ID 180 - RED BLOOD CELL TRANSFUSIONS BENEFIT EARLY NEUROLOGICAL FUNCTIONING OF PRETERM INFANTS

Miss Willemien S. Kalteren1, Mrs. Karianne E. Kraft1, Mrs. Klasien A. Bergman1, Mrs. Dr. Elisabeth M.W. Kooi1, Prof. Dr. Arend F. Bos1

1Department of Pediatrics, Division of Neonatology, Beatrix Children’s Hospital, University Medical Center Groningen, Groningen, Netherlands

Background:
Most very and extremely preterm infants receive at least one red blood cell (RBC) transfusion during their stay in the neonatal intensive care unit. The effects of both anemic hypoxia, and the subsequent RBC transfusion with potential reperfusion injury, on early neurological functioning in preterm infants are largely unknown. Our aims were therefore to determine whether the neurological functioning changed in preterm infants following their first RBC transfusion, and whether this might be related to differences in cerebral oxygen saturation.

Methods:
We prospectively recorded the general movements (GMs) of preterm infants (gestational age <32 weeks) within a few days before and after their first RBC transfusion. We determined the neurological functioning using general and detailed GM assessment. First, we scored the general quality of as either normal or abnormal. Second, we assessed the general movement optimality score (GMOS). Furthermore, we assessed cerebral oxygen saturation (rcSO2) from before until 24-hours after RBC transfusion. We performed regression analyses to test whether differences in hemoglobin level and rcSO2 were related to the change in GMOS.

Results:
We included 24 preterm infants with a median gestational age of 27.3 weeks and a median birth weight of 863 grams, of whom ten were boys. Before RBC transfusion, one infant had normal GMs. After transfusion, four infants had normal GMs. Median GMOS increased from 25 to 33 points after RBC transfusion, p<0.01 (Figure 1). Twenty infants improved, two remained stable, and two deteriorated. Median hemoglobin increased from 6.3 mmol/L at baseline to 8.4 mmol/L 24-hours after transfusion, p<0.01. Median rcSO2 increased from 68% to 80% respectively (Figure 1). Each mmol/L gain in hemoglobin 24-hours after RBC transfusion was associated with a 5 points higher GMOS 95%-confidence interval 2–7, p = 0.001). A 10% rcSO2 increase after 24-hours was associated with a 9 points higher GMOS after RBC transfusion (95%-confidence interval 6–12, p<0.01).

Conclusion:
RBC transfusions benefit the early neurological functioning of preterm infants instantly, possibly mediated by a rise in cerebral oxygen saturation. Our findings suggest beneficial effects of RBC transfusions on brain development, which need further elucidation.
Figure 1. General movement optimality scores, hemoglobin level and cerebral oxygen saturation
** p=0.001; *** p<0.001.
GMOS, general movement optimality score; RBC, red blood cell transfusion; rcSO2, cerebral tissue oxygen saturation.
None declared.
ID 182 - RED BLOOD CELL TRANSFUSIONS ARE ASSOCIATED WITH SHORT-TERM INTESTINAL INJURY IN PRETERM INFANTS

Miss Willemien S. Kalteren1, Prof. Dr. Arend F. Bos1, Mrs. Klasien A. Bergman1, Dr. Willem van Oeveren2, Prof. Dr. Jan B.F. Hulscher3, Mrs. Dr. Elisabeth M.W. Kooi1

1Department of Pediatrics, Division of Neonatology, Beatrix Children’s Hospital, University Medical Center Groningen, Groningen, Netherlands, 2HaemoScan BV, Groningen, Netherlands, 3Department of Surgery, Division of Pediatric Surgery, University Medical Center Groningen, Groningen, Netherlands

Background: Anemic preterm infants may require red blood cell (RBC) transfusions to maintain sufficient oxygen supply to vital organs. Transfusion treatment, however, is not always without adverse (intestinal) effects. We aimed to investigate short-term effects of RBC transfusions, and hypothesize to find signs of both intestinal injury and oxidative stress following RBC transfusion, possibly related to levels of splanchnic re-oxygenation.

Methods: We prospectively included preterm infants (gestational age <32 weeks). We measured urinary biomarkers for intestinal cell damage (intestinal fatty acid-binding protein, I-FABP) and oxidative stress (8-isoprostane) directly before and after RBC transfusion. Cerebral and splanchnic oxygen saturation (rcSO2 and rsSO2) and rsSO2 variability were assessed simultaneously using Near-Infrared Spectroscopy. We used non-parametric tests for related samples to compare different time points. Next, we assessed the association between urinary biomarkers using Spearman’s Correlation Test.

Results: Twenty-nine preterm infants, fourteen boys and fifteen girls, median gestational age 27.3 weeks (range 24.9–31.0), median birth weight 865 grams (range 630–1850), received 58 RBC transfusions at a median postnatal age of 17 days (range 2–31). Six (21%) developed necrotizing enterocolitis (NEC) ≥ stage II within three days after transfusion. Figure 1 shows that urinary I-FABP and 8-isoprostanes increased significantly following RBC transfusion (median 4732 to 6968pg/ml and 282 to 606pg/ml respectively). Both rcSO2 and rsSO2 also increased significantly after transfusion (Figure 1). Level of I-FABP increase was correlated with level of 8-isoprostane increase (rho=0.562, p<0.001). The increase in urinary I-FABP and 8-isoprostanes was more pronounced in infants that developed NEC.

Conclusion: In preterm infants, RBC transfusions are associated with an increase in urinary I-FABP and 8-isoprostanes, signs of intestinal injury and oxidative stress. These results support the susceptibility of the preterm splanchnic vasculature, and suggest that RBC transfusions cause intestinal (re-oxygenation) injury. The suggested intestinal injury and oxidative stress after RBC transfusion, possibly from intestinal re-oxygenation, may represent the early process of the pathogenesis of transfusion-associated necrotizing enterocolitis.
Urinary I-FABP and 8-isoprostane, hemoglobin level, and cerebral and splanchnic oxygen saturation at several time points before and after red blood cell transfusion

** p<0.01

None declared
ID 183 - NEONATAL ANEMIA IS ASSOCIATED WITH INTESTINAL INJURY IN PRETERM INFANTS

Miss Willemien S. Kalteren¹, Prof. Dr. Arend F. Bos¹, Dr. Willem van Oeveren², Prof. Dr. Jan B.F. Hulscher³, Mrs. Dr. Elisabeth M.W. Kooi¹

¹Department of Pediatrics, Division of Neonatology, Beatrix Children’s Hospital, University Medical Center Groningen, Groningen, Netherlands, ²HaemoScan BV, Groningen, Netherlands, ³Department of Surgery, Division of Pediatric Surgery, University Medical Center Groningen, Groningen, Netherlands

Background:
Anemia, described as low hemoglobin (Hb) levels, is a common comorbidity in preterm infants admitted to the neonatal intensive care unit (NICU). Anemia is associated with a decline in tissue mixed venous saturations and is a proposed mechanism for necrotizing enterocolitis (NEC). We aimed to investigate whether anemia is associated with intestinal injury, by comparing infants prior to red blood cell (RBC) transfusion with matched controls. We hypothesize to find signs of (hypoxic) intestinal injury with decreasing Hb levels.

