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NEW CHALLENGES IN PERINATAL MEDICINE

TUESDAY, JANUARY 22, 2019

KULTUR- UND KONGRESSZENTRUM AARAU

Abstract book
Discharge teaching quality, readiness for discharge, and post-discharge healthcare utilization in mothers of hospitalized neonates from two NICUs: a correlational descriptive study

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Aims and objectives

Large variations of serum sodium (Na) are described during the first 28 days of life in preterm infants <32 weeks gestation. Although associated congenital anomalies are less common with jejino-ileal atresia, the entity is difficult to distinguish between necrotizing enterocolitis (NEC) and Meckel’s diverticulum, if NEC is not properly suspected. Neonatal screening performed on the 1st day of life showed intestinal atresia – it might be an important clue to cystic fibrosis.

Recurrent Pneumatoses in extreme preterm!

Aurélie De Mul, Marie Saint Faust
Neonatal Intensive Care Unit, Hôpitaux Universitaire de Genève

Cove milk protein allergy (CMPA) is the most common food allergy in children younger than 2 years. Diagnosis and management of CMPA during the first 6 months of life can be challenging. We report the case of a 4-month-old male infant who was referred to our service with recurrent enterocolitis and failure to thrive. CMPA was suspected due to marked delayed milestones, abnormal stools, and respiratory symptoms. Despite a thorough investigation, including a jejunal biopsy and a gastric lavage, we were unable to identify the causal agent. We concluded that the patient had CMPA and recommended starting a strict CMP-free diet and attention must be paid to fortifier ingredients.

Intestinal atresia – it might be an important clue to cystic fibrosis

Chiara De Angelis 1, Corinne Daester 1, Gabriel Konetzny 1, Mark Adams 1, Giancarlo Natalucci 4, Juliane Schneider 3, Jean-Claude Fauchère 1,

A term, female infant was born by elective cesarean section to a 36 year old G3 para 1 mother. Within one hour after birth the baby developed rapidly progressive extensive bruising and petechia periorbitally, on the trunk and extremities. The platelet count in the initial blood draw was 1G/l, other coagulation test results were within normal limits. The baby was otherwise well with a birth weight of 3081g and an Apgar score of 9 at 1 min. The diagnosis in presence of potentially misleading false negative tests, with abnormal diagnostic gene panels, is crucial for early diagnosis and therapy. An affected child will present with bruises/ petechia or other signs of bleeding with isolated thrombocytopenia. NAT1 is of the key causes of intracranial haemorrhage in term infants and occurs in 10-20% of diagnosed children. Therapy with typhoid platelets is only possible for the most frequent genotype HPA1A. Subsequent pregnancies need to be monitored closely for complications and an elective cesarian section is recommended.

Conclusion The diagnosis of NAT should be considered early in newborn babies, who are otherwise well, but present with severe thrombocytopenia and clinically with bruising and petechia.

Characterization of postnatal sodium fluctuation in very preterm neonates

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Discussion

Severe NAT is a rare disease, which requires rapid diagnosis and therapy. An affected child will present with bruises/ petechia or other signs of bleeding with isolated thrombocytopenia. NAT1 is of the key causes of intracranial haemorrhage in term infants and occurs in 10-20% of diagnosed children. Therapy with typhoid platelets is only possible for the most frequent genotype HPA1A. Subsequent pregnancies need to be monitored closely for complications and an elective cesarian section is recommended.

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A Newborn with Bruises

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Bromochondropulmonary dysplasia (BPD): development of a predictive scoring system for premature infants

The BPD-Risk-Score

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Objective
to develop and validate a predictive risk score for bronchopulmonary dysplasia (BPD), according to two clinically used definitions:

1. New-BPD: need for supplementary oxygen (>12 hours per day) during ≥28 cumulative days between birth and 36 weeks of gestation (W36)

2. Old-BPD: need for supplementary oxygen at 36 WDG

Method
Logistic regression was performed in a national cohort (Minimal Neonatal Data Set (MNDS) of the Swiss Neonatal Network including all infants with birth weight <1500 g and/or between 23.07 and 32.06 weeks of gestation 2005-2010, n=1488) to identify predictors of BPD. The BPD-Risk-Score was built as the sum of these factors, weighted according to their coefficients. Internal validation of the score was performed using the bootstrap method (repeated 1000 times). The discriminative properties of the score were analyzed by confusion matrix using the ROC (Receiver Operating Characteristic) Curves (AUC). Calibration was assessed with the use of the Hosmer-Lemeshow goodness-of-fit test.

