infants are managed on single medication for an average duration of 8 months.

Hypoxic-Ischemic Encephalopathy Biomarkers

PS-107 A RATING SCALE (RS) FOR EARLY AND ACCURATE EVALUATION OF THE SEVERITY OF HYPOXIC-ISCHAEMIC ENCEPHALOPATHY (HIE)

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Background Clinical RS for HIE are intended to determine trial entry and to compare groups within or between trials. Categorical current schemes do not reflect the broad clinical continuum spectrum of HIE and they were not design for this task.

Objective To prospectively validate a new structured multi-item RS for HIE.

Methods A standardised structured ordinal RS for HIE with 7 clinical items (alertness, spontaneous motor activity, motor response elicited by stimuli, posture, myotatic reflexes, breathing and clinical seizures) and two aEEG items (background and electric seizures), scored by an asymmetric scale (0–8, with higher scores indicating more severe dysfunction) was designed.

The RS was scored in 75 term infants; 47 infants with HIE and in 28 control healthy infants by two blinded examiners within the first 8 h of life. Stages of HIE were established on the basis of our previous qualitative scheme.

Results There were no differences between both cohorts regarding gestational age, weight, and age at evaluation. The Intra-Class Correlation Coefficient of the RS was 0.969 in the group of HIE group and 0.930 in the control group. The Internal consistency (Cronbach's alpha) was 0.897.

The ROC curves depicted that RS distinguished between HIE and control subjects (cut-off 3.5; AUC 0.89) and more importantly between the different stages of HIE: mild compared to moderate HIE (cut-off 7; AUC 0.981) and moderate compared to severe HIE (cut-off 30; AUC 0.920).

Conclusions Our RS for HIE appears to be valid, reliable and sensitive to reflect the severity of HIE.

PS-108 URINARY BIOMARKERS MAY HELP PREDICT OUTCOME IN NEONATAL ENCEPHALOPATHY

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Background Following a perinatal hypoxic-ischaemic insult, term infants are at risk of multi-organ injury including AKI. Infants with NE experience up-regulation of urinary cytokines which may reflect severity of brain injury.

Objective To investigate the association between novel urinary biomarkers and outcome in a group of term infants with NE compared to controls.

Methods Levels of urinary biomarkers [Albumin, B2M, Cystatin-C, EGF, NGAL, Osteopontin, Uromodulin] were serially measured over day 1–11 in a group of term newborns with NE and controls. These values were compared to grade of encephalopathy defined by Sarnat score.

Results Ten control and 82 cases had urine samples collected (Grade 0 NE = 7, Grade I NE = 22, Grade II NE = 42, Grade III NE = 11). Thirty-nine infants underwent TH, 4 infants died. Control infants had significantly lower B2M on day 1, NGAL on day 1–2 and significantly higher urinary EGF on day 2–3 and Uromodulin on day 3, compared with cases (p-values

Conclusion Infants with NE have elevated urinary biomarkers compared to controls. Abnormal grade of encephalopathy is best predicted by day 2 urinary Cystatin-C and day 3 NGAL. Urinary biomarkers may have a role in long term outcome prediction following NE.

PS-109 B-LINES IN LUNG ULTRASOUND IN NEWBORNS: COMPARISON WITH STATIC LUNG COMPLIANCE

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Background and aims Vertical artefacts (B-lines) in lung ultrasound have been shown to correlate with lung liquid. In neonates the abundance of B-lines decreases after birth reflecting the decrease in the liquid content of the lungs. Static lung compliance, a sign of the elasticity of the lungs, improves after birth. Our aim was to study the correlation between static lung compliance and lung ultrasound in neonates.

Methods 24 healthy term infants were studied. Static lung compliance was measured by the double occlusion technique at the age of 0–4 h during silent sleep and regular respiration. Lung ultrasound was performed immediately after the compliance measurement. B-lines in ultrasound from six designated areas on the chest were scored on a 5-step scale to yield the US score.

Results Static lung compliance correlated significantly ($p = 0.043$, Pearson Correlation) with the abundance of B-lines in ultrasound.

Conclusion Our result supports the utility of lung ultrasound in estimating lung liquid.

PS-110 DOES AMPLITUDE-INTEGRATED ELECTROENCEPHALOGRAPHY (aEEG) MONITORING ADD DIAGNOSTIC VALUE IN ASPHYXIATED NEONATES IN A NON-NICU SETTING?

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Background and aims Asphyxiated neonates are at risk for developing hypoxic ischaemic encephalopathy and seizures. Although conventional electroencephalography (cEEG) is the standard method to detect subclinical seizures and encephalopathy, aEEG is a validated bedside screening tool used in routine clinical practice in many NICUs.