Methods:
We performed a case-control study in which we selected preterm infants (gestational age <32 weeks) who received a RBC transfusion. For each case, we matched a control infant based on gestational age, birth weight and postnatal age. To assess intestinal cell damage we prospectively measured urinary intestinal fatty acid-binding protein, I-FABP, twice weekly. To investigate the presence of concomitant hypoxia we assessed splanchnic oxygen saturation (rsSO2) and rsSO2 variability simultaneously. Hemoglobin levels were collected on clinical purpose. We limited data to the samples collected before RBC transfusion, if administered. We subsequently used Spearman’s Correlation Tests to analyze whether Hb level, rsSO2, and rsSO2 variability were associated with levels of I-FABP on several time points prior to transfusion.

Results:
Seventy-two preterm infants, median gestational age 27.6 weeks (range 24.1–31.0) and median birth weight 1020 grams (630–1850), were included. Median postnatal day of RBC transfusion was 11 (2–29). Hemoglobin was lower in cases already from six days prior to transfusion (Figure 1A). Figure 1B shows that urinary I-FABP increased with increasing postnatal age, most prominent in cases. Both rsSO2 and rsSO2 variability were lower in cases at the last moments before transfusion compared to controls (Figure 1C and 1D). Within all infants, hemoglobin levels <24-hours correlated strongly yet negatively with concurrent levels of urinary I-FABP (rho = -0.670, p<0.01), as did rsSO2 and rsSO2 variability (rho = -0.282, p<0.05 and rho = -0.526, p<0.01 respectively).

Conclusion:
Increasing levels of urinary I-FABP are present in a substantial proportion of preterm infants prior to RBC transfusion compared to their matched controls, which may predispose anemic infants to NEC-associated intestinal injury.
Hemoglobin level, urinary I-FABP, and splanchnic oxygen saturation at several time points in cases and controls on the same postnatal days.

Black boxes, cases; grey boxes, controls; *p<0.05; **p<0.01; ***p<0.001.

None declared
HIGH AMOUNTS OF ANDROGENS ARE SUPPLIED VIA PLASMA TRANSFUSIONS FROM MALE ADULTS TO VERY PRETERM INFANTS: NO EFFECT ON CIRCULATING LEVELS IN THE RECEIVING CHILD

PhD Anders K Nilsson, PhD Gunnel Hellgren, MSc Ulrika Sjöbom, PhD Andreas Landin, MD Dirk Wackernagel, Prof David Ley, MD Ingrid Hansen Pupp, Prof Matti Poutanen, Prof Claes Ohlsson, Prof Ann Hellström

Department of Clinical Neuroscience, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, Institute of Biomedicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, Institute of Health and Care Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, Department of Internal Medicine and Clinical Nutrition, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, Department of Neonatology, Karolinska University Hospital and Institute, Astrid Lindgrens Children’s Hospital, Stockholm, Sweden, Department of Pediatrics, Institute of Clinical Sciences Lund, Lund University and Skane University Hospital, Lund, Sweden, Institute of Biomedicine, Research Centre for Integrative Physiology and Pharmacology and Turku Center for Disease Modeling, University of Turku, Turku, Finland

Background.
Sex steroid hormones contribute to the regulation of fetal and neonatal organ maturation. Very preterm infants are often transfused with plasma from adult donors. Specifically, only men are considered as donors to prevent immune-mediated transfusion reactions. The sex steroid profile of adult male plasma is likely very different from that of the receiving child. This study aimed to determine if sex steroids from male donor plasma affect circulating sex steroids in receiving preterm infants.

Methods.
Nineteen infants born at gestational age <29 weeks requiring plasma transfusion during their first week of life were recruited at three neonatal intensive care units in Sweden. The concentrations of seven sex steroids were analyzed by GS-MS/MS in donor plasma and infant plasma collected immediately before start, after transfusion, and at 6h, 12h, 24h, 72h after the end of the transfusion.

Results.
The concentrations of progesterone, dehydroepiandrosterone, and androstenedione were lower in donor plasma than in infant plasma before the start of transfusion, while the concentration of estrone and estradiol were higher in donor plasma. Testosterone and dihydrotestosterone (DHT) levels were on average 364 and 36-fold higher in donor plasma as compared to pre-transfusion levels in female infants whereas the corresponding difference was not present in male infants. No change in infant plasma levels of any of the analyzed sex steroids were found when comparing before and after completed transfusion, irrespective of the gender of the receiving infant.

Conclusions.
A single transfusion of adult male plasma to preterm infants has limited impact on circulating sex steroid levels irrespective of the gender of the receiving infant. Administered male donor plasma exposes female preterm infants to high amounts of testosterone and DHT, which are rapidly cleared from the circulation. Further studies are needed to discern possible effects on organ development in female recipients of male donor plasma.

None declared
INFLUENCE OF PHYSIOLOGICAL BASED CORD CLAMPING (PBCC) ON CARDIOPULMONARY STABILITY IN PRETERM NEONATES DURING THE FIRST 24 HOURS AFTER BIRTH

Doctor Nina Höller, Doctor Christina Wolfsberger, Doctor Ernst Prethaler, Prof. Gerhard Pichler, Prof. Berndt Urlesberger

Medical University of Graz, Graz, Austria

Background:
Animal studies and recent human studies in preterm neonates have shown better cardiorespiratory stability during immediate transition using physiological based cord clamping (PBCC). The present observational study investigated the influence of PBCC in preterm neonates on immediate postnatal stabilisation and in addition on cardiorespiratory stability during first 24 hours after birth.

