Results 480 biomarker assays were performed in 80 samples from ten infants. OI correlated positively with BNP, NTproBNP, and VEGF-A, and negatively with PLGF (Table 1). PH measures correlated negatively with PLGF and positively with NTproBNP and Troponin1. Measures of diastolic function correlated negatively with Troponin1 and VEGF-A, and positively with PLGF.

Conclusions 1) Plasma biomarker analysis is feasible in infants with PH in CDH.

2) Worsening disease status (impaired oxygenation, PH, diastolic dysfunction) was associated with elevated BNP, NTproBNP, Troponin1 and VEGF-A, and reduced PLGF.

3) The utility of these peptides as disease biomarkers, prognostic indicators, and their role in disease pathogenesis merits further investigation.

O-024 OUTCOME RESEARCH IN 77 PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION RECEIVING SILDENAFIL: A DOUBLE-BLIND, RANDOMISED CONTROLLED STUDY

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Purpose PAH resulting from CHD – a major cause of postoperative morbidity and death. Sildenafil: selective inhibitor of phosphodiesterase-5 - an effective and promising pulmonary vasodilator, with minors reverse effects.

Methods This monocentric, randomised placebo-controlled study evaluated the efficacy, safety, tolerability of oral Sildenafil in children with severe PAH secondary congenital shunts (simple (14 patients), mixed (35), complex (28)). 77 PAH patients (35 – repaired shunts, 31 – palliative, 11 inoperable) assigned to placebo or Sildenafil – dose of 1–2 mg/kg/day each 8h: 6–12 months. Sildenafil group - 38 (mean age 19, 9 ± 5, 3 months: 16 boys/22 girls); placebo – 39 (mean age 21, 7 ± 7, 8 months: 22 boys/17 girls). Research protocol: FC NYHA; 6-min walk test; O2 saturation; echocardiography PAPm, myocardial performance index (MPI/Tei index), right cardiac catheterisation – PVRI; questionnaire for adverse reactions was available.

Results Sildenafil patients improved FC from 3,16 ± 0, 1–2, 15 ± 0,1 ($p < 0,001$); effort tolerance (+152,5 ± 17,4m – 6 months and +184,3 ± 21,2 m - 12 months of treatment), ($p < 0,001$); O_2 saturation (+3,1 ± 0,5%) but placebo (+0,6 ± 0,3%), ($p < 0,001$); PAPm decreased: 22,0 ± 2,22 at 6 months with 19,03 ± 2,3 mmHg - 12 months ($p < 0,001$); PVRI decreased: 2,45 ± 0,19 UWood·m^2 ($p < 0,001$); Tei index with 0,15 ± 0,01(-31%) to initial ($p < 0,001$). In placebo group only PVRI diminished from 6,4 ± 0,1 to 5,7 ± 0,3 UW/m^2 ($p < 0,05$). No death in the Sildenafil group, but 5 in placebo.

Conclusions Sildenafil – efficient in treating severe PAH secondary to congenital shunts, but even more effective in children after cardiac surgery. Sildenafil improves FC, effort tolerability, O_2 saturation, RV global function, diminishing PAPm and PVRI comparing with placebo. Sildenafil has good safety, tolerability, favourable impact on life quality – insignificant adverse reactions.

Cerebral Oxygenation

O-025 DO SUSTAINED LUNG INFLATIONS DURING RESUSCITATION OF PRETERM INFANTS AFFECT CEREBRAL BLOOD VOLUME AND CEREBRAL REGIONAL OXYGEN SATURATION?

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Background and aim Sustained lung inflations (SLI) promote lung aeration and alveolar recruitment.

Changes in total haemoglobin (ΔcHb) and cerebral tissue oxygenation index (cTOI) measured by near-infrared spectroscopy (NIRS) give information on changes in cerebral blood volume (CBV) and regional oxygen saturation, respectively.

Do SLI during resuscitation affect CBV and cTOI?

