MMP-9) revealed changes in protein expression between asphyxia and control cases.

**Conclusion** Placental biopsies collected at up to 90 minutes after delivery show stable gene and protein expression and may provide useful early biomarkers in NE.

**Abstract 1063**

### CEREBELLAR AND THALAMIC GROWTH IN PRETERM INFANTS IN RELATION TO BIRTH WEIGHT (BW)

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1 E Andrew, 1 J Siu, 2 VJ Pelling, 2 H Rabe, 3 P Arness, 3 JR Fernandez Alvarez. 1 Brighton and Sussex Medical School, 2 Brighton and Sussex University Hospitals NHS Trust, 3 Brighton and Sussex University Hospitals, Brighton, UK

**Background** Reduced cerebellar/thalamic growth affects neurodevelopment. The exact mechanisms are unknown.

**Aims** To compare cerebellar/thalamic growth of preterm infants in relation to BW and weight at 36 weeks’ corrected (W36).

**Methods** Retrospective matched cohort-analysis: 4 BW groups matched for maternal smoking, chorioamnionitis, antenatal steroids, delivery mode, multiples and gender.

**Exclusions** Growth restriction, congenital anomalies.

**Study Variables (table1)** gestational age (GA), BW, W36, head circumference at birth/36 weeks (HC/HC36), transverse cerebellar/thalamic diameter at birth/36 weeks (TCD/TTD) and TCD36/TTD36.

**Confounding variables** ventilation days (V), oxygen requirement at 36 weeks’ corrected (O2), postnatal steroids (PS), NEC, days antibiotic treatment (ABX), days parenteral nutrition (TPN), phototherapy, IVH, PVL.

**Statistics** median (quartiles, 25th/75th), Friedman-/Cochran-Test.

There was a statistically significant difference in V, PS, O2, ABX, TTD36 and control cases.

**Conclusion** Cerebellar growth is more resilient than thalamus or cerebrum to the negative effects of established risk factors for poor neurodevelopmental outcome.

**Abstract 1064**

### NEUROLOGICAL INVOLVEMENT OF ENTEROVIRUS INFECTION IN YOUNG INFANTS WITH SEPSIS-LIKE ILLNESS

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1 EP De Jong, 2 EPM Van Elzakker, 3 H Holscher, 4 FJ Walther, 1 F Brus. 1 Juliania Children’s Hospital, 2 Medical Microbiology, 3 Radiology, Haga Hospital, The Hague; 4 Paediatrics, Division of Neonatology, Leiden University Medical Center, Leiden, The Netherlands

**Introduction** Enterovirus (EV) infection is common in young infants. Amongst those requiring intensive care seizures and cerebellar white matter abnormalities with serious neurologic sequelae have been reported. We questioned whether similar neurologic features occur in less seriously ill infants with EV infection.

**Methods** From august 2011 onward we included children under 90 days of age, admitted to a medium care unit with sepsis-like illness due to EV infection but not requiring intensive care. Cerebral ultrasound imaging was performed during hospital stay, cerebral MRI and hearing screening 4–6 weeks post-infection. During all visits neurological examination was performed and developmental milestones determined.

**Results** Preliminary results of the first 13 infants included are presented. Seven had positive EV PCR in CSF and serum, 6 tested positive in serum only. None showed seizures or abnormal neurological examination at admission. Cerebral ultrasound was performed in 12/13 infants and showed no abnormalities. Cerebral MRI was performed in 10/13 infants; one showed diffuse white matter abnormalities in the frontal and occipital lobe. Hearing screening was normal in all infants. Neurological examination 4–6 weeks after infection showed slight hypertonia of the lower extremities in one infant. At 6 months of age all infants had normal neurologic examination.

**Conclusion** At 4–6 weeks following EV cerebral white matter abnormalities were found on MRI in one infant, whereas a slight hypertonia of the legs was found in another. At 6 months of age neurological examinations were normal in all infants. The long term implications of our findings are unclear.

