417

IRON ABSORPTION AND RED BLOOD CELL INCORPORATION FOLLOWING ENTERAL AND INTRAVENOUS ADMINISTRATION IN ERYTHROPOIETIN-TREATED PREMATURE INFANTS

JA WIDNESS[1], RE SERFASS[2], N HAIDEN[3], SE NELSON[1], KA LOMBARD[4], A POLLAK [1]UNIVERSITY OF IOWA, COLLEGE OF MEDICINE, DEPT. PEDIATRICS (USA), [2]UNIVERSITY OF TEXAS MEDICAL BRANCH, DEPT. PREVENTIVE MEDICINE & COMMUNITY HEALTH (USA), [3]MEDICAL UNIVERSITY OF VIENNA, DEPT. PEDIATRICS, NEONATOLOGY (AUSTRIA), [4]BARBARA BUSH CHILDREN'S HOSPITAL AT MAINE MEDICAL CENTER, DEPT PEDIATRICS (USA)

Background: Clinically important information regarding iron absorption and erythrocyte incorporation in infants is incomplete.

Methods: A prospective, controlled, randomized, open, 18-day treatment trial was conducted in infants <1,300 g and <31 wks at birth to assess the efficacy of intravenous (IV) iron sucrose in combination with recombinant human erythropoietin (r-HuEPO) in increasing red blood cell (RBC) iron incorporation, enteral iron absorption, and erythropoiesis. Three groups of clinically stable infants were enrolled at 3–4 wks of age: 1) Control; 2) EPO (2,100 U r-HuEPO/kg-wk); and 3) IV Iron (Fe) + EPO (2 mg IV Fe sucrose/kg-d plus 2,100 U r-HuEPO/kg-wk). All infants received 9 mg/kg-d of enteral Fe polymaltose (IPC), but were not permitted to receive RBC transfusions. Indicators of iron status and erythropoiesis were assessed before and after treatment. On day 4, tracer doses of enteral 57Fe polymaltose and IV 58Fe sucrose were administered with subsequent stool and blood samples collected to determine Fe absorption and RBC Fe incorporation.

Results: Compared to Control and EPO Groups, the IV Fe + EPO Group demonstrated greater total RBC Fe incorporation along with greater increases in hemoglobin (Hb) concentration, reticulocyte counts, and plasma ferritin (Table). Compared to Controls, the EPO Group demonstrated greater increases in Hb concentration and reticulocyte counts, but not in RBC Fe incorporation. Absorption of 57Fe and non-isotopic Fe polymaltose were similar among the three study groups.

Conclusions: In summary, IV Fe sucrose administered in combination with r-HuEPO to VLBW premature infants significantly increases RBC Fe incorporation and erythropoiesis above that of r-HuEPO alone without increasing iron absorption. Based on the present data, future studies in which IV iron and r-HuEPO dosing are modified with the purpose of achieving greater erythropoietic stimulation for achieving greater reductions in RBC transfusions are warranted.

Study Groups	Total RBC Fe Incorporation (mg/kg-d)	? Hemoglobin (g/L)	? Retic Count ($x10^3/\mu L$)	? Plasma Ferritin ($\mu g/L$)	Absorption ^{57}Fe IPC (% dose)	Absorption ^{57}Fe IPC (mg/kg-d)
Control	0.19 ± 0.10	-21.4 ± 3.4	36 ± 18	-131 ± 28	57.8 ± 5.1	4.94 ± 0.42
EPO	0.25 ± 0.14	-14.1 ± 6.9	110 ± 23a	-172 ± 54	46.7 ± 4.7	4.01 ± 0.39
IV Iron + EPO	0.95 ± 0.49	+3.6 ± 6.8	194 ± 24	+370 ± 43	47.6 ± 6.4	4.08 ± 0.56
ANOVA *P*	<0.0001	0.02	0.0002	<0.0001	0.37	0.37

418

DYNAMIC CHANGES IN BRAINSTEM AUDITORY ELECTROPHYSIOLOGY IN NEWBORN PIGLETS AFTER ISCHAEMIA

ZD JIANG[1], GM WOUNG[2], M SHAO[2], AR WILKINSON[1] [1]DEPARTMENT OF PAEDIATRICS, UNIVERSITY OF OXFORD (UK), JOHN RADCLIFFE HOSPITAL, OXFORD , [2]CHILDREN'S HOSPITAL, FUDAN UNIVERSITY, SHANGHAI (CHINA)

Background/Aims: To further the understanding of pathophysiological process of neural impairment in thre brain following severe hypoxia-ischaemia (HI), we examined dynamic changes in brainstem auditory electrophysiology after experimental HI in piglets.