Methods:
Preterm neonates (<32 weeks of gestation) with a birth weight <1500g, who were admitted to the NICU of the Medical University Graz, were included in this retrospective study. PPBC was introduced in June 2020. Included neonates with PBCC delivered since June 2020 were matched 1:1 according to their gestational age (± 1 week) and birth weight (± 100g) to neonates delivered from December 2014 to February 2021 with routine management (control group) and a routine cord clamping time of 30sec. Neonates of the PBCC group were stabilised after birth according to local standard guidelines using a mobile and heated resuscitation table for intact cord resuscitation. Routine monitoring parameters (heart rate [HR], arterial oxygen saturation [SpO2], respiratory rate [RR], mean arterial blood pressure [MABP]) in each minute of the first 15 minutes and in each hour during the first 24 hours after birth, as well as results of the first blood gas analyses (pH, pO2, pCO2, bicarbonate, base excess) were compared between the two groups.

Results:
44 preterm neonates were included (PBCC n=22; control n=22). Demographic data are displayed in table 1. The first blood gas analyses (sample time median [IQR] for PBCC: 90 [60-120]minutes; controls: 100 [90-120]minutes) showed higher pO2 values in the PBCC group compared to controls (69.0 [46.9-74.5]mmHg vs. 47.2 [41.7-59.0]mmHg; p=0.04), without difference in supplemental FiO2. Concerning monitoring parameters, no significant differences between the two groups were observed, neither during immediate transition, nor within the first 24 hours after birth.

Conclusion:
There was no difference in routine monitoring parameters comparing PBCC (in combination with a mobile and heated resuscitation table) to standard delayed cord clamping technique, neither during immediate transition, nor within the first 24 hours. Interestingly, there was a significant difference in the first paO2, showing an improved oxygenation in the PBCC group.
<table>
<thead>
<tr>
<th></th>
<th>PBCC group</th>
<th>Control group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>22</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>28.0 (26.0; 28.6)</td>
<td>27.6 (26.1; 28.6)</td>
<td>0.92</td>
</tr>
<tr>
<td>Birth weight (g)</td>
<td>917 (700; 996)</td>
<td>880 (739; 1078)</td>
<td>0.94</td>
</tr>
<tr>
<td>NAEPH</td>
<td>7.27 (7.20; 7.34)</td>
<td>7.33 (7.28; 7.39)</td>
<td>0.06</td>
</tr>
<tr>
<td>APGAR 1min</td>
<td>8 (5; 8)</td>
<td>6 (5; 8)</td>
<td>0.65</td>
</tr>
<tr>
<td>APGAR 5min</td>
<td>8 (8; 9)</td>
<td>8 (8; 9)</td>
<td>0.46</td>
</tr>
<tr>
<td>APGRA 10min</td>
<td>9 (8; 9)</td>
<td>9 (9; 9)</td>
<td>0.38</td>
</tr>
<tr>
<td>Cord clamping time (sec)</td>
<td>180 (150; 205)</td>
<td>30 (30; 30)</td>
<td>&lt;0.01*</td>
</tr>
</tbody>
</table>

Table 1: Demographic data of 44 preterm neonates. Data are presented as median (IQR). A p-value <0.05 was considered statistically significant.

None declared
ID 385 - PERIPHERAL ARTERIAL CATHETERIZATION IN EXTREMELY PREMATURE INFANTS AT AN AUSTRIAN TERTIARY CENTER

Mr Bernhard Schwaberger¹, Mrs Michaela Schneider¹, Mrs Marlies Bruckner¹, Prof Friedrich Reiterer¹, Mr Lukas Peter Mileder¹, Mrs Nariae Baik-Schneditz², Prof Gerhard Pichler¹, Prof Berndt Urlesberger¹ ¹Division of Neonatology, Department of Pediatrics and Adolescent Medicine, Medical University of Graz, Graz, Austria

BACKGROUND
Besides umbilical artery catheterization, another option for arterial catheter management in neonates are peripheral arterial catheters (pAC). Although frequently used, only little is known about catheter dwell time, insertion sites, reasons for catheter removal, adverse event rates associated with pAC, and frequency of use, particularly in extremely premature infants.

METHODS
Retrospective data analysis of electronic patient records of all extremely premature infants (<28 weeks of gestation) born at the University Hospital Graz, Austria between January 2014 and December 2020.

RESULTS
A total of 196 premature infants with a median (IQR) gestational age of 25.7 weeks (24.6-26.6) and birth weight of 730 g (614-898) were included. In 155 (79%) of these neonates, 286 pAC (and six umbilical artery catheters) were inserted successfully during their stay at the neonatal intensive care unit. In median (IQR), the first pAC was inserted 2.5 h (1.4-7.4) after birth and the catheter dwell time was 57.5 h (22.5-107.2). The pAC insertion sites were the radial artery (63%), posterior tibial artery (21%), ulnar artery (6%), dorsalis pedis artery (6%), other sites (1%), and not documented (3%). Neither gestational age and birth weight, nor catheter insertion site correlated with the catheter dwell time.

Reasons for pAC removal were loss of function (41%), impaired peripheral perfusion (17%), others (14%) and not documented (28%). Complications including temporarily impaired peripheral perfusion, local inflammation, extravasation or bleeding were reported in 13% of all pAC, but none of these resulted in a persistent loss of function/disability. In median (IQR), 9 (5-18) arterial blood samples were drawn from pAC.

CONCLUSION
This data collected at an Austrian tertiary center show that pAC are frequently utilized in extremely premature infants and suggest that their use is feasible and safe. The median catheter dwell time was 57.5 h. During this time, pAC enabled continuous non-invasive blood pressure monitoring, which is potentially crucial during neonatal intensive care, and reduced the number of painful interventions distinctly by avoiding heel punctures or venous blood sampling. Noteworthy, there were no serious adverse events associated with pAC placement.

None declared
ID 402 - EVALUATING LATE ADMINISTRATION OF ERYTHROPOIETIN (EPO) IN PRETERM INFANTS WITH BIRTH WEIGHT ≤ 1,250 GRAMS

**Miss Alison Chen**, RPH Alyssa Le, Dr. Cherry Uy, Dr. Fayez Bany-Mohammed

1University Of California, Irvine, Orange, United States

**Background:**
Current data shows that late administration of EPO reduces the number of transfusions. However, EPO dosing varies, and the transfusion reduction may not be clinically significant. The purpose of this study is to determine the efficacy and safety of late administration of EPO in decreasing late RBC transfusions and donor exposure.