This calculated BPD-Risk Score was then applied to another population with the same inclusion and exclusion criteria (MNDS of the years 2014 and 2015, n=208) in order to obtain an external validation.

Results
Incidence of New-BPD varied from 21.5% to 11.2% in the national derivation cohort (MNDS 2009-2010) and from 25.1% to 10.5% in the validation cohort (MNDS 2014-2015), according to the first or second definition respectively.

Gestational age, birth weight, corresponding z-score, antenatal corticosteroid treatment, surfactant administration, proven infection, and duration of respiratory support treatment and sum of days of mechanical ventilation were identified as independent predictors of BPD. The AUC of the score in the derivation cohort was 0.59 and 0.89 to 1st and 2nd definition respectively. In the validation cohort AUCs were 0.81 and 0.87. The score was well calibrated in derivation and validation cohorts for both definitions with the Hosmer-Lemeshow test being not significant.

Conclusion
This BPD-Risk-Score is a simple score to predict respiratory outcome for premature infants using 7 variables at any day of life. The score performed well in an external validation and might be a useful tool for clinical practice and neonatal research to identify early patients with a high risk for BPD.

Evaluation of exposure to vancomycin in neonates with current dosing approaches

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Aims and objectives
There is no single consensus regarding optimal dosing of vancomycin in term or preterm neonates. Current dosing recommendations are based on age, kidney function and body weight and developed (NONMEM®). The final model was applied to simulate vancomycin exposure for 20 neonates included in the study. Predicted exposures within and above target exposure were used as a performance measure. Target attainment meant AUC/4MIC ratio of 400-700 and minimal drug concentration of 10-20 mg/L.

Results
Mean predicted vancomycin concentrations during routine TDM. A one-compartment model with linear elimination incorporating covariates such as age, kidney function and body weight was developed (NONMEM®). Validation of the score was performed using the bootstrap method (repeated 1000 times). The discriminative properties of the score were analyzed by confusion matrix using the ROC (Receiver Operating Characteristic) Curves (AUC). Calibration was assessed with the use of the Hosmer-Lemeshow goodness-of-fit test.

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A case of congenital secretory diarrhea with GUCY2C mutation

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Aims and objectives
Congenital sodium diarrhea is a rare cause for severe metabolic acidosis and hypernatremia. This case report focuses on a preterm boy with congenital secretory diarrhea, finally diagnosed with a GUCY2C mutation. The underlying mechanism for severe sodium loss in the newborn helped to find the correct diagnosis.

Materials and methods
We report of a preterm boy who was born and treated at the Department of Neonatology of the University hospital in Zurich. The clinical presentation is published and put into context with prior publications about this rare congenital defect.

Case report
Prenatal ultrasound demonstrated dilated bowel loops and a prominent polyhydramnios suggesting intestinal atresia. The 2-kg-newborn was delivered via cesarian section at 27 8/7 weeks gestation due to a polyhydramnios and postnatal cardiolungus ultrasound and cardiac pathologodiagnost. The newborn showed a poor postnatal adaptation (Apgar at 1/5/10min of life: 1/5/6) and was therefore intubated. High respiratory support was applied to ensure adequate oxygenation (maximum peak inspiratory pressure 50, PEEP 10, TID 2). The baby exhibited with massive abdominal distension. Circulatory support via fluid application, combined with extensive catheterisation support was needed. Dehydration was sus- pected. Laboratory analysis showed in normal urine output 180 mg/dl creatinine, with a creatinine clearance of 250 ml/min. Metabolic acidosis became worse at day three if urine pH 7.16, Co2-BPA, BE- 12, potassium 13. Impactation of fluid therapy was monitored. Gastric fluid levels were increased between 3 and 4 liters and every 4 hours and abdominal surgery did not show any intestinal obstruction. On day three of life, sodium levels below 130 mmol/L were detected. Only sodium substitution higher than 30 mmol/kg helped to normalise blood sodium levels. Consequently, congenital sodium diarrhea were suspected. Sodium levels were measured. Vancomycin DNA samples were collected in genomic DNA samples and were used for a de novo GUCY2C or TTHR3B8 mutation, consecutively.

Conclusions
If low sodium levels cannot be explained by increased intravascular water content, sodium loss has to be suspect ed. These losses may be caused by decreased levels of aldosterone or cortisol, by vomiting, diarrhoea or impaired skin barrier (burns). If there is a prenatal history of polyhydramnios and massive bowel dilatation combined with postnatal impresive loss of water and sodium, diarrhoea is one – rare – differential diagnosis.