Our Hospital is a non-referral hospital without NICU facilities. Neonates meeting the criteria for therapeutic hypothermia need to be transported to a NICU. The diagnostic value of aEEG monitoring in a non-NICU setting is unknown. We hypothesised aEEG monitoring in a non-NICU setting adds value to diagnostic and therapeutic decision making in asphyxiated neonates.

Methods A retrospective analysis was performed on all asphyxiated neonates born from January 2011 until July 2013 in our hospital. Asphyxia was defined as Apgar score ≤ 5 after 5 min or resuscitation or ventilation from birth for 10 min or pH < 7.0 and base deficit > 16 mmol/L or lactic acid > 10.0 mmol/L.

Results We evaluated 57 asphyxiated neonates of which 12 neonates were directly intubated and transported to NICU. In 7 out of 45 (15.5%) asphyxiated neonates the performed aEEG had diagnostic consequences. Finally, 4 out of 7 neonates (9%) were treated for subclinical seizures ($n = 3$) or therapeutic hypothermia ($n = 1$).

Conclusions aEEG monitoring in a non-NICU setting adds diagnostic and therapeutic value in asphyxiated neonates, especially in the recognition of subclinical seizures.

PS-111 WITHDRAWN

PS-112 ISCHAEMIC NEONATAL STROKE CLASSIFICATION WITH A 3D MAP OF THE ARTERIAL TERRITORIES OF THE INFANT BRAIN

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Background and aim Prognosis of neonatal Arterial Ischaemic Stroke (AIS) seems to depend strongly on early MRI findings, while standard neurological examination provides limited prognostic value. The extent of a lesion as well as the brain areas involved appear to be the main outcome indicators. Moreover, classification according to arterial irrigation regions has proven useful. We aim to provide a tool for systematic vascular classification by means of a segmented 3D map with standard neonatal dimensions.

Methods A T1 structural MR image as well as a TOF angiography were deformed into a standardised neonatal brain. Brain structures and main arteries were then identified in this brain, and the corresponding arterial territories delineated with the help of published arterial region maps for adults. The standardised brain was then manually segmented, under supervision of three experts, and assembled into a 3-dimensional map.

Results Reliability of the resulting 3D map was assessed by automatically classifying a series of previously diagnosed AIS. Arterial region attribution mistakes were detected in radiology reports in some cases, supporting the need of this kind of tool. A test sample of 25 AIS with heterogeneous distribution and sizes was used to validate the original segmentation. Only minor corrections to territory boundaries were necessary.

Conclusions We propose a systematic method to characterise AIS location and extent in neonates by means of a standard template of arterial territories. Its effectiveness in the assessment of stroke outcome is left as a future research endeavour with an independent, larger sample.

Abstract PS-112 Figure 1

PS-113 THE ASSOCIATION BETWEEN ELECTRICAL BRAIN ACTIVITY AND ARTERIAL SPIN LABELLING PERFUSION MRI IN NEONATES WITH HYPOXIC-ISCHAEMIC ENCEPHALOPATHY (HIE)

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Background and aims (a)EEG predicts outcome in full-term infants with HIE. Recently, increased perfusion in the basal ganglia, detected with arterial spin labelling (ASL), was shown to be related to brain injury¹. Our aim was to investigate the relationship between (a)EEG and brain tissue perfusion.

Methods 20 subjects with HIE, eligible for hypothermia, were enrolled. Four 1-hour periods were selected from the (a)EEG: P1 (4–6 h), P2 (20–24 h), P3 (32–36 h) and P4 (44–48 h). Burst-rate (number of burst/min) and IBI (interburst interval) from the rawEEG, minimum (MIN) amplitude (μV) and the % of time $< 5 \mu V$ ($\% < 5 \mu V$) of the aEEG, were included in the analysis. Mean perfusion in the basal ganglia and thalami (BGT-CBF) was measured using ASL-MRI.

Results In P1 a relation was found for suppressed aEEG signal ($\% < 5 \mu V$: $p = 0.015$; $R = 0.709$; MIN: $p = 0.028$; $R = -0.659$) and increased BGT-CBF. Concomitantly, a negative correlation was found between burst-rate and BGT-CBF, MIN in P2–3–4 ($p < 0.05$), whereas suppressed background pattern expressed by $\% < 5 \mu V$ and IBI correlated positively with higher BGT-CBF ($p < 0.05$). In the multivariable regression, corrected for sedatives and anti-epileptic medication, the association between EEG parameters and BGT-CBF persisted ($p < 0.05$), with the exception of burst-rate in P1.

Conclusion A depressed cortical activity in the first 48 h after birth, secondary to hypoxic-ischemia, is related to an abnormally increased brain perfusion. Using both techniques together might be of additional value to predict neurodevelopmental outcome.

REFERENCES

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