

Abstract O-029 Table 1

	Day 1				Day 2				Day 3		
	preterm	term	P value		preterm	term	P value		preterm	term	P value
rSO ₂ cerebral	81.9	78.3	n.s.		84.1	79.8	n.s.		78.6	77.0	n.s.
rSO ₂ renal	79.9	92.9	0.001		68.5	84.3	0.022		65.9	88.1	0.007
rSO ₂ abdominal	64.9	78.2	0.045		62.6	69.2	n.s.		59.8	81.1	0.041
SaO ₂	96.0	98.0	0.002		94.8	98.3	0.001		94.7	97.7	0.014
FTOE cerebral	0.13	0.22	0.030		0.10	0.19	0.002		0.17	0.22	n.s.
FTOE renal	0.16	0.04	0.001		0.27	0.13	n.s.		0.30	0.12	0.012
FTOE abdominal	0.29	0.16	n.s.		0.34	0.31	n.s.		0.37	0.18	0.047

Background and aim IUGR fetuses display redistribution of fetal blood flow to vital organs. This can be different in preterm and term IUGR fetuses. It is not known whether the distribution of the neonatal circulation is still affected by IUGR, and if it differs between these groups. Our aim was to compare the neonatal circulation in preterm and term IUGR infants, measured by NIRS.

Methods Preterm and term infants were prospectively included between May 2012 and April 2014 when IUGR was diagnosed. Cerebral, renal and abdominal regional tissue oxygen saturations (rSO₂) were measured for 2 h continuously using NIRS on days 1 to 3 after birth. Fractional tissue oxygen extraction (FTOE) was calculated using rSO₂ and arterial oxygen saturation (SaO₂) values: (SaO₂-rSO₂)/SaO₂.

Results We included 42 IUGR infants (21 preterm/21 term), gestational age median 31.3 weeks (IQR 28.5–33.2), and 38.6 weeks (37.7–39.1), respectively; birth weight 1100 grams (770–1510), and 2420 grams (2027–2645). Results are shown in Table 1.

Conclusion In the first 2 days after birth, preterm IUGR infants showed lower renal and abdominal rSO₂ (higher FTOE) when compared with term IUGR infants, indicating altered neonatal circulation. Furthermore, cerebral rSO₂ was higher and cerebral FTOE was lower indicating increased cerebral perfusion. This may be interpreted as brain sparing continuing after birth. However, the difference with term IUGR (higher cerebral FTOE indicating no brain sparing) vanishes. We conclude that preterm IUGR infants experience brain sparing in the first 2 days, whereas term IUGR infants do not.

Circulation/PDA

O-030 NEW IBUPROFEN DOSING STRATEGY FOR OPTIMAL PATENT DUCTUS ARTERIOSUS CLOSURE IN PRETERM NEONATES

¹SHP Simons, ²E Spaans, ¹IKM Reiss, ³K Allegaert, ⁴CA Knibbe. ¹Neonatology, Erasmus University Medical Center – Sophia Children's Hospital, Rotterdam, Netherlands; ²Department of Pediatric Surgery and Intensive Care, Erasmus University Medical Center – Sophia Children's Hospital, Rotterdam, Netherlands; ³Neonatology, University Hospitals Leuven, Leuven, Belgium; ⁴Clinical Pharmacy, St Antonius Hospital and Leiden Amsterdam Center for Drug Research, Nieuwegein/Leiden, Netherlands

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Background and aims Ibuprofen is the drug of first choice to close a patent ductus arteriosus (PDA) in preterm neonates. The most commonly used 10–5–5 mg/kg/3days bolus dosing schedule

Abstract O-030 Table 1 Suggested ibuprofen bolus and continuous doses

PNA (days)	CI (ml/hr)	T1/2 (hr)	Bolus dose (mg/kg)	Infusion rate (mg/kg/hr)
1	1,20	216	15	0,04
2	3,36	77,16	15	0,12
3	6,15	42,17	15	0,22
4	9,44	27,47	15	0,33
5	13,17	19,70	15	0,46
6	17,28	15,01	15	0,60
7	21,74	11,93	15	0,76
8	26,53	9,78	15	0,93

is only effective in about 60% to 80% of patients, dependent on post natal age. We provide a new dosing regimen for ibuprofen, based on current available pharmacokinetic/pharmacodynamic (PK/PD) evidence that would result in the highest PDA closure rate.