**Methods:**
This is a single-center retrospective review comparing preterm infants with birth weight ≤ 1,250 grams who received late EPO treatment (1,200 units/kg/week after 3 weeks of life) vs no EPO (control arm) for study period 2015-2019. Infants with congenital anomalies, thromboembolic disease, hypertension, or seizures were not eligible to receive EPO. Primary outcome measures were the number of late blood transfusions, total volume transfused, number of donors an infant is exposed to and hemoglobin prior to discharge. Secondary outcomes include the incidence of retinopathy of prematurity (ROP), intraventricular hemorrhage (IVH), necrotizing enterocolitis (NEC) and bronchopulmonary dysplasia (BPD). Student's t test, Wilcoxon rank sum test, Chi-square, or Fisher's exact test were used where appropriate.

**Results:**
Two hundred and thirty-five infants were included (138 in EPO arm vs 97 in control). Infants who received EPO were of younger gestation age (weeks) and smaller birth weight (g) (27.0±2.04 vs 28.5±2.30; 868±218 vs 987±225, p=0.0001). The percentage of infants requiring late blood transfusions were similar in both arms (37.0% in EPO vs 25.8% in control arm, p=0.07). The number of late transfusions per patient was significantly lower in EPO vs control (2.0±1.8 vs 4.0±2.8, p=0.0006). Total transfusion volume per patient (mL/kg) and the number of donors per patient were also significantly less in the EPO vs the control arm (57.0±49.7 vs 89.4±64.3, p=0.008; 1.19±0.56 vs 1.74±0.93, p=0.0006). Despite having a lower hemoglobin at 3 weeks of age, hemoglobin (g/dL) prior to discharge was significantly higher in the EPO group (11.7±1.5 vs 10.8±1.5, p=0.0001). No differences in the incidence of NEC, severe IVH, severe ROP and BPD between the two arms were observed (p>0.05).

**Conclusion:**
Late administration of EPO in preterm infants with birth weight ≤ 1,250 grams reduces the number of late transfusions, total transfusion volume, and donor exposure.
<table>
<thead>
<tr>
<th></th>
<th>Intervention n = 138</th>
<th>Control n = 97</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcome</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients with late blood transfusions, n (%)</td>
<td>51 (37.0)</td>
<td>25 (25.8)</td>
<td>0.0712</td>
</tr>
<tr>
<td>No. of late transfusions received</td>
<td>2.04 ± 1.84</td>
<td>3.96 ± 2.79</td>
<td>0.0006</td>
</tr>
<tr>
<td>Patients with blood transfusions, n (%)</td>
<td>63 (45.7)</td>
<td>31 (32.0)</td>
<td>0.0349</td>
</tr>
<tr>
<td>Time to first blood transfusion, days</td>
<td>11 [11-21]</td>
<td>9 [9-16]</td>
<td>0.9677</td>
</tr>
<tr>
<td>Volume of transfusions per patient, mL/kg</td>
<td>57.04 ± 49.71</td>
<td>89.35 ± 64.30</td>
<td>0.0081</td>
</tr>
<tr>
<td>No. of donor exposure</td>
<td>1.19 ± 0.56</td>
<td>1.74 ± 0.93</td>
<td>0.0006</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinopathy of prematurity, n (%)</td>
<td>60 (43.5)</td>
<td>25 (25.8)</td>
<td>0.0054</td>
</tr>
<tr>
<td>Severe ROP (Stage 3)</td>
<td>23 (38.3)</td>
<td>4 (16.0)</td>
<td>0.072</td>
</tr>
<tr>
<td>Intraventricular hemorrhage, n (%)</td>
<td>22 (15.9)</td>
<td>16 (16.5)</td>
<td>0.9098</td>
</tr>
<tr>
<td>Grade 1</td>
<td>12 (54.5)</td>
<td>7 (43.8)</td>
<td>0.5111</td>
</tr>
<tr>
<td>Grade 2</td>
<td>3 (13.6)</td>
<td>3 (18.8)</td>
<td>0.6695</td>
</tr>
<tr>
<td>Grade 3</td>
<td>1 (4.5)</td>
<td>3 (18.8)</td>
<td>0.1589</td>
</tr>
<tr>
<td>Grade 4</td>
<td>6 (27.3)</td>
<td>3 (18.8)</td>
<td>0.5418</td>
</tr>
<tr>
<td>Necrotizing enterocolitis, n (%)</td>
<td>8 (5.8)</td>
<td>10 (10.3)</td>
<td>0.2004</td>
</tr>
<tr>
<td>Bronchopulmonary dysplasia, n (%)</td>
<td>31 (22.5)</td>
<td>14 (14.4)</td>
<td>0.1235</td>
</tr>
<tr>
<td>All-cause mortality, n (%)</td>
<td>3 (2.2)</td>
<td>4 (4.1)</td>
<td>0.3867</td>
</tr>
<tr>
<td>Hemoglobin prior to discharge, g/dL</td>
<td>11.67 ± 1.48</td>
<td>10.84 ± 1.45</td>
<td>0.0001</td>
</tr>
<tr>
<td>Hospital length of stay, days</td>
<td>81.03 ± 30.58</td>
<td>64.86 ± 39.73</td>
<td>0.0005</td>
</tr>
<tr>
<td>Gestational Age at discharge, wks</td>
<td>38.35 ± 4.85</td>
<td>37.76 ± 5.12</td>
<td>0.3763</td>
</tr>
</tbody>
</table>

Table 1. Clinical Outcomes and Characteristics by Cohort
All values reported as median [IQR] or mean ± SD unless otherwise stated

None declared
ID 495 - VALIDATION OF ELECTRICAL CARDIOMETRY TO MEASURE CARDIAC OUTPUT IN CRITICALLY ILL NEONATES

BSc. Chantal Lokhorst¹, MD PhD Robin van der Lee¹, MD PhD Sabine Vrancken¹, MD PhD Willem-Pieter de Boode³
¹RadboudUMC, Nijmegen, Netherlands

BACKGROUND
Patients admitted to a neonatal intensive care unit (NICU) are continuously monitored on heart rate and blood pressure. However, to assess the hemodynamic state more accurately, the cardiac output (CO) should also be taken into consideration, as this can assist in timely recognition of hypoperfusion and early stages of shock. Measuring the CO in neonates is complex, as most of the methods used in adults cannot be applied in neonates. The ICON© is an electrical cardiometry monitoring system based on bioimpedance that continuously measures CO. Research validating electrical cardiometry in (preterm) neonates is scarce. Therefore, the aim of this study is to validate the ICON with transthoracic echocardiography.