Methods: Twelve newborn piglets were randomly assigned to one of the following two groups: (a) Study group (n = 6): On days 5–7 after birth, HI was induced by abruptly reducing inspired oxygen concentration to 6% and simultaneously ligaturing both common carotid arteries for 30 minute. (b) Control group (n = 6). No Maximum length sequence brainstem auditory evoked response (MLS BAER) was recorded shortly before HI and at 12 time points after HI (2h -15d). Clicks were presented at 91–910/s. In the controls, the recording was made at the same time points.

Results: From the first recording shortly before HI to the recording at 60h after HI, MLS BAER variables in HI group did not show any systematic, significant changes. At 72h, wave V latency and I-V interval increased significantly at almost all click rates (91–910/s, all p <0.05). Wave I and III latencies and I-III and III-V intervals also increased significantly at some click rates (all p <0.05). All latencies and intervals tended to increase further on 4d, and reached peak values on 7d. On day 10, MLA BAER wave latencies and intervals tended to decrease, but still differed significantly from the controls at most rates (p <0.05–0.01). On days 13 and 15, all latencies and intervals decreased further, but did not reach normal values at most rates.

Conclusions: Following severe HI, brainstem auditory function in piglets did not show any major impairment until 72h later. The impairment progressed, reached a peak on day 7 after HI, and then tended to recover. On day 15, the impaired function had not returned to normal.

419

NEONATAL DISTORTION PRODUCT OTOACOUSTIC EMISSIONS AND LOW APGAR SCORE

Z JIANG [1], Z. ZHENG[1], A. WILKINSON[1] [1]NEONATAL UNIT, DEPARTMENT OF PAEDIATRICS, OXFORD UNIVERSITY, JOHN RADCLIFFE HOSPITAL, OXFORD (UK), [2]CHILDREN'S HOSPITAL, FUDAN UNIVERSITY, SHANGHAI (CHINA)

Background: Whether neonates with low Apgar scores but not signs of brain damage have cochlear impairment is unclear.

Aims: to detect any cochlear impairment in neonates with low Apgar scores but no hypoxic-ischaemic encephalopathy and to define which frequencies of the cochlear audiogram are affected.

Methods: The subjects were 54 term neonates with Apgar scores <7 at 1 and/or 5 min. None had clinical signs of hypoxic-ischaemic encephalopathy. Normal controls were 35 term neonates without perinatal problems or conditions. On day 3–5 after brith, DPOAEs were elicited by two pune tones (f1/f2 = 1.22). The lower (f1) and higher (f2) frequency primary tones were simultaneously presented at 65 and 55 dB SPL, respectively. The f2 primary tone was presented at 10 frequencies (0.5–10 kHz). The left and right ears were tested, respectively.

Results: The general pattern of DPOAE pass rates at different frequencies in the subjects were similar to that in the controls, with a dip at 750 Hz and 1 kHz. Compared to the controls, the DPOAE pass rate in the subjects was lower at most frequencies of the f2 primary tone. The greatest difference occurred at 1 kHz at which the pass rate was 34.3% in the subjects, compared with 82.9% in the controls. The pass rates in the subjects were significantly lower than in the controls at 1, 2, 3, 5, and 6 kHz (P <0.05–0.01). The overall failure rate in the subjects (16.3%) was significantly higher than in the controls (4.3%, P <0.05).

Conclusions: There was a cochlear impairment in neonates who had a low Apgar score but no hypoxic-ischaemic encephalopathy. The impairment occurred mainly at the frequencies 1, 2, 3, 5 and 6 kHz. Nevertheless, this impairment was less severe than that we previously reported in infants who had both low Apgar scores and hypoxic-ischaemic encephalopathy.