Methods Simulation of different ibuprofen treatment strategies using NONMEM to predict the best pharmacodynamic effect based on available PK/PD data. Based on current evidence we assumed that ibuprofen efficacy depends on the cumulative time of threshold plasma level above 15 mg/l and that the volume of distribution is independent of postnatal age.

Results We show that the predicted plasma concentrations fit best after a 15 mg/kg ibuprofen loading dose followed by a post-natal age dependent continuous ibuprofen dose (table1). With this dosing schedule predicted plasma levels of 90% of patients continuously remain above threshold.

Conclusions Based on PK/PD evidence, we suggest that the 10–5–5 mg/kg ibuprofen dosing schedule that has been used for PDA closure around the world during last decades is insufficient and should be improved. Our new dosing strategy needs further validation in daily clinical practice, but we expect a very high PDA closure rate.

O-031 COMPARISON OF BNP AND NT-PRO-BNP FOR ASSESSMENT OF THE PATENT DUCTUS ARTERIOSUS IN VERY PRETERM INFANTS

¹K König, ²KJ Guy, ²G Walsh, ²SM Drew, ²CP Barfield. ¹Neonatal and Paediatric Intensive Care Unit, Children's Hospital Lucerne, Lucerne, Switzerland; ²Department of Paediatrics, Mercy Hospital for Women, Melbourne, Australia

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Background and aims B-type natriuretic peptide (BNP) and N-terminal-pro-BNP (NTproBNP) have been shown to correlate with the size of patent ductus arteriosus (PDA) in preterm infants. We investigated whether BNP or NTproBNP is more accurate for assessment of a PDA.

Methods Prospective observational study. Preterm infants born.

Results 60 infants were recruited, 58 had complete datasets. The cohort's mean (SD) gestational age was 27³ (2²) weeks and had a mean (SD) birth weight of 1032 (315) grams. 46 (79.3%) infants had a PDA with a mean (SD) PDA diameter of 3.2 (0.9) mm. Median (IQR) BNP levels: 486.5 (219–1316) pg/ml for infants with PDA, 190 (95.5–514.5) pg/ml for infants without PDA. Median (IQR) NTproBNP levels: 10858.5 (6319–42108) pg/ml for infants with PDA, and 7488 (3363–14227.5) pg/ml for infants without PDA. Both BNP and NTproBNP showed a significant correlation with PDA size in this cohort: BNP R=0.35 (p = 0.0066); NTproBNP R = 0.31 (p = 0.018).

Conclusion BNP and NTproBNP were closely correlated to PDA size. Both markers were useful for assessment of PDA size in this cohort of very preterm infants.

0-032 SEROTONIN IS A SELECTIVE VASOCONSTRICTOR OF CHICKEN EMBRYO DUCTUS ARTERIOSUS

L van Zogchel, E Villamor. *Pediatrics, Maastricht University Medical Center, Maastricht, Netherlands*

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Introduction Decreased platelet number and/or function have been related to patent ductus arteriosus (DA). Activated platelets release vasoactive products, including serotonin (5-HT) that might be relevant for DA homeostasis DA. The chicken embryo has emerged as a suitable model for the study of DA vascular biology. In the present study, we investigated the possible vasoactive role of 5-HT in the chicken DA.

Methods Rings of the DA of 15- to 20-d-old chicken embryos (total incubation time 21-d) were studied in a wire myograph. The response to 5-HT was investigated under different O₂ tensions (3, 7, and 74 kPa). The responses to the 5-HT_{1B/D} receptor agonist sumatriptan, the 5-HT_{2A/B/C} receptor agonist DOI and the selective serotonin reuptake inhibitors fluoxetine and sertraline were also investigated.

