PREGNANCY AND NEONATOLOGY

ANATOMIC AND PHYSIOLOGIC CHANGES IN NEONATAL INTENSIVE CARE UNITS: HOW LARGE ARE THEY REALLY?

Introduction and Aims: Preterm infants are more prone for reduced cognitive capabilities than their term peers. Moreover, extreme preterm birth interferes with normal in utero maturation. Serum creatinine is traditionally used as a marker of renal function in neonates and is related to gestational age and disease severity in extremely low birth weight (ELBW) infants. We aim to compare postnatal creatinine trends as biomarker for subsequent cognitive outcome.

Methods: A cohort of ELBW infants was analyzed by the Bayley Scales of Infant Development (BSID-II) at the corrected age of 2 years old (mental developmental index, MDI). Sequences of creatinemia of survivors (n=140) and BSID scores (n=96) are compared and analyzed using optimal matching analysis. Each creatinine measurement is assigned a state in relation to the mean at day of measurement: $0=\bar{x}-1\sigma \leq x \leq \bar{x}+1\sigma$, $1=x>\bar{x}+1\sigma$. The optimal matching algorithm generates a matrix of dissimilarity scores between any one sequence and all other sequences. Hierarchical clustering analysis is applied to identify creatinemia trends.

Results: Four different creatinemia trends were identified (persistent high, normal, low, and normalizing). A low creatinemia trend is significantly associated with the lowest percentages of postnatal corticosteroids, NSAIDs and intraventricular hemorrhage ($p=0.005$, $p=0.013$ and $p=0.041$ respectively) compared to a normal or persistent high creatinemia trend and associated with the best cognitive outcome (+13 MDI points compared to the mean creatinine trend and +23 MDI points compared to a persistent high creatinine trend).

Conclusions: Creatinemia trends after birth are not only useful to predict renal function, but are also useful as biomarker of cognitive outcome in extremely low birth weight infants. Neonates who have low creatinemia trends after birth, tend to have the highest BSID scores at the age of two years old. This might be a reflection of individual differences in microcirculation. ELBW infants following a low creatinemia trend (<-1SD from mean) after birth compared to their peers have the best MDI scores at the age of two years (+13-23 MDI points). This is a high impact compared to other factors (sepsis/NEC, enriched formulas, prolonged breastfeeding; 10, 2.5, 4.5 and 4 MDI points respectively).