422

CEREBRAL OXYGENATION MEASURED BY NEAR INFRARED SPECTROSCOPY AND PARTIAL JUGULAR VENOUS OCCLUSION IN NEWBORN LAMBS

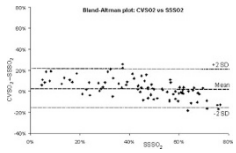
FY WONG[1,2], CP BARFIELD[1,2], L CAMPBELL[2], V BRODECKY[1], AM WALKER[1] [1]RITCHIE CENTRE FOR BABY HEALTH RESEARCH, MONASH UNIVERSITY , [2]NEWBORN SERVICES, MONASH MEDICAL CENTRE (AUSTRIA)

BACKGROUND: Near Infrared Spectroscopy (NIRS) combined with the method of partial jugular venous occlusion (JVO) has been introduced to measure cerebral venous saturation (CVSO2) at the bedside. As yet, the method has not been validated in the newborn brain. We aimed to validate the JVO procedure in a newborn lamb model using cerebral venous oxygen saturation in withdrawn superior sagittal sinus blood as the 'gold standard'.

METHOD: Seven newborn lambs were anaesthetised and ventilated using 10–40% inspired oxygen to generate a range of oxygen saturations from normoxia (SPO2 > 95%) and hypoxia (SPO2 < 95%). Unilateral JVO was performed by compressing the jugular vein for 20s. NIRS (Hamamatsu NIRO-500) measurements of cerebral oxyhaemoglobin (delta HbO) and total haemoglobin (delta HbT) concentrations were used to calculate CVSO2 (CVSO2 = (delta HbO / delta HbT) x100%). Blood samples drawn from the superior sagittal sinus were analysed for oxgyen saturation (SSSO2; Radiometer Hemoximeter) as the 'gold standard' for comparison with CVSO2.

RESULTS: Median (range) SSSO2 was 45.5% (4.3–76.6%). Median (range) CVSO2 measured by NIRS was 49.8% (10.6–88.5%) with significant correlation between the two measurements ($r=0.7$, $p<0.0001$). The mean difference (SD) between SSSO2 and CVSO2 was 5.1% (13.7%). Median percentage change in cerebral blood volume (CBV, calculated using delta HbT) induced by JVO during hypoxia was significantly less than what was induced during normoxia (14.7% and 23.3% respectively, $p<0.001$). When only occlusions inducing change of CBV >10% were included, mean difference (SD) betweeen SSSO2 and CVSO2 reduced to 2.7% (9.3%) with further improved correlation ($r=0.9$).

CONCLUSION: The accuracy of NIRS with JVO in estimating CVSO2 varies according to the changes in cerebral venous blood volume induced by JVO. This critical aspect of the JVO technique needs to be taken into consideration in developing an accurate measurement in human infants.



423

CEREBRAL OXYGEN DELIVERY AND CONSUMPTION INCREASE WITH POSTNATAL AGE IN PRETERM INFANTS ON INOTROPES

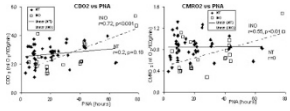
FY WONG[1,2], CP BARFIELD[1,2], AM WALKER[1] [1]RITCHIE CENTRE FOR BABY HEALTH RESEARCH, MONASH UNIVERSITY , [2]NEWBORN SERVICES, MONASH MEDICAL CENTRE (AUSTRIA)

BACKGROUND: The effect of inotropic medication on cerebral oxygen metabolism of preterm infants remains unknown. We recently validated the method of Near Infrared Spectroscopy (NIRS) combined with partial jugular venous occlusion to measure cerebral venous saturation (CVSO2) in the newborn lamb brain (separate abstract). Using NIRS, we studied normotensive infants (NT) and infants who were on inotropes (INO, dopamine) for hypotension, and compared their cerebral oxygen delivery (CDO2) and consumption (CMRO2) in the first few days of life.

METHOD: Nineteen infants in the NT group and ten infants in the INO group, born at median (range) gestational age of 26 (24–30) weeks, were studied at median (range) postnatal age (PNA) of 17 (2.4–77) hours. Using NIRS (Hamamatsu NIRO-500), cerebral blood flow (CBF) and CVSO2 were measured to compute CDO2 (CDO2 = CBF x cerebral arterial oxygen content), and CMRO2 (CMRO2 = CBF x cerebral arterial minus venous oxygen content).

RESULTS: In INO infants, CDO2 increased with PNA ($r=0.7$, $p<0.001$), but not so in NT infants. Similarly, CMRO2 in INO infants increased with PNA ($r=0.6$, $p<0.01$), but not so in NT infants. Before PNA of 24 hours, median (IQR) CDO2 and CMRO2 in INO infants were 2.0 (1.6–2.4)ml/100g/min and 0.5 (0.4–0.9)ml/100g/min respectively, both lower ($p<0.05$) than the CDO2 and CMRO2 in NT infants (2.7 (2.3–3.1)ml/100g/min and 0.8 (0.7–1.0)ml/100g/min respectively). However, after PNA of 24 hours, no significant difference in CDO2 and CMRO2 was found between the two groups. There was no difference in cerebral oxygen extraction ((arterial saturation-CVSO2)/arterial saturation) between the two groups at any PNA, implying the increase in CMRO2 in INO infants was not delivery-dependent.