METHODS
Patients admitted to the NICU of the RadboudUMC Nijmegen, the Netherlands, with a gestational age between 26 and 42 weeks were included. Cardiac output was continuously measured using ICON (CO_ICON) and transthoracic echocardiography was performed at least once per day to obtain left and right ventricle output (LVO_echo, RVO_echo). Bland-Altman analysis was performed to determine the agreement between the two methods. Additionally, the measured values were categorized as low (<150 ml/min/kg), normal (150-350 ml/min/kg) and high (>350 ml/min/kg) cardiac output and compared.

RESULTS
35 echocardiography’s were performed in 14 neonates with a mean ± SD gestational age of 30.1 ± 1.7 weeks and a weight of 1218 ±290 g. CO_ICON and LVO_echo were similar (219±38 ml/min/kg vs 241±94 ml/min/kg, p=0.2), CO_ICON and RVO_echo differed (324±108 ml/min/kg, p<<0). Bland-Altman analysis of CO_ICON and LVO_echo [RVO_echo] resulted in a mean bias and precision (1.96×SD) of 22 [104] and 203 [216] ml/min/kg, respectively, with a percent bias of 9.7% [38.2%] and a percent error of 88.4% [79.4%]. CO_ICON gave a similar categorization as LVO_echo and RVO_echo in 65.7% and 61.7% of the measurements, respectively, all within the normal CO range. A lower CO_ICON value was found in 17.1% and 38.2% for LVO_echo and RVO_echo, respectively, and a higher value in 17.1% and 0%.

CONCLUSION
Low agreement between CO_ICON, and LVO_echo and RVO_echo, but the ability of the ICON to categorize cardiac output similarly as the LVO and RVO is promising.

None declared
ID 575 - PLASMA LEVELS OF TAU PREDICT POSTOPERATIVE WHITE MATTER INJURY AFTER CARDIOPULMONARY BYPASS IN THE NEONATE

**Doctor Åsa Jungner**, Professor Kaj Blennow, Professor Henrik Zetterberg, Professor David Ley

1Skane University Hospital, Lund University, Lund, Sweden, 2The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden

**BACKGROUND**
Neonates born with a critical congenital heart defect are at risk for brain white matter injury and impaired neurodevelopmental outcome. The association with brain injury blood biomarkers in neonatal open-heart surgery is not well defined.

**METHODS**
Forty term neonates with critical congenital heart defects were included in a clinical study aiming to delineate the influence of exposure to cell-free hemoglobin and supranormal oxygen tensions on postoperative brain white matter integrity. This abstract reports on pre- and postoperative plasma levels of brain injury markers, a predefined secondary outcome.

Plasma glial fibrillary acidic protein (GFAP), neurofilament light chain protein (NFL) and tau were measured preoperatively and at postoperative day 1 – 3 using ultrasensitive Simoa immunoassays on a HD-X instrument (Quanterix Corp). Univariate regression analyses were used to determine the influence of sex, postmenstrual age and biventricular repair (yes/no) on plasma brain injury marker concentrations at respective time point. The predictive potential for white matter injury at the postoperative MRI scan was assessed for all brain injury markers. Comparison of proportions was done using Fisher’s exact test. Considering the exploratory nature of investigations, results were not corrected for multiple analyses.

**RESULTS**
The measured brain injury markers followed uniform temporal dynamics where GFAP and tau reached their respective maximal values at postoperative day 2, whereas NFL increased throughout the measured time period.

Sex and postmenstrual age at surgery did not influence brain injury marker concentrations. Plasma concentrations of tau at postoperative day 2 and postoperative day 3 was significantly increased in neonates having undergone a palliative procedure, Fig 1a. Plasma levels of tau at postoperative day 2 was significantly increased in neonates with subsequent postoperative white matter injury in univariable analysis, Fig 1b. The proportion of neonates with brain white matter injury at the postoperative MRI scan was not significantly different in the groups with biventricular repair and palliative procedure, respectively.

**CONCLUSIONS**
Brain injury marker levels in blood follow uniform temporal dynamics after cardiopulmonary bypass circulation in the neonate. Concentrations of tau at postoperative day 2 was increased in neonates with subsequent white matter injury.
Fig 1a) Plasma brain injury markers in neonates subjected to biventricular repair or palliative procedure. 1b) Plasma brain injury markers in neonates with or without postoperative white matter injury.

None declared
Miss Amina Houssary

Lebanese International University, Beirut, Lebanon

Background:
Bone health is a complex issue affected by multiple hormones and minerals. Findings show that 1 out of 3 women and 1 out of 5 men are suffering from osteoporosis. Some of the adults group are suffering from Adult Lactose Intolerance (ALI). Those cases prefer not consume dairy products since they feel uncomfortable after eating cheese or drinking milk knowing that they are not lactose-free food. Now, we investigate the influence of (ALI) on Calcium intake, absorption and osteoporosis.

Method:
Investigated calcium intake single nucleotide polymorphism of LCT, markers of bone metabolism and BMD in 183 Turkish immigrants.

Result:
154 out of 183 was (ALI) diagnosed. Osteopenia was diagnosed in 59 out of 183 (32%) and osteoporosis in 15 out of 183 (8%). Probands had a decreased calcium intake and probands with reduced bone mass density (BMD) had (ALI) in 86%. There was no significant association between (ALI), Calcium intake, BMD or markers of bone metabolism.

Conclusion:
Turkish immigrants who suffer from (ALI) don’t consume dairy products and this means low calcium intake compared to other people who normally eat dairy products. However, (ALI) didn’t significantly influence calcium intake. Therefore, (ALI) doesn’t seem to be a risk factor for osteoporosis or affect directly the bone health.


Calcium rich food
Calcium needs and standards
Pubmed resources
ID 8 - IS SMALL FOR GESTATIONAL AGE STATUS INDEPENDENT CORRELATED WITH BMI, AND BODY COMPOSITION DURING CHILDHOOD?

Doctor Foteini Balomenou¹, Professor Dimitrios Rallis¹, Doctor Filippos Evangelou¹, Doctor Anna Zisi¹, Doctor Kalliopi Balomenou¹, Doctor Nikolaos Tsekas¹, Professor Meropi Tzoufi¹, Professor Ekaterini Siomou¹, Professor Vasileios Giapros¹

¹University Of Ioannina, Ioannina, Greece

BACKGROUND

It is controversial whether small for gestational age status (SGA) as a proxy of in-utero growth restriction has an effect on body composition and obesity later in childhood. The aim of this study was to examine if SGA status is correlated with alterations in body composition at prepuberty independent of other prenatal, perinatal and postnatal factors by comparing children born SGA with those born with appropriate weight at birth (AGA).