Air leaks and prenatal exposure to magnesium sulphate: coincidence or causality?

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Aims and objectives
Pulmonary interstitial emphysema (PIE) and pneumothorax are known complications of mechanical ventilation in preterm infants. However, restrictive use of mechanical ventilation and the implementation of non-invasive respiratory support such as continuous positive airway pressure (CPAP) is also associated with the development of air leaks and surfactant administration are among the most important strategies to reduce the risk of air leaks. We try to identify risk factors in newborns with air leaks in newborns with a history of prenatal exposure to magnesium.
The impact of newborns on their parents’ quality of life

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Background, aims and objectives
The number of preterm infants is constantly increasing. Preterm infants are at risk for a range of disease conditions such as low birth weight, persistent ductus arteriosis, bronchopulmonary dysplasia, cerebral haemorrhage, Retinopathy of prematurity and necrotizing enterocolitis. This prospective project assesses the families’ quality of life and possible protective factors which could prevent adverse effects. Differences between parental quality of life of term born versus preterm born infants who have survived the first three months. The fathers’ quality of life and the couple’s relationship will be further important topics of research in this project, as previous studies have shown. Studies are needed to determine whether the quality of life of parents is affected by the prematurity of their newborn. Thus our study aims to include mothers and fathers with preterm newborns and investigate the impact on their quality of life.

Material and methods
We apply a questionnaire including standardised questions: SF-12, EPDS (Edinburgh Postnatal Depression Scale), SCU (Swiss Quality of Inpatient Care Study – Zurich, Switzerland, Mea- sure Parenting Self-Efficacy). The SF-12 is a questionnaire used to measure the health related quality of life of adults. The EPDS, CSI and TOPSE will be used to find possible risk and protective factors for families more likely of having a lower quality of life. Additionally, the parents are asked for the reasons for the problems.

Case presentation

Ms Selim Hamed

A female term infant born by vaginal delivery at 40 4/7 weeks of gestation had a white forelock and areas of depigmented skin on the anterior trunk and extremities, and cafe-au-lait macules. Further clinical examination was normal. We enforced a histological examina- tion showing no obvious signs and evident laboratory findings. A pragmatic conservative, observant approach was feasible in this asymptomatic presentation of Citrobacter koseri brain abscess by cultural examination. After diagnostic, intravenous antibiotic treatment was given for 5 ½ weeks, leading to an almost completely regression of the cysts.

Discussion

Incidence of piebaldism is less than 1 : 20 000, no dif- fference noted up to date. Laboratory findings did not show signs of pie- baldism. The parents have not been genetically tested yet. Today the child is 2 years old with normal development and no other ill-ness noted up to date.

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Clinical cases & summary results  Both BW and GA are significant predictors for case related costs in the linear regression model (BW R^2=0.35, p<0.001 ; GA R^2=0.47, p<0.001). By testing GA and BW for multicollinearity we could show, that it does only slightly impair the efficacy of the model (VIF 1.14).

BW categorization by SwissDRG groups: GA as a predictor is significant in the BW-categories (1250-1499g, R^2=0.32 ; 1500-1999g, R^2=0.36 ; 2000-2500g, R^2=0.31 ; all p<0.0001), whereas BW is not (R^2=0.06/0.12/0.03). There is a remarkable difference of R^2 especially in the group of 2000-2500g between GA and BW as a single predictor (R^2=0.32 versus 0.03). GA+BW combined show a better impact than GA alone (<750g, R^2=0.62 ; 750-999g, R^2=0.10 ; 1000-1249g, R^2=0.21 ; 1250-1499g, R^2=0.33 ; 1500-1999g, R^2=0.38 ; 2000-2500, R^2=0.32). The group of cases >2500g shows no significant prediction for GA and/or BW.

GA categorization: GA as a predictor is significant in each GA-category (p<0.0001). However, classified by GA, GA+BW show highest prediction compared to BW or GA, especially in the group of late preterm and very preterm (R^2=0.32/0.41). The combination of variables GA+BW is most effective in all GA groups.

Conclusion(s)  The hypothesis that GA is a potent predictor of case related costs could be confirmed. Within the different classes an assessment of either GA or BW or a combination, probably even introducing a factor, would be highly suitable to predict costs and refine the DRG systems especially concerning specific groups as the late preterm infants.

Comparing all models, GA categories with the variables GA+BW combined give the best prediction to costs. However, with R^2 being below 0.5 in most groups and models, we state that case related costs can be explained by either variable GA/BW only partially.