CONCLUSION: Infants on inotrope had lower cerbral oxygen delivery and consumption in the first day of life, which increased with postnatal age to equate values in normotensive infants.



424

LONG-TERM EFFECT OF PREGESTATIONAL AND GESTATIONAL DIABETES MELLITUS ON OFFSPRING

K WROBLEWSKA-SENIUK[1], E WENDER-OZEGOWSKA[2], J SZCZAPA[1] [1]DEPARTMENT OF NEONATAL INFECTIOUS DISEASES, CHAIR OF NEONATOLOGY, POZNAN UNIVERSITY OF MEDICAL SCIENCES , [2]CHAIR OF OBSTETRICS AND GYNECOLOGY, POZNAN UNIVERSITY OF MEDICAL SCIENCES (POLAND)

Background: It has been suggested that maternal diabetes during pregnancy increases childhood risk of developing obesity and impaired glucose tolerance. The aim of the study was to compare the impact of pregestational (PGDM) and gestational (GDM) diabetes on selected metabolic and developmental parameters in children of diabetic mothers.

Material and methods: A total of 26 offspring of mothers with PGDM and 28 offspring of mothers with GDM were examined at 4–8 years of age. All children had an oral glucose tolerance test (OGTT) performed, with glucose and insulin measured at 0, 30, 60 and 120 min after loading. Glycated hemoglobin and lipids levels were measured in fasting plasma. Basic body measurements were taken and BMI and symmetry index were calculated.

Results: Offspring of mothers with GDM had higher BMI (17.1 ± 2.28 vs. 15.8 ± 2.52; $p<0.05$), symmetry index (1.12 ± 0.18 vs. 1.02 ± 0.18; $p<0.01$) and percentage of age-adjusted normal body weight (114.72 ± 21.93 vs. 101.32 ± 19.58; $p<0.05$) than offspring of mothers with PGDM. Similarly, the percentage of children with body weight, BMI and symmetry index above 75th percentile was also significantly higher in offspring of mothers with GDM compared to offspring of mothers with PGDM (respectively: 31.5% vs. 11.1%, 29.6% vs. 11.1% and 29.6% vs. 11.1%; $p<0.05$). Fasting glucose, cholesterol, triglyceride, LDL and glycated hemoglobin levels as well as glucose tolerance were not significantly different between groups.

Conclusions: GDM seems to predispose to higher body weight, BMI and symmetry index in offspring compared to PGDM. However, there is no difference in glucose tolerance, glycated hemoglobin and lipids levels between both groups. The tendency to overweight and obesity observed in offspring of mothers with GDM is type 2 diabetes risk factor and might be related to the fetal metabolic experience, genetic predisposition or family life style.

425

EARLY ENDOTRACHEAL INSTILLATION OF BUDESONIDE (B) USING SURFACTANT (SF) AS A VEHICLE TO PRETERM INFANTS AT RISK FOR CLD¢WA PILOT STUDY

TF YEH[1], HC LIN[1], BH SU[1], CH TSAI[1] [1]DEPT. OF PED. COLL. OF MED. CHINA MED. UNIV (TAIWAN).

Budesonide (B) undergoes an extensive biotransformation during the first pass metabolism in the liver to metabolites of low glucocorticoid activity. Surfactant (SF) (Survanta) can be used as a vehicle for B delivery in ventilated rabbits. Our previous study indicated that the addition of B to survanta (with ratio< =1:50) would not affect the surface tension property of surfactant. We therefore hypothesize that direct endotracheal installation of B and survanta would effectively deliver B into the lungs and would provide strong local anti-inflammation without much systemic side effects.

Thirty-two infants (< = 1500 gm) with severe RDS who required IMV shortly after birth were randomly assigned into 2 groups: Gr. I (16) received SF (100 mg/kg) and B (0.5 mg or 2 ml/kg) and Gr. II (16) received SF (100 ml/kg) and saline (2 ml/kg). CLD was judged at 36 wks postconp. age. All infants were followed a standard protocol for resp. care.

The two groups were comparable in BW, GA, perinatal characteristics and cardiopulmonary status on admission to NICU. Infants in Gr. I had significantly ($P<0.05$) higher PaO2 and lower OI on day 2, 3 and required less need of CPAP than Gr. II (mean ¡Ó S.D.; PO2 63 ¡Ó 25 vs 47 ¡Ó 18 mmHg and 62 ¡Ó 9 vs 43 ¡Ó 4 mmHg; OI 3.8 ¡Ó 0.7 vs 7.2 ¡Ó 2.4 and 3.6 ¡Ó 0.9 vs 6.3 ¡Ó 1.9; CPAP 2/16 vs 5/16). The incidence of CLD tends to be lower in Gr. I than Gr. II (4/16 vs 8/16). The two grs. were comparable in mortality (5/16 vs 4/16), in physical growth (BW, HL and HC), in blood pressure and serum glucose and in doses of surfactant administered (mean 1.8 vs 2.6 doses). We concluded that endotracheal instillation of surfactant + Budesonide improved pulmonary status without immediate side effects. This therapeutic regimen is warranted for further study.

