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TARGETED BIOMARKER DISCOVERY IN HYPOXIC-ISCHEMIC ENCEPHALOPATHY; CORRELATION WITH EARLY CONTINUOUS EEG

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Background and aims: Hypoxic-ischaemic encephalopathy (HIE) remains a significant cause of long-term neurological injury. The introduction of therapeutic hypothermia has led to improved outcomes when initiated within the first six hours following delivery. The aim of this study was to examine potential early blood biomarkers of perinatal asphyxia, and to correlate these with the severity and evolution of HIE, as defined by both clinical assessment and continuous multi-channel video-electroencephalography (EEG).

Methods: Fullterm infants with perinatal asphyxia and full term controls had umbilical cord blood drawn and bio-banked. EEG was recorded within the first 24 hours in infants with asphyxia, and a Sarnat score assigned. Analysis of cord blood was performed using Luminex technology.

Results: 30 neonates were recruited, 10 with HIE, 10 with biochemical signs of asphyxia, and 10 controls. Three biomarkers (Matrix Metalloproteinase-9(MMP-9), Interleukin-16(IL-16), and Interleukin-6(IL-6)) significantly differentiated between HIE and non-HIE infants. Each significantly correlated with clinical Sarnat score (r= 0.747; r= 0.577; r= 0.640; respectively) and EEG grade of encephalopathy (r=0.647; r=0.725; r=0.574; respectively). All 3 predicted development of electrographic seizures, with an Area Under the Curve for MMP-9 of 0.975 (CI 0.92-1.00); for IL-16, 0.864 (CI 0.72-1.00); and for IL-6, 0.87 (CI 0.70-1.00).

Conclusion: We have identified three umbilical cord blood biomarkers in full term infants which show promise in their ability to predict the clinical and electrographic grade of HIE injury at 24 hours of age, and the development of electrographic seizures.