METHODS

We examined anthropometrics, waist circumference, BMI, 6 skin-fold thickness and body composition by using the method of Bioelectrical Impedance (BIA) in 636 children aged 7-10 years living in the same city in Northwestern Greece. This number is representative of the total population with similar age living in the area. The factors that were taken into consideration were: age, gender, birth order, birth mode, mother’s age, prepregnancy weight, weight gain during pregnancy, pathology of pregnancy, previous SGA child, social status, BMI of both parents type of feeding, daily exercise duration of the children.

RESULTS

Among 636 children who were examined at a mean age of 9 years 106 were SGA (BW<10 percentile) and 530 were AGA (BW>10<90 percentile). The 2 groups did not differ in regard gender and age at the study period. SGA children had a higher percentage of caesarian section (72% vs 33% p<0.01) and a history of a previous SGA and a lower percentage of breast feeding.  SGA born children had lower BMI (0.26±0.89 vs 0.46±0.84 z-scores, p<0.05) but similar waist circumference (-0.14±0.56vs 0.0±0.58 z-scores p=NS). They also trended to have lower fat free mass (25.6±6.9kg vs 26.7±6.8kg, p=0.07), lower lean mass (24.2± 6.6kg vs 25.3 ±6.4kg p=0.08) but similar fat mass and fat mass (%) with children born AGA. Logistic regression analysis revealed a strong independent negative relationship between SGA status and lean mass (beta =-2.43, OR=0.95 p<0.01), fat free mass (beta=-2.41, OR=0.95, P<0.01), and BMI (beta=-2.33, OR=0.70 p=0.019).

CONCLUSION

This study has shown that SGA status at birth is correlated to a relatively higher fat mass with a central distribution of the fat despite a concomitant handicap in lean mass.

None declared
ID 9 - THE SPECIAL ROLES OF SEVERITY OF IN-UTERO GROWTH RESTRICTION, ASYMMETRY AT BIRTH AND POSTNATAL GROWTH IN FAT AND LEAN MASS VARIATION IN CHILDREN AT SCHOOL AGE

Doctor Foteini Balomenou¹, Professor Dimitrios Rallis¹, Doctor Filippous Evangelou¹, Professor Ekaterini Simou¹, Professor Meropi Tzoufi¹, Professor Vassileios Giapros¹
¹University Of Ioannina, Ioannina, Greece

BACKGROUND
Small for gestational age (SGA) status has been correlated with alterations in body composition. Most studies examine SGA children without taking into consideration type or severity of growth restriction or postnatal growth. All these conditions may pose different risks. We aim to examine body composition during childhood in SGA and appropriate for gestational age (AGA) children taking into consideration all the above-mentioned factors.

METHODS
We examined BMI, waist circumference, skin fold thickness and body composition by using the method of Bioelectrical Impedance (BIA) in 365 SGA and AGA children aged 7-10 years living in the same urban area. SGA children were categorized as mildly (birth weight 1-2 z-scores below mean) or severely (BW >2 z-scores below mean) growth restricted, as symmetrical or asymmetrical (ponderal index >or<2.20) and as having rapid or slow catch-up. Age, gender, birth order, prepregnancy weight, weight gain during pregnancy, pathology of pregnancy, previous SGA child, social status, BMI of both parents, type of feeding, daily exercise were taken into consideration.

RESULTS
Among 365 children 75 were SGA (BW<10 percentile) and 290 were AGA (BW>10<90 percentile). Severe growth restriction was observed in 29 and mild in 46 children while asymmetrical were 45 children and symmetrical 30. In 34 SGA, postnatal growth was of high velocity and in 41 of lower velocity. No differences in anthropometrics and body composition were found in regard either type or severity of growth restriction. Postnatal growth velocity correlated independent to body composition at prepuberty and children with lower growth velocity had lower lean mass (beta =-3.83, OR=0.80 CI:0.72-0.90, P<0.001), lower fat free mass (beta =-3.83, OR=0.82 CI:0.75-0.92 P<0.001) and lower BMI (beta =-2.24, OR=0.58 CI:0.36-0.93 P=0.02). The SGA with high postnatal growth velocity had lean mass, free fat mass and BMI similar to AGA while trended to have higher fat mass.

CONCLUSION
SGA children with higher postnatal growth trended to gain more fat, while those with lower growth had lower BMI and lean mass. Meticulous observation is needed during postnatal period as both growth patterns are correlated with alterations in body composition.

None declared
ID 121 - BOVINE COLOSTRUM FORTIFICATION OF HUMAN MILK IMPROVES BOWEL HABITS IN PRETERM INFANTS

Susanne S. Kappel1,2, Per T. Sangild1,2,3, Agnethe M. Ahnfeldt1, Valdis Jóhannsdóttir3, Line J. Soernsen3, Lene B. Bak4, Christel Friborg2, Sören Möller5,6, Gitte Zachariassen3,6, Lise Aunsholt1,2

1Comparative Pediatrics and Nutrition, University of Copenhagen, , Denmark, 2Department of Neonatology, Copenhagen University Hospital Rigshospitalet, , Denmark, 3Department of Neonatology, Aarhus University Hospital, , Denmark, 4Department of Neonatology, Aarhus University Hospital, , Denmark, 5Open Patient data Explorative Network (OPEN), Odense University Hospital, , Denmark, 6Department of Clinical Research, University of Southern, , Denmark

Background:
Human milk does not meet the nutritional needs to support optimal growth during the first weeks of life in very preterm infants. Nutrient fortifiers, similar to processed infant formula products, are added to mothers’ own milk or human donor milk, but they are suspected to induce feeding intolerance (FI) and gut dysmotility. We hypothesized that a fortifier based on intact bovine colostrum (BC; Biofiber Damino, Denmark), rich in protein and milk bioactive ingredients, may improve gut maturation, bowel habits and reduce FI in very preterm infants compared with a conventional fortifier (CF; preNAN FM85, Nestlé, Switzerland).

Methods:
In an unblinded randomized trial (NCT03537365), 232 very preterm infants (26-30 weeks of gestation) were randomized to BC or CF fortification. Volume, consistency and frequency of gastric residuals (GR), stools (Amsterdam stool Scale) and bowel gas restlessness (BGR, defined by grunting, body-movements, bloated bowel) were recorded before each meal during the intervention period from start of fortification and until 35 weeks post-menstrual age.