Methods Preterm infants ≥28+0 and <34+0 gestational weeks and need for respiratory support (RS) during postnatal transition were included. Within the first 15 min of life of each subject ΔcHb and cTOI were continuously detected by using 'NIRO-200-NX' (Hamamatsu; Japan).

Two groups were compared based on RS:

SLI group: RS was started by applying 1–2 SLI for 15sec at 25 cmH2O and continued by *continuous positive airway pressure* (CPAP) or *positive pressure ventilation* (PPV).

Control group: CPAP/PPV depending on respiratory insufficiency.

Results 40 preterm infants (23 female) with mean gestational age of 32+1 weeks (±3 days) and mean birth weight of 1707 g (±470) were included. Demographic data did not show significant differences between groups.

Median *ΔcHb* was in SLI/control group -0.38/0.20 µM 30 sec after initializing RS, –1.33/–0.43 µM after 60 sec, 3.37/2.30 µM after 2 min, –0.19/–0.46 µM after 3 min, 2.52/1.05 µM after 5min and 2.93/–4.78 µM after 10 min.

Median *cTOI* increased in SLI/control group from 49/47% 30 sec after initialising RS to 54/50% after 60 sec, to 56/51% after 2 min, to 56/58% after 3 min, to 61/61% after 5 min, and to 65/69% after 10 min.

Conclusion Initialising RS immediately after birth by using SLI in preterm infants did not show significant differences in CBV and cTOI compared to control group.

O-026 INFLUENCE OF PATENT FORAMEN OVALE (PFO) ON REGIONAL CEREBRAL OXYGEN SATURATION DURING IMMEDIATE NEONATAL TRANSITION

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Background During postnatal transition there is a significant association between regional cerebral oxygen saturation of the brain and the shunt via the ductus arteriosus (DA). The influence of the patent foramen ovale (PFO) on the cerebral regional saturation remains as a question.

Aim The aim of the study was to investigate the influence of the PFO on the cerebral oxygen saturation, measured by near-infrared spectroscopy (NIRS) after 15 min of neonatal transition.

Methods Observational study. Term neonates (>37 weeks of gestational age) after elective caesarian section and without any

need of medical care and respiratory support were included. After uncomplicated postnatal transition of 15 min, the cerebral oxygenation (TOI) was measured on the right forehead using NIRO 200NX. The diameter of PFO was measured using echocardiography. The influence of PFO on TOI was investigated by applying correlation-analysis.

Results 25 term neonates after uncomplicated adaptation period of 15 min (APGAR: 9/10/10) were included. The mean gestational age was 38.7 ± 0.9 weeks and the mean birth weight 3114.0 ± 423.9 g.

The mean cerebral oxygen saturation was 76.6 ± 8.9% and the mean diameter of PFO was 2.3 ± 0.7 mm.

The correlation-analysis could show a trend of negative correlation between the cerebral oxygen saturation and the diameter of PFO, but this correlation was not statistically significant.

Conclusion In term neonates after uncomplicated transition, the diameter of PFO has no influence on the cerebral oxygen saturation.

O-027 MICROCIRCULATION WITHIN THE FIRST MINUTES AND FIRST 24 HOURS OF LIFE IN HEALTHY TERM NEWBORNS

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Background and aims Microcirculation is important to ensure adequate tissue oxygenation and nutrient delivery. Clinical findings, perfusion index (PI) measurements are used to assess microcirculation. Side stream dark field (SDF) imaging is a noninvasive method of assessing microcirculation by means of a videomicroscope.

This study aimed to assess microcirculation in healthy term newborns born either by spontaneous vaginal delivery (SVD) or caesarean section (C/S).