420

COST MINIMISATION OF RESPIRATORY SYNCITIAL VIRUS PROPHYLAXIS WITH PALIVIZUMAB

SL WILLS[1], J COUTTS[1], J SIMPSON[1] [1]QUEEN MOTHER'S MATERNITY HOSPITAL, GLASGOW (UK)

Introduction: Prescription of palivizumab varies throughout the UK. Concern regarding the high price of RSV prophylaxis compared to possible savings from preventing an admission is cited as a reason to restrict palivizumab prescription. We report a method for minimising drug costs, achieving a 16% reduction with no adverse impact on clinical effectiveness.

Aims: To tightly coordinate the delivery of palivizumab prophylaxis, reducing drug wastage by cohorting and vial sharing.

Methods: We identified barriers to efficient cohorting through audit of previous experience and appointed a trainee to coordinate a programme of clinics to deliver RSV prophylaxis. Prior to the start of the season we agreed referral criteria, improved the referral process and sent explanatory letters to parents and general practitioners. Initial referrals were split into three groups who attended on consecutive afternoons for their first dose. Infants who were inpatients for part or all of the season were identified and dosed along with main cohorts. Infants continued to be referred throughout the season and new cohorts were created, timed to join a main cohort after the first dose where possible. Non-attenders were contacted by the coordinator and re-appointed to join another group.

Results: We began with three cohorts and ended with eight without compromising dosage intervals. We reduced drug wastage by 14% with a monetary saving of 16%. Over the whole season we dispensed 34,300mg and delivered 32,570mg in 356 doses to 114 patients at a total drug cost of £220,847, discarding only 1,730 mg (5%). Without vial sharing we would have dispensed 39,900mg and spent a further £41,527. Five patients were hospitalised with RSV (4.4%) which is in line with the published efficacy of palivizumab prophylaxis.

Conclusions: We have minimised drug costs effectively through strict cohorting and vial sharing, positively contributing to the cost-benefit analysis of RSV prophylaxis.

421

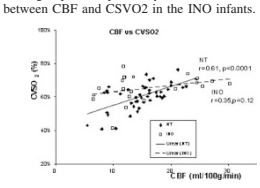
PRETERM INFANTS ON INOTROPES HAVE LOWER CEREBRAL OXYGEN CONSUMPTION MEASURED BY NEAR INFRARED SPECTROSCOPY

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: Sick preterm infants are often on inotropic medication to maintain mean arterial blood pressure (MAP). The effect of inotropes on cerebral oxygen metabolism 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 to measure CVSO2 and cerebral blood flow (CBF), we aimed to compare cerebral oxgyen consumption (CMRO2) between normotensive infants and those who were on inotropes.

METHOD: Twenty-nine infants born at median (range) gestational age of 26 (24–30) weeks were studied at median postnatal age of 17 (2.4–77) hours. Nineteen infants were normotensive (NT) and ten were on inotropes (INO, dopamine) for hypotension. Using NIRS (Hamamatsu NIRO-500), replicate measurements of CBF and CVSO2 were grouped into 20-minute bins and averaged. CMRO2 was determined by CBF and cerebral oxygen extraction (CMRO2 = CBF x cerebral arterial minus venous oxygen content).

RESULTS: CMRO2 was lower (p<0.05) in the INO infants compared to NT infants, with median (IQR) of 0.63 (0.46–0.95)ml/100g/min and 0.85 (0.74–0.96)ml/100g/min respectively. CVSO2 was higher in the INO infants compared to NT infants (p<0.05), implying less cerebral oxygen extraction in INO infants. There was no significant difference in MAP and CBF between the NT and INO groups. CBF positively correlated with CSVO2 (r=0.61, p<0.001) in NT infants. In contrast, no correlation existed between CBF and CSVO2 in the INO infants.



CONCLUSION: Infants on inotropes have lower CMRO2, lower cerebral oxygen extraction, and uncoupling of cerebral perfusion and oxygen extraction. The aetiology of the lower cerebral oxygen demand in these infants and its relationship with the initial hypotension remain to be clarified.