Results:
Data were available in 194 very preterm infants (84%). Volume of GR per day was similar between groups and unaffected by GA at birth, amount of added protein from fortifiers and volume of enteral intake. With advancing age, clinical bowel scores improved, as reflected by less discoloration and reduced visible bowel loops and blood vessels, especially in BC infants (p<0.01). During the first two weeks of fortification, stools were softer in BC infants (p< 0.05). Further, as intake of grams of fortifier increased, stool consistency for both groups became harder (p< 0.01). Additionally, need for laxative treatment and occurrence of BGR increased with length of fortification in both groups (p< 0.01, Figure 1), and after two weeks of fortification CF fortified infants had a 2.6-fold higher risk of initiating laxative treatment (p< 0.01, Figure 1).

Conclusion:
Stool consistency and signs of GR were not affected by type of fortifier in very preterm infants. Abdominal appearance, assessed by qualitative scoring, was more normal in BC infants and these infants received less laxative with a tendency to less occurrence of BGR.
Figure 1: Use of laxative (%) and related gas-restlessness (%) between groups.

University of Copenhagen has filed a patent on BC for infants (PCT/DK2013/050184) together with Biofiber Damino. PTS has declined share of revenue and was not participating in NICU clinical work.
ID 211 - ARE THE SCORING SYSTEMS RELIABLE IN EVALUATING THE BREASTFEEDING SUCCESS OF MOTHERS?

Doctor Dilek Kahvecioğlu¹, Doctor Hatice Tatar Aksoy¹, Doctor Duygu Aldaç², Doctor Arzu Yılmaz²

¹Ankara Training And Research Hospital, Neonatal Intensive Care Unit, Ankara, Turkey, ²Ankara Training And Research Hospital, Department of Pediatrics, Ankara, Turkey

Background
Breast milk is the most suitable nutritional source for babies. Factors such as age of mother, type of delivery and the education level of the mother may affect the success of breastfeeding. Breastfeeding success of mothers can be evaluated with scoring systems. In our study, it was aimed to reveal the relationship between body weight loss on the postnatal 1st day and LACHT scoring system and also evaluates the factors affecting body weight loss.

Methods
The mothers and baby diads who gave birth in Ankara Training and Research Hospital Obstetrics and Neonatal Service between March and August 2018 were prospectively included in the study. The patients were divided into two groups according to LATCH score (group 1: LATCH ≥7 and group 2: LATCH <7). LATCH scoring was scored out of 10 by evaluating: latch on breast, audible swallowing, type of the nipple, breastfeeding comfort, and holding the baby. Groups were compared in terms of demographic characteristics and pathological weight loss on the postnatal 1st day.

Results
A total of 176 patients in group 1 (LATCH ≥7) and 52 patients in group 2 (LATCH <7) were evaluated. Average birth weight in group 1 (3311 ± 403 g) was found to be significantly higher than group 2 (3123 ± 586 g) (p = 0.009). Rates of early skin to skin contact and breastfeeding in the first half hour after birth found to be significantly higher in group 1 (p = 0.001). There was no difference between the two groups in terms of pathological weight loss on the 1st postnatal day.

Conclusion
In our study, it has been found that; scoring systems are not sufficient alone to estimate pathological losses on the 1st postnatal day. Early skin to skin contact and breastfeeding in the first half hour after birth are effective interventions to increase success of breastfeeding.

None declared
ID 220 - BREASTFEEDING AND MATERNAL MENTAL HEALTH AMIDST THE COVID-19 PANDEMIC: OUTCOMES IN A CATALAN COHORT

Mr Pablo González-Álvarez¹, Ms Anna Sala-Concepción¹, Doctor Maria Giralt-López², Doctor Roser Porta³, Doctor Gemma Ginovart¹, Doctor Paula Sol Ventura Wichner¹, Doctor Marta Nicolás López³

¹Department of Pediatrics, Hospital Universitari Germans Trias i Pujol, Badalona (Barcelona), Spain, ²Department of Paidopsichiatry, Hospital Universitari Germans Trias i Pujol, Badalona (Barcelona), Spain, ³Neonatology Unit, Department of Pediatrics, Hospital Universitari Germans Trias i Pujol, Badalona (Barcelona), Spain

BACKGROUND

The world population has undergone major changes as a result of the Covid-19 pandemic. Such changes impose an added stressor during pregnancy and the postpartum period, potentially affecting the mental state of puerperal women, the mother-newborn bond, the process of breastfeeding and neonatal development in terms of weight increase. The aim of the present study is to describe how these three items might have been affected by the pandemic in the immediate post-lockdown period in our area after the first wave (March to May 2020), trying to characterize if children born after the pandemic are at risk for worse outcomes in the neonatal period.

METHODS

A prospective observational study was designed following a cohort of women and their newborns chosen amongst patients in the Maternity ward of a tertiary pediatric hospital from June to August 2020. Participants were asked to complete two separate steps: step one comprised both a clinical interview and the answering of a survey with three psychometric scales (EPDS: Edinburgh Postnatal Depression Scale, PBQ: Postpartum Bonding Questionnaire and STAI-S: State-Trait Anxiety Inventory), thus collecting sociodemographic, personal, psychological and other clinically relevant data. In step two, mother-child dyads were followed using a round of three brief telephonic interviews conducted at the newborn’s 7, 14 and 28 days of age. Breastfeeding status, satisfaction towards the aid received to establish breastfeeding, the weight of the newborn and other questions relating to their health status were recorded, in an effort to accurately depict the newborn’s outcome in the neonatal period.

RESULTS

When comparing the rates of types of feeding between 2020 and pre-pandemic years (2017-2019), a significant increase in breastfeeding is found in pandemic times. All newborns in the sample show an adequate weight gain during their first month of life. In terms of maternal mental health, 25% of the sample screens positively in the EPDS, requiring further evaluation to rule out depressive symptoms. STAI-state and PBQ detect no anomalies in our sample.

CONCLUSION

Patients in our sample did not experiment an increase of adverse outcomes in the neonatal period in terms of breastfeeding rates, maternal mental health, bonding and development.