Methods The assessments were done within the first 30 min of life (T0) and repeated at the 24th hour of life (T1). Microcirculation was assessed from axillary skin by using SDF technique with Microscan device where total and perfused vessel density (TVD, PVD) and microvascular flow index (MFI) were calculated, as well as by using microcirculation score (MS) based on capillary refill time, skin colour and warmth and PI measured by Masimo Radical7 pulse oxymeter. Vital signs were also recorded. Nonparametric tests were used for statistical analysis.

Results Twelve newborns born by SVD and 25 newborns born C/S were included. The mean, SD, median values for temperature, TVD, PVD, MFI, MS, and PI at T0 and T1 are as follows;

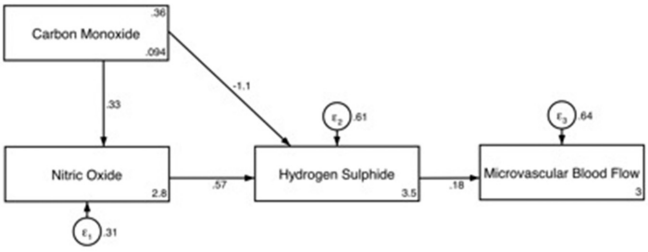
T0: Temp:36 ± 0,44(36,1), TVD: 18,79 ± 1,49(18,81), PVD: 18,73 ± 1,5(18,81), MFI: 3,07 ± 0,25(3), MS: 2,14 ± 1,36(2), PI: 1,84 ± 0,97(1,75).

T1: Temp:37,1 ± 0,26(37,1), TVD: 18,93 ± 2,1(18,73), PVD: 18,9 ± 2,13(18,73), MFI: 3,17 ± 0,32(3,1), MS:1,65 ± 0,48(2), PI: 1,9 ± 0,8(2).

Temperature was significantly and MFI was slightly higher at T1 compared to T0 (p = 0,001 and p = 0, 04).

No difference was observed between SVD or C/S groups or at different times within the same group.

Conclusions Peripheral microcirculation in general is not affected by mode of delivery in term healthy newborns and doesn't seem to change significantly within the first 24 h of life.



Abstract O-028 Figure 1

O-028 MICROVASCULAR TONE IN THE PRETERM NEONATE: GASOTRANSMITTER INTERACTIONS MAY BE THE KEY

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Background and aims Hydrogen sulphide (H_2S) can be produced by one of two enzymes: CSE or CBS. H_2S is associated with transitional microvascular tone dysregulation in the preterm infant. We have animal model evidence that increases in H_2S associated with microvascular dysregulation are driven by CSE-dependent mechanisms. Nitric oxide (NO) and carbon monoxide (CO) also play a role in the transitional circulation of preterm neonates. The aim of this study was to characterise the interrelationships of all 3 gasotransmitters using structural equation modelling analysis.

Methods 90 preterm neonates were studied at 24h postnatal age. Microvascular studies were performed by laser Doppler. Arterial COHb levels (a measure of CO) were determined through co-oximetry. NO was measured as total nitrate and nitrite in urine. H_2S was measured as urinary thiosulphate by liquid chromatography.

Results We observed a positive relationship between NO and H_2S (p = 0.008, r = 0.28) and an inverse relationship between CO and H_2S (p = 0.01, r = –0.33). No relationship was observed between NO and CO (p = 0.18, r = 0.18). Structural equation modelling was used to examine the combination of these effects on microvascular blood flow. The model with the best fit (χ^2 = 1.11) is presented.

Conclusions NO production positively related to H_2S production. Previous studies report that NO inhibits H_2S production via the enzyme CBS but induces CSE expression. These results suggest that in the preterm newborn, CSE expression is significantly modulated by NO. The relationship between NO and CSE/H_2S may thus be critical to the deleterious higher microvascular blood flow.

O-029 NEONATAL CIRCULATION MEASURED USING NEAR-INFRARED SPECTROSCOPY (NIRS) DIFFERS BETWEEN PRETERM AND TERM BORN INTRAUTERINE GROWTH RESTRICTED (IUGR) INFANTS

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