)	12 (6)	1 (0.5)	131(71)	33 (18)	18 (10)	0.468
I hold my baby	45 (24)	25 (13)	115 (61)	99 (52)	41 (22)	45 (24)	0.228
I put my baby in a good position	37 (20)	32 (17)	117 (62)	87 (46)	40 (21)	57 (30)	0.452
I use facilitated tucking	89 (47)	42 (22)	55 (29)	131 (70)	32 (17)	18 (10)	0.438
I swaddle my baby	128 (68)	32 (17)	23 (12)	128 (68)	39 (21)	17 (9)	0.417
I use skin-to-skin contact	156 (83)	14 (7)	14 (7)	163 (86)	13 (7)	5 (3)	0.498
I sing	103 (55)	48 (25)	34 (18)	170 (90)	7 (4)	4 (2)	-
I use recorded music	176 (93)	5 (3)	5 (3)	178 (94)	2 (1)	2 (1)	0.336
I use breastfeeding [a]	133 (70)	17 (9)	14 (7)	158 (84)	17 (9)	4 (2)	0.470
I use multisensory stimulations	88 (47)	22 (12)	74 (39)	129 (68)	27 (14)	19 (10)	0.553

[a] Only mothers are included.

ABS 23

EFFECTS OF MILKING OF CUT UMBILICAL CORD IN VERY PRETERM NEONATES: A RANDOMIZED CONTROLLED TRIAL IN SOUTHERN INDIA

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INTRODUCTION

Milking of a cut umbilical cord is a placental transfusion method and an alternative to delayed cord clamping. It has the potential benefit of avoiding delays in resuscitation initiation. The primary objective was to evaluate whether milking of the cut umbilical cord reduces the composite outcome of death and disability at 12 months of age. The effect of cut cord milking on Apgar score, hematocrit levels, phototherapy requirement, incidence of cranial ultrasound abnormalities, and duration of respiratory support and hospital stay are secondary outcomes.

MATERIAL AND METHODS

Our tertiary care hospital in Southern India conducted an open-label randomized controlled trial on neonates born between 27 and 32 weeks of gestation. Exclusion criteria included monochorionic diamniotic twins, intrauterine growth restriction, hydrops fetalis, and major congenital anomalies. After initial resuscitation measures, the cut umbilical cord was milked 3 times for 10 to 20 seconds in the intervention group. In the controls, early cord clamping was performed without milking the cord.

RESULTS

Out of 218 neonates screened, 179 were enrolled (93 in the intervention group and 86 in the control group). The intervention group had a significantly lower rate of death and disability after 1 year (OR = 2.14; 95% CI: 1.01 to 4.53; p = 0.046). The intervention group had a higher survival rate than the control group (OR = 4.70; 95% CI: 1.65 to 13.20; p = 0.002). The intervention group required less ventilatory assistance (OR = 0.58; 95% CI: 0.32 to 0.99; p = 0.047) and had a lower rate of abnormal cranial ultrasound findings (OR = 0.31; 95% CI: 0.09 to 0.98; p = 0.046). No adverse consequences were observed. Birth weight and umbilical cord milking were independently associated with mortality in a multivariate analysis.

CONCLUSIONS

Cut umbilical cord milking, an innovative method of placental transfusion, might improve survival and neurodevelopmental outcomes. However, before cut cord milking can be recommended as the standard of care, these potential benefits that seem promising and relevant in resource-limited settings must be validated by large multi-centric trials.