(interburst interval) and relative power of delta EEG frequency band values surrounding the point pCO_2 measurements were averaged using a specified smoothing window.

Results It is shown that by combining the measurements of both a defined period of EEG interburst interval and the relative power of delta EEG frequency band using a multivariate linear regression model, a prediction of pCO_2 can be performed. The automatic removal of mechanical artefact and artefact due to other external influences is demonstrated. A regression coefficient (R^2) of 0.64 is obtainable using both the interburst and delta relative power as predictors for pCO_2. All variables are significant to within $p<0.05$. A section of continuous prediction of pCO_2 using EEG showing correlation with simultaneous transcutaneous carbon dioxide measurement is demonstrated.

Conclusion The ability to provide a novel non-invasive continuous monitoring of pCO_2 in newborn preterm babies is discussed.

1108 AN EVALUATION OF THE USE OF ENTERAL NUTRITION DURING HYPOTHERMIA TREATMENT FOR PERINATAL HYPOXIC ISCHAEMIC ENCEPHALOPATHY

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Background There is widespread variation in enteral feeding practices of infants receiving therapeutic hypothermia (cooling) following hypoxic ischemic encephalopathy (HIE). We compared the safety and efficacy of early versus delayed enteral feeding during cooling.

Methods Retrospective case control study (January 2009 – December 2011). Cooled infants at Karolinska Hospital, Stockholm (KH) received early enteral feeding and were compared to similar infants at Princess Anne Hospital (PAH) Southampton, who had delayed feeding (controls). Infants also received early parenteral nutrition in both centres.

Results A complete data set was available for 28/37 infants at PAH compared to 51/51 neonates at KI. Mean baseline parameters at PAH/KH were birth weight (3404.80/3723 g), male/female ratio (50/55 %), umbilical arterial pH (7.1/7.04) and base deficit (–15.65/–12.03).

There were differences in enteral feeding rates at PAH/KH (20.1/91.0%). The mean volume of enteral feeds (mls/kg/day) at PAH/KH on days 1–4 were: 0/2.1, 0.2/6.1, 1.8/10.1, 1.9/17.1.

There were also differences (PAH/KH) in mean time to establishing full nasogastric tube feeding (5.9/7.2 days) achieving full oral feeds (7.45/10.1 days) and breast feeding rates at discharge (56/70.2%). The mean length of stay was 9.77/14.7 days (PAH/KH).

One baby developed spontaneous intestinal perforation at KH but none developed necrotising enterocolitis in either centres.

Conclusion Feeding practices during hypothermia varies between centres. Early enteral feeding during hypothermia is safe and not associated with any additional morbidity. However, delayed introduction of enteral feeds does not delay the time to reach full enteral feeds or prolong the length of stay at hospital.

1109 TOTAL BODY HYPOTHERMIA AND CIRCULATING BIOMARKERS OF LIVER FUNCTION

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Background and Aims Total body hypothermia (cooling) improves outcome in hypoxic-ischaemic encephalopathy (HIE). This study tested the hypothesis that cooling affects the liver by examining whether cooling during HIE was associated with differences in clinically relevant biomarkers of hepatic metabolism.

Methods Clinical records in 3 centres were searched for babies with HIE and umbilical artery pH at birth ≤ 7.0 born between 01/07/2006 and 30/06/2011. Each centre adopted routine cooling on a different date. The results of blood tests reflecting hepatic metabolism measured according to clinical practice within 7 days of birth were collected. ANOVA was used to assess the associations between extreme values of each analyte, HIE grade and the use of cooling and to calculate estimated marginal means for each condition.

Results 127 babies were identified including 31 with Grade 1 (42% cooled), 65 with Grade 2 (80% cooled) and 31 babies with Grade 3 (90% cooled). Grade of HIE was associated with maximum AST [HIE1: mean 180 (s.e. 120); HIE2: 367 (85); HIE3: 850, (123)], maximum prothrombin time [HIE1: 18 (3); HIE2: 22 (2); HIE3: 36 (4)] maximum bilirubin [HIE1: 117 (9); HIE2: 108 (8); HIE3 68 (15)] and minimum albumin [HIE1: 28.5 (0.9); HIE2: 23.6 (0.7); HIE3: 20.1 (1)] but not with maximum ALT or maximum APTT. Cooling was not associated with any variables.

Discussion Clinically graded HIE was associated with markers of liver function. Cooling did not modify these associations. Liver and brain may have different susceptibilities to hypoxic-ischaemia or different responses to cooling.

1110 IMPLEMENTING A THERAPEUTIC HYPOTHERMIA PROGRAM FOR THE TREATMENT OF PERINATAL HYPOXIC ENCEPHALOPATHY: EXPERIENCE FROM A UK TERTIARY NEONATAL CENTRE

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Introduction Hypoxic-ischaemic encephalopathy (HIE) is a leading cause of neonatal morbidity and mortality. Therapeutic hypothermia (TH) is an effective neuroprotective treatment. In the U.K NICE endorsed selected TH use in 5/2010. Access to treatment is increasing. Our institution is a tertiary neonatal unit serving South-East London perinatal network. We designed and implemented a TH program with established clinical governance procedures and a rolling training program followed by the treatment of the first patient in 8/2009.

Aim To present our experience in implementation of our TH program.

Methods Review of clinical records, aEEG, EEG and MRI of the infants treated with TH from 8/2009–3/2012.

Results 44 infants with moderate or severe HIE were treated. Mean GA:40 weeks (36–42 weeks). 61% outborn (N=27) 10/27 from outside SE-London. Treatment commenced at median age:2.5h for inborns. Outborns commenced passive cooling. On admission 30% of the outborns had rectal temperature < 30°C 48% of patients were treated for seizures before TH, 16%. During treatment 1 infant developed arrhythmia (PEA) after phenytoin. One infant required extended TH for seizures. 77% survived to discharge.

93% had brainMRI performed.

Conclusions Successful introduction of a TH program requires an on-going education program and established clinical governance procedures. Access toTH and transport procedures should be further improved. TH should ideally be provided in centres equipped to provide neurocritical intensive care able to address the complex