None declared
ID 340 - INCREASED SERUM LEVELS OF DOCOSAHEXAENOIC ACID IN COMBINATION WITH A MINIMUM LEVEL OF ARACHIDONIC ACID ARE ASSOCIATED WITH A REDUCED RISK OF SEVERE RETINOPATHY OF PREMATURITY

MD PhD Ann Hellström1, MSc Aldina Pivodic1, MD PhD Lotta Gränse2, MD PhD Pia Lundgren Lundgren1,2, MSc Ulrika Sjöbom1,2, PhD Anders K Nilsson1, MD Helena Söderling Söderling2, MD PhD Anna-Lena Hård Hård1, MD PhD Lois EH Smith5, PhD Chatarina Löfqvist1,4

1Department of Clinical Neuroscience, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, 2Department of Ophthalmology, Institute of Clinical Sciences Lund, Lund University and Skane University Hospital, Lund, Sweden, 3School of Medical Sciences, Faculty of Medicine and Health, Örebro University, Örebro, Sweden, 4Institute of Health Care Science, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden, 5Department of Ophthalmology, Boston Children’s Hospital, Harvard Medical School, Boston, USA

BACKGROUND: This study aimed to evaluate the relationship of the serum levels (mol%) of the long-chain polyunsaturated fatty acids (LCPUFAs), docosahexaenoic acid (DHA) (22:6 ω-3) and arachidonic acid (AA) (20:4 ω-6), with the severity of retinopathy of prematurity (ROP).

METHODS: A sub-study of a randomized clinical trial with enteral fatty acid supplementation. This trial included 175 randomized infants born at a gestational age (GA) < 28 weeks (76 [43.0%] females; mean [SD] GA, 25.6 [1.4]). Samples were obtained at birth, followed by venous blood samples at the postnatal age of 1, 3, 7, 14, and 28 days. Serum phospholipid fatty acids were transmethylated and measured through gas chromatography-mass spectrometry. We performed ordinal logistic regression, with description of unadjusted (OR), as well as GA- and birth weight-adjusted odds ratios (aOR) and 95% confidence intervals (CIs). LCPUFA levels were evaluated as the mean area under the curve during postnatal days 1-28. Main outcome measures: ROP severity was classified as no ROP, mild/moderate ROP (stages 1-2), and severe ROP (stage 3 and Type 1).

RESULTS: A higher DHA proportion was associated with no ROP than with ROP (mild/moderate or severe ROP) (OR [95% CI] per 0.5 mol% increase 0.49 [0.36–0.68], P < .0001, aOR 0.66 [0.46–0.93], P = 0.020). The corresponding aOR for AA per 1 mol% increase was 0.83 (0.66–1.05), P = 0.13. The association between DHA and ROP severity was dependent on sufficient AA levels, which suggested that a mean daily minimum level of ~7.8–8.3 mol% of AA was necessary for a detectable preventive effect of higher DHA on ROP severity. Moreover, there were significant adjusted associations of higher daily mean levels of eicosatrienoic (20:3 ω-3) and eicosadienoic acids (20:2 ω-6) with lower ROP severity.

CONCLUSION: Daily mean serum levels of DHA during the first month of life were associated with lower ROP severity even after adjustment for known risk factors. The preventive effect of DHA on ROP appeared to emerge with sufficiently high AA levels. This indicates that a certain relationship between LCPUFAs is necessary for ROP prevention and that further studies aiming to find nutrition strategies that may prevent ROP are warranted.

None declared
ID 475 - PROTEIN INTAKE IS ASSOCIATED WITH WHITE MATTER INTEGRITY AND NEURODEVELOPMENTAL OUTCOME IN EXTREMELY PRETERM BORN INFANTS

L.M. Hortensius1,2, E. Janson1,3, P.E. van Beek4, F. Groenendaal1,2, N.H.P. Claessens1, H.F.N. Swanenburg5, M.J.C. Eijsermans1,6, C. Koopman-Esseboom1, J. Dudink1,2, R.M. van Elburg1,7, M.J.N.L. Benders1,2, M.L. Tata-ranno1,2, N.E. van der Aa1,2

1Department of Neonatology, Wilhelmina Children’s Hospital, University Medical Center Utrecht, Utrecht, Netherlands, 2University Medical Center Utrecht Brain Center, Utrecht University, Utrecht, The Netherlands, 3Department of Cognitive Psychology, Faculty of Social Sciences, Leiden University, Leiden, The Netherlands, 4Department of Neonatology, Máxima Medical Centre, Veldhoven, The Netherlands, 5Department of Medical Psychology, Wilhelmina Children’s Hospital, University of Utrecht, Utrecht, The Netherlands, 6Child Development and Exercise Center, University Medical Center Utrecht, Utrecht, The Netherlands, 7Emma Children’s Hospital, Amsterdam University Medical Center, University of Amsterdam, Amsterdam, The Netherlands

BACKGROUND
Providing extremely preterm infants with adequate nutrition is of vital importance, but determining optimal feeding regimens remains a challenge. The aim of this study was to evaluate the effect of a new nutritional regimen and individual macronutrient intake on white matter integrity at term equivalent age (TEA) and neurodevelopmental outcome at 2 and 5.5 years of age.

METHODS
For this retrospective study, two cohorts of extremely preterm infants were included (median gestational age 26.6 weeks; IQR 25.9-27.3). Cohort A (n=99, born in 2011-2013) received the old nutritional regimen, while Cohort B (n=79, born in 2013-2015) received the new nutritional regimen, with more rapidly increased, higher protein intake. Individual protein, lipid, and caloric intakes were calculated for the first 28 postnatal days, diffusion tensor imaging was performed at TEA, and cognitive and motor development were evaluated at 2 years corrected age (Bayley-III-NL) and 5.5 years chronological age (WPPSI-III-NL and M-ABC-2 NL). Associations between nutritional intake, white matter microstructure, and neurodevelopment were assessed using tract-based spatial statistics and multivariate linear regression, controlling for confounders.

RESULTS
Compared to infants in Cohort A, infants in Cohort B had significantly higher protein intake (2.7 g/kg/day vs 3.4 g/kg/day, p < .001), higher fractional anisotropy (FA) in several white matter tracts (p < .05), and lower motor scores at 2 years (mean [SD] 109 [12] vs 103 [12], B = -5.2, p = .007), although still within normal range. Protein intake was significantly associated with higher FA (p < .05) and lower motor scores at 2 years (B = -6.7, p = .001). Lipid and caloric intakes were not significantly associated with FA or neurodevelopment. Nutritional intake was not significantly associated with neurodevelopment at 5.5 years of age.

CONCLUSION
In our cohort of extremely preterm infants, increased protein intake during the first 28 postnatal days was associated with higher FA in several white matter tracts at TEA, and lower motor scores at 2 years of age, although still within normal range. Increased protein intake seems important for white matter development during early life, but does not necessarily improve long-term neurodevelopment in extremely preterm born infants.

None declared