**Outcome After Inflicted Traumatic Brain Injury in Shaken Baby Syndrome: Neurosurgical Approach**

F Menegazzo, M Bua, M Rosa Rizzotto, E Sgaravatti, P Facchin, R Faggin, Department of Pediatrics, Child Abuse Unit, University of Padova, Padova, Italy.

**Background and Aims** Shaken Baby Syndrome (SBS) is a severe form of child abuse caused by violent shaking leading to severe head injuries, causing mild-severe long-term disabilities and death. The study aims to explore medium/long-term consequences of SBS comparing children undergoing neurosurgery with hematoma evacuation/cranialplasty with those with hematoma evacuation or no surgery.

**Methods** A cohort of 21 children with SBS, admitted to Pediatric Department/Padua Hospital (2003–2011), was followed-up. Each clinical record was reviewed collecting information on onset, acute course, ophthalmologic examinations, neuroimaging, treatment and procedures, family history and social background. Cases were followed-up at 3, 6 and 12 months after trauma, every year. The assessment included fundus evaluation and visual function, neuro-radiological exams (MRI).

**Results** 21 cases were reviewed (M:F=2:1.1), 12 foreigners, 9 Italians. Mean age at onset: 5.7 months (range 1.2–18). Mean age at last follow-up evaluation: 30.4 months (range 5–82). Mean follow-up duration: 24.6 months (range 1–73.5). In acute phase 8/19 underwent neurosurgical intervention and 1/19 underwent eye surgery. 20/21 showed retinal hemorrhages, 21/21 cerebral hemorrhages, 11/21 cerebellar hemorrhages, 5/10 spinal subdural hematoma, 4/21 skull fractures, 6/21 other body region fractures. At last follow-up evaluation resulted: 2/21 hemiplegia, 1/21 paraplegia, 1/21 tetraplegia, 2/21 cortical visual impairment, 3/21 visual field deficits, 4/21 strabismus. 10/21 underwent cognitive and behavioural assessment demonstrating in 6 cases global delay and in 4 cases delay in specific functions (locomotor, eye and hand coordination, performance scale). Surgical procedure’s video will be shown.

**Conclusions** SBS may influence child development and therapeutic surgical approach seems crucial.

**Impact of Warmed Inhaled Gas from the Mechanical Ventilator on Esophageal Temperature During Whole Body Hypothermia for Hypoxic-Ischemic Encephalopathy**

1C McKeering, 1P Gaydecki, 2A Hendrickson, 2C Jennings, 2S Victor, 1School of Electrical and Electronic Engineering, University of Manchester; 2Newborn Intensive Care Unit, Central Manchester University Hospitals NHS Foundation Trust; 3School of Biomedicine, University of Manchester, Manchester, UK.

**Background** The continuous monitoring of partial pressure of blood carbon dioxide (pCO₂) in premature babies has proven to be challenging. Spot measurements of pCO₂ can be performed by taking a blood sample. However the frequency of such measurements is limited by their invasiveness.

**Aim** We aim to develop a continuous non-invasive method of predicting pCO₂ using features of the preterm electroencephalography (EEG) signal.

**Methods** A regression model was trained on eight 12 hour EEG recordings that contained 22 blood gas measurements in total. All measurements were obtained from babies born before 28 weeks’ gestation and less than 72 hours old. The duration of EEG quiescence

**Abstract 1106 Figure 1** Comparison of E-R (in centigrade) between 2 groups

**Conclusions** Warmed inhaled gas does not interfere with the esophageal temperature during WBC.

**Continuous Carbon Dioxide Monitoring Using Features of Neonatal Electroencephalography**

1C McKeering, 1P Gaydecki, 2A Hendrickson, 3C Jennings, 2S Victor, 1School of Electrical and Electronic Engineering, University of Manchester; 2Newborn Intensive Care Unit, Central Manchester University Hospitals NHS Foundation Trust; 3School of Biomedicine, University of Manchester, Manchester, UK.
(interburst interval) and relative power of delta EEG frequency band values surrounding the point pCO2 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 pCO2 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 pCO2. All variables are significant to within p<0.05. A section of continuous prediction of pCO2 using EEG showing correlation with simultaneous transcutaneous carbon dioxide measurement is demonstrated.

**Conclusion** The ability to provide a novel non-invasive continuous monitoring of pCO2 in newborn preterm babies is discussed.

**AN EVALUATION OF THE USE OF ENERAL NUTRITION DURING HYPOTHERMIA TREATMENT FOR PERINATAL HYPOXIC ISCHAEMIC ENCEPHALOPATHY**

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1A Tilqvist, B Thyagarajan, V Baral, B Hallberg, B Vollmer, M Bännow. *Karolinska University Hospital, Karolinska Institute, Stockholm, Sweden; *Neonatal Medicine, Princess Anne Hospital; *Paediatric Neurology, University of Southampton, Southampton, UK

**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 KH. Mean baseline parameters at PAH/KH were birth weight (3404.80/5723 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 is 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.

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

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K Povazai, E Molnar, M Chilton, A Kapetanakis. *Neonatal Medicine, Evelina Children's Hospital Guy's and St Thomas' Hospital NHS Foundation Trust, Kings Health Partners, London, UK

**Introduction** Hypoxic-ischaemic encephalopathy (HIE) is a leading cause of neonatal morbidity and mortality. Therapeutic hypothermia (TH) is an effective neuroprotective treatment. In the UK NICE endorsed 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.


**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.

98% had brainMRI performed.

**Conclusions** Successful introduction of a TH program requires an on-going education program and established clinical governance procedures. Access to TH 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...