426

EXPRESSION OF A HUMAN CATHELICIDIN ANTIMICROBIAL PEPTIDE, LL-37, IN AMNIOTIC FLUID WITH NEONATAL OR MATERNAL INFECTION

H YOSHIO[1], M YAMADA[2], M YOSHIDA[2], A TAKEUCHI[1], S FUJII[1], Y KUNII[1], M KAGEYAMA[1], Y YOKOI[1], Y YAMAUCHI[1], B AGERBERTH[3] [1]DEPT. OF NEONATOLOGY, NATIONAL HOSPITAL ORGANIZATION OKAYAMA MEDICAL CENTER (JAPAN), [2]DEPT. OF VIROLOGY, OKAYAMA UNIVERSITY MEDICAL SCHOOL (JAPAN), [3]MEDICAL BIOCHEMISTRY AND BIOPHYSICS, KAROLINSKA INSTITUTET (SWEDEN)

Aim: Antimicrobial peptides are widespread in nature and play a critical role in host defense. LL-37 is a mere cathelicidin present in human at the moment and is thought to contribute to the innate immunity of newborn. Our aim is to examine the LL-37 concentration in amniotic fluid and the relationship with neonatal and maternal infection.

Material and methods: Amniotic fluids at cesarean section from 17 newborns were examined. The gestational ages and birth weights were 34 ⅱ} 3.9w (range: 27–39) and 1854 ⅱ} 793g (range: 678-3132), respectively. The collected amniotic fluid was adjusted with 0.1% trifluoroacetic acid (TFA). For enrichment of proteins/peptides these solutions were passed through OASIS columns at 4ⅱ<C and eluted peptides/proteins were lyophilized. All these samples were analyzed for antimicrobial activity against Bacillus megaterium, (strain Bm11), using an inhibition zone assay. The LL-37 concentration was measured with ELISA assay.

Result and conclusion: The diameters of inhibition zone assay against Bm11 (10.6 ⅱ} 4.6mm,) and the LL-37 concentrations (31.1 ⅱ} 20.1ng/ml) with neonatal or maternal infection (n=6) were significantly higher ($p<0.05$) than those (5.2 ⅱ} 0.6mm, 8.6 ⅱ} 1.4ng/ml) without any complication(n=5), respectively. Expression of LL-37 seemed to be induced in amniotic fluid with neonatal or maternal infection and antimicrobial peptide in amniotic fluid may play a more intrinsic role in a inflammatory condition during perinatal period.

427

AUDITORY BRAINSTEM RESPONSESS (ABR) IN SEVERE HYPERBILIRUBINEMIC NEONATES BEFOR AND AFTER EXCHANGE TRANSFUSION

Y ZAHEDPASHA[1], M AHMADPOUR[1], R NAZARI[1] [1]BABIL UNIVERSITY OF MEDICAL SCIENCES , [2]BABIL UNIVERSITY OF MEDICAL SCIENCES, [3]BABIL UNIVERSITY OF MEDICAL SCIENCES (IRAN)

Objective : Neonatal Hyperbilirubinemia is a very common Problem and can lead to Kernicterous and hearing impairment. Change in ABR were studied and followed in sever hyperbilirubinemic Newborns before and after exchange transfusion (ET) in order to detection bilirubin encephylopathy and early hearing impairment.

Methods :ABR were measured in 12 fullterm newborns with severe hyperbilirubinemia, total bilirubin concentration >20 mgldl, direc bilirubin <2mg/dl , before and 6 days after ET (Case), The follow up of ABR was performed at 3months of life. The means of birth weight, gestational age and day of life-on admission were 3066±477gr, 39± 1.4 weeks and 4.25±3.1 days respectively, non of the newborns have had clinically symptom and sign of bilirubin encephalopathy. Data were collected by spss software and analyzed by the method of repeated measure and t test.

Result : In tow neonates wave absence before ET was followed by appeared of the waves after ET.The mean latencies time of waves V in before , after ET and follow up (at 3 Months of age) of ABR were 7.53±0.34, 7.43±0.33 , 6.99±0.29 milliseconds , ($P<0.00l$) respectively, that marked improved . The mean inter- peak- interval (IPI) of III.V were 2.58± 0.19 , 2.65±0.19 , 2.32±16 respectively ($p< 0.009$) . the IPI of I-V were 5.38±0.29 , 6.16±0.32 , 4.84±0.28 ($P<0.004$) that shortening of IPI after ET.

Conclusion: thought ET is effective for improvement of neurological side effect of severe hyperbiliruinemia. The persisting hearing impairment (ABR abnormality) should be discovred early for audiological intervention program. Therfore we recommended ABR for screening and early detection of bilirubin ototoxicity.