**Abstract 1065 Table 1**

<table>
<thead>
<tr>
<th>GA(weeks)</th>
<th>1000g(N=14)</th>
<th>1000–1499g(N=17)</th>
<th>1500–2499g(N=8)</th>
<th>≥2500g(N=46)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW(g)</td>
<td>762(585–882)</td>
<td>1200(1130–1380)</td>
<td>1670(1573–1765)</td>
<td>3345(2814–3668)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>HC(cm)</td>
<td>23.5(22.0–24.5)</td>
<td>27.0(26.0–27.3)</td>
<td>29.2(28.3–30.1)</td>
<td>34.2(33.5–35.5)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>TCD(cm)</td>
<td>2.4(2.3–2.7)</td>
<td>3.2(2.7–3.4)</td>
<td>2.9(2.6–3.5)</td>
<td>4.0(3.6–4.3)</td>
<td>0.002</td>
</tr>
<tr>
<td>TTD(cm)</td>
<td>1.8(1.7–2.0)</td>
<td>2.2(2.0–2.3)</td>
<td>2.4(2.3–2.4)</td>
<td>2.8(2.6–2.9)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>W36(g)</td>
<td>1702(1528–1850)</td>
<td>2050(1800–2200)</td>
<td>2250(2018–2350)</td>
<td>Not applicable</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>HC36(cm)</td>
<td>29.0(28.4–31.6)</td>
<td>32(31.0–32.6)</td>
<td>32.3(30.3–32.8)</td>
<td>Not applicable</td>
<td>0,001</td>
</tr>
<tr>
<td>TCD36(cm)</td>
<td>3.3(3.2–3.7)</td>
<td>3.6(3.1–4.3)</td>
<td>4.0(3.5–4.4)</td>
<td>Not applicable</td>
<td>0.072</td>
</tr>
<tr>
<td>TTD36(cm)</td>
<td>2.4(2.3–2.6)</td>
<td>2.4(2.3–2.5)</td>
<td>2.7(2.6–2.9)</td>
<td>Not applicable</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Abstracts**

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A305
plane. Transverse cerebellar diameter (TCD), 4th ventricle width (4VW) and length (4VL) were assessed via mastoid fontanelle.

**Results** Sector probe gave significantly smaller measurement results than convex transducer. Left side measurements were significantly greater than right side ones. VI, VW, BW, TCD and 4VW were dependent on birth weight, birth length, head circumference and gestational age. ACSF, FHW, TOD and JR were independent of those factors. No relationships were found between gender and measured diameters or calculated ratios.

**Conclusions** Reference values for cranial measurements, ER and JR were determined for examined population of premature newborns. Described indices may be useful for everyday clinical practice in neonatal units.

**ABNORMAL HEART RATE CHARACTERISTICS ARE ASSOCIATED WITH ABNORMAL BRAIN ULTRASOUND AND MRI IN EXTREMELY LOW BIRTH WEIGHT INFANTS**

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1K Fairchild, 1R Sinkin, 1J Matsumoto, 1F Davalian, 1D Lake, 1JR Moorman, 1J Blackman.
1Pediatrics; 2Radiology; 3Medicine, University of Virginia, Charlottesville, VA, USA

**Background and Aim** Brain injury may lead to autonomic nervous system dysfunction reflected by abnormal heart rate characteristics (HRC). A HRC monitor was developed to analyze heart rate variability and decelerations and predict catastrophic illness in NICU patients (HeRo monitor). We tested the hypothesis that the HRC index would be abnormally high in preterm infants with abnormal brain ultrasound and MRI.

**Methods** We collected HRC data on extremely low birthweight infants who underwent brain MRI as part of a study of neurodevelopmental outcomes. Brain ultrasounds (US) were performed in the first week and as clinically indicated, and brain MRI was performed near discharge. US were scored as normal/mild (including grades 1–2 IVH) and moderate/severe (grades 3–4 IVH or cystic periventricular leukomalacia). MRI was scored 0–3 for gray and white matter injury.

**Results** 45 ELBW infants with MRI performed had HRC data available. MRI was classified as 0 (normal, n=22), 1 (mild, n=14), 2 (moderate, n=5) or 3 (severely abnormal, n=4) and US as normal/mild (n=96) or moderate/severe (n=9). Average HRC index in the first 28 days after birth (aHRC28) was highly correlated with severity of abnormal brain US and MRI. aHRC28 for patients with normal/mild US abnormalities was 1.57±0.48 (mean±SD) and with moderate/severe 2.53±1.69 (p<0.001). For MRI, aHRC28 for patients with classes 0–3 was 1.24±0.44, 1.59±0.53, 2.49±0.68*, 2.72±0.82*, (p<0.001 versus class 0). Differences persisted after adjustment for gestational age and birthweight.