Results 5-HT (10 nM–0.3 mM) contracted the pulmonary side of the DA (PulmDA) in a concentration-dependent manner. By contrast, 5-HT induced negligible contractions in the vessels that surround the PulmDA (i.e., the pre- and post-ductal pulmonary arteries, and the aortic side of the DA). 5-HT-induced contraction increased with development (15-d >17-d >19-d=20-d). O₂ tension did not affect 5-HT-induced contraction but elimination of extracellular calcium completely abolished it. Sumatriptan and DOI also contracted the PulmDA in a concentration-dependent manner. By contrast, fluoxetine and sertraline evoked contractions at very high concentrations (>0.1 mM).

Conclusions Our data indicate that 5-HT receptors are functionally present in the chicken DA and suggest that platelet-derived 5-HT may play a pivotal role in the postnatal closure of the DA.

Abstract 0-033 Table 1 Clinical outcomes

		Rate (%)	p-value*	OR (CI95%)
Survival-without-morbidity	P2	53.4	NS	1.34(0.70–2.57)†
	P1	46		
Mortality	P2	18.2	NS	1.05(0.45–2.45)
	P1	17.5		
Chronic lung disease	P2	12.5	<0.05	0.39(0.15–0.98)
	P1	26.9		
Retinopathy (≥3)	P2	12	NS	1.31(0.41–4.15)
	P1	9.4		
Necrotizing enterocolitis	P2	5.1	<0.05	0.28(0.08–0.96)
	P1	16.1		
Intraventricular haemorrhage (≥3)	P2	25	NS	0.90(0.43–1.88)
	P1	27		

P1 aggressive, P2 conservative

*Chi-square

†Adjusted for gestational age, sepsis and days on mechanical ventilation (logistic regression).

0-033 CONSERVATIVE APPROACH TO PATENT DUCTUS ARTERIOSUS IN VERY LOW BIRTH WEIGHT INFANTS

¹C Borrás-Novell, ²V Aldecoa, ²M Domingo, ²C Figaró, ¹J Moreno, ¹A Riverola. ¹Neonatology, Hospital Sant Joan de Déu, Barcelona, Spain; ²Neonatology, Parc Taulí Sabadell, Sabadell, Spain

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Background and aims Management of patent ductus arteriosus (PDA) is still a dilemma. We aimed to prove that a more conservative approach of PDA is equally effective without increasing morbidity-mortality in preterm infants.

Methods From January 2009 to December 2013 clinical charts of preterm <31 weeks admitted into two NICUs with clinical/echocardiographic PDA were analysed. In January 2011 management was changed. In the first period (P1), patients who failed medical treatment underwent surgical ligation; in the second (P2), only those with cardiopulmonary compromise (mainly those that could not be weaned from ventilator). We compared survival-without-morbidity, defined as patients discharged without chronic lung disease, severe retinopathy, necrotizing enterocolitis or severe intraventricular haemorrhage.

Results Patients in P1 (n = 63) and P2 (n = 88) had similar clinical characteristics. Significant lower rates of medical (85.7% vs 56.8%) and surgical treatment (33.9% vs 14.3%) were observed in P2. No differences in survival-without-morbidity were observed (Table 1). In P2, 19.4% patients showed PDA at discharge.

Conclusions A conservative approach in preterm with PDA can avoid medical/surgical treatment and its side effects, without changes in survival-without-morbidity.

0-034 HALF SYSTOLIC DECAY TIME (½SDT) OF DUCTAL FLOW MEASURED BY ECHOCARDIOGRAPHY WOULD PREDICT NEED FOR TREATMENT OF PATENT DUCTUS ARTERIOSUS (PDA) IN EXTREMELY PREMATURE NEONATE

¹A Kulkarni, ²JS Carvalho, ¹J Richards. ¹Neonatology, St George's Hospital NHS Trust, London, UK; ²Fetal Medicine, St George's Hospital NHS Trust Royal Brompton Hospital NHS Trust, London, UK

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