a challenge. Multi-channel EEG is not always freely available, leading many to rely on amplitude integrated EEG (aEEG). We wished to examine the correlation between simultaneous EEG and aEEG recordings and their ability to predict 24 month outcome in HIE.

Methods: Continuous EEG was recorded in 46 term infants with HIE. Background EEG activity in one hour epochs was graded at 6, 12, 24 and 48 hours. Neurodevelopmental outcome was measured at 24 months. Simultaneous aEEG was graded by experts blinded to the clinical details, EEG or outcome. Both amplitude based and a pattern recognition grading systems were used and compared.

Results: In 46 recruited infants 125 simultaneous EEG/aEEG recordings were analysed. There was a significant correlation between aEEG and EEG grades ($R=0.642$, $p<0.001$, gamma value = 0.87). Correlation was excellent for normal/mildly abnormal EEGs and isoelectric EEG grades. In the moderate/severe range assigned aEEG grades were on average (SD) -1.54(0.55) and -1.96(0.85) grades below assigned EEG grades respectively. The ability of EEG to predict adverse neurodevelopmental outcome was good with AUROC = 0.87 (0.80-0.94). For aEEG the AUROC was 0.76(0.65-0.86) using amplitude based and 0.79(0.69-0.89) with pattern recognition grading systems.

Conclusions: There is good correlation between expert analysis of aEEG and EEG. Use of aEEG tends to underestimate moderate and severe EEG grades. Prediction of outcome using amplitude based and pattern recognition based aEEG grading were equally reliable, with both being less accurate than multi-channel EEG.

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COMBINING NUCLEATED RED BLOOD CELLS AND EEG TO PREDICT SARNAT STAGE, AND OUTCOME AT 2 YEARS IN NEONATAL HIE

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Background and aims: No early biomarker is conclusive in the prediction of outcome in Hypoxic-Ischaemic Encephalopathy (HIE). Both Nucleated Red Blood Cell (NRBC) count and electroencephalogram (EEG) have been shown to predict outcome in isolation. We wished to examine

whether combining these markers could improve their predictive ability.

Methods: Term infants were recruited if they had ≥ 2 of; initial pH < 7.1 , 5 minute Apgar score ≤ 5 , and abnormal neurology. Sarnat Score was assigned at 24 hours. NRBC count and continuous multi-channel EEG were recorded within the first 24 hours. Outcome was determined at 2 years using the Revised Griffiths Scales of Mental Development.

Results: Of 44 recruited infants 39 have completed 2 year follow-up. The median NRBC count differed significantly between infants with mild and moderate/severe HIE (8 [0.9-23] versus 16.0 [0.0-239.8], $p=0.016$), and between infants with normal and abnormal outcome (8.3 [0.0-50] versus 21.3 [1-239.8], $p=0.004$). The predictive ability of EEG changed with time post-delivery. The combined marker was more robust than EEG in isolation at 12 and 24 hours post-delivery to predict the grade of HIE (12hrs: AUC: 0.80 $p=0.003$ vs 0.75, $p=0.010$), (24hrs: AUC 0.81, $p=0.001$ vs 0.76, $p=0.004$). At 12 and 24 hours, use of the combined marker also improved prediction of abnormal outcome at 2 years (12hrs: AUC 0.90, $p<0.001$ vs 0.80, $p=0.004$), (24hrs: AUC 0.91, $p<0.001$ vs 0.82, $p=0.001$).

Conclusion: At 12 and 24 hours, using a combination of EEG and NRBC count improved prediction of HIE severity and neurological outcome.

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AUTOMATED ANALYSIS OF LONG-TERM CONTINUOUS MULTICHANNEL EEG IN PREMATURE INFANTS

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Background: Continuous long-term multichannel EEG monitoring of the premature infant is feasible and could be a useful tool in early detection of pathological processes. This could help in early prediction of long-term outcome. To date interpretation and quantification of EEG have been based on visually edited recordings after rejection of artifacts. This is a cumbersome and time consuming process, specially in long-term monitoring. Thus a method for automated analysis is greatly needed.