**Conclusion** HRC monitoring may be a useful adjunct test for severity of brain injury in NICU patients.

**INITIAL EXPERIENCE OF EFFECT OF SELECTIVE HEAD COOLING IN NORMOTHERMIC AND HYPOTHERMIC INFANTS**

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1AN Sofijanova, 1OV Jordanova, 1K Piperkova. 1Neonatal and Pediatric Intensive Care; 2Department of Neonatology, University Children’s Hospital, Skopje, FYR Macedonia

**The Aim of this Study** To evaluate the effect of selective head cooling (introduced 3 months ago in the Neonatal Intensive Care Unit at the University Children’s Hospital in Skopje-Macedonia) on S100 B protein levels, previously measured only in normothermic infants after perinatal asphyxia and the preliminary neurodevelopment outcome at the age of 3 months.

**Methods** All risk neonates with severe asphyxia admitted within 24h of injury were eligible for inclusion in the study. One serum blood sample was obtained from each patient the first day of admission, and 48h and 72h hours after admission. S100B levels were measured using ECLI A method (Electro-Chemiluminescence Immuno Assay-Elecsys 2010-Roche Diagnostic).

**Results** The average serum S100B levels for the control group (N=48) was 0.12 microgL (–1) (cut-off point). Serum S100B levels were grossly elevated in both HT and NT groups of infants with asphyxia. The differences were statistically significant as follows: a) between the first (24h) and second (day 4) time interval significant at p<0.05; b) between the second (day 4) and third (day 7) time interval significant at p<0.005; c) between the first (24h) and third (day 7) time interval significant at p<0.001. Serum S100B values were lower in HT (selective head cooling infants) compared to NT infants (p=0.049 at 48 hours).

**Conclusion** Serum S100B levels were lower in the HT group after 72h, and strongly correlated with the neurodevelopment impairment. S100B levels are highly elevated following asphyxia. Serum S100B levels are lowering in the HT and strongly correlate with the early neurodevelopmental outcome.

**CAN LOSS OF SLEEP-AWAKE CYCLICITY AT aEEG PREDICT POSTHEMORRHAGIC HYDROCEPHALUS IN PRETERM INFANTS WITH INTRAVENTRICULAR HEMORRHAGE?**

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1A Scoppa, ‘N Pozzi, 2C Pallante, 1F Boffa, 1L Orfeo. 1NICU AND PICU, ‘G. Rummo’ Hospital, Benevento, 2A. Cardarelli Hospital, Naples, Italy

**Background and Aim** Intraventricular hemorrhage (IVH) is the most common brain injury in preterm infants. Among infants with IVH 30% develops posthemorrhagic hydrocephalus (PHH). Actually there is no predicting factor for the development of PPH. We observed if loss of sleep-awake cyclicity, at aEEG evaluation is predictive for PPH.

**Methods** 6 preterms of gestational age between 25 and 30 weeks were detected for IVH (II degree to IIIH) at cerebral ultrasonography. Cerebral background activity was continuously performed by CFM (Braintz US).

**Results** Sleep-awake cyclicity was observed in all 6 infants in the first 24 hours after the detection of IVH. But in 2 of these we noted the loss of cyclicity few days after the diagnosis of the bleeding. These 2 patients developed posthemorrhagic hydrocephalus whereas the other 4 infants didn’t develop PPH.

**Conclusions** Loss of sleep-awake cyclicity, at aEEG, has a high positive predictive value for the developing of PPH in preterm infants with IVH; therefore study of cerebral background activity and in particular of sleep-awake cyclicity can be used as a early prognostic tool in patients at risk of PPH.

**DOES CEREBRAL OXYGENATION AID IN OUTCOME PREDICTION IN ASPHYXIATED NEWBORNS SUBMITTED TO HYPOThERMIA?**

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P Costa, I Sampaio, K Cardosa, C Moniz, A Graça. Neonatology, Hospital de Santa Maria, CHLN, Lisbon, Portugal

**Background and Aims** Neurological outcome in asphyxiated newborns submitted to hypothermia is being predicted by aEEG and MRI. The aim of this study was to assess the value of regional cerebral oxygen saturation (rSO2) in early outcome prediction and its relation with aEEG and brain MRI.

**Methods** rSO2 was measured by NIRS INVOS monitor. Newborns were simultaneously monitored with aEEG during hypothermia and rewarming period. Values of rSO2 were analyzed in six groups of predicted outcome (normal, intermediate or abnormal) according