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

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

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 is only effective in about 60% to 80% of patients, dependent on postnatal 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 postnatal 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.

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

Background and aims: BNP is a peptide hormone that is released by the heart in response to myocardial stretch. It is used for the diagnosis and assessment of cardiac diseases, especially in the case of heart failure. NT-proBNP is the N-terminal propeptide of BNP, which is released from the myocardium in response to cardiac stress. Both markers are useful for diagnosing and monitoring heart failure in newborns. This study aims to compare the use of BNP and NT-proBNP in assessing the presence and severity of ductus arteriosus (PDA) in very preterm infants.