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Early postnatal illness severity scores predict neurodevelopmental impairments at 10 years of age in children born extremely preterm**J Wells Logan¹, Olaf Dammann^{2,3}, Elizabeth N Allred^{4,5}, Christiane Dammann², Kristyn Beam², Robert M Joseph⁶, T Michael O'Shea⁷, Alan Leviton^{4,5} and Karl C K Kuban⁶**¹The Ohio State University, USA²Tufts University, USA³Hannover Medical School, Germany⁴Harvard Medical School, USA⁵Boston Children's Hospital, USA⁶Boston University, USA⁷University of North Carolina, USA

Introduction: A neonatal illness severity score, The Score for Neonatal Acute Physiology-II (SNAP-II), predicts neurodevelopmental impairments at two years of age among children born extremely preterm. We sought to evaluate to what extent SNAP-II is predictive of cognitive and other neurodevelopmental impairments at 10 years of age.

Methods: In a cohort of 874 children born before 28 weeks of gestation, we prospectively collected clinical, physiologic and laboratory data to calculate SNAP-II for each infant. When the children were 10 years old, examiners who were unaware of the child's medical history assessed neurodevelopmental outcomes, including neurocognitive, gross motor, social, and communication functions, diagnosis and treatment of seizures or attention deficit hyperactivity disorder (ADHD), academic achievement, and quality of life. We used logistic regression to adjust for potential confounders.

Results: An undesirably high SNAP-II (≥ 30), present in 23% of participants, was associated with an increased risk of cognitive impairment (IQ, executive function, language ability), adverse neurological outcomes (epilepsy, impaired gross motor function), behavioral abnormalities (attention deficit disorder and hyperactivity), social dysfunction (autistic spectrum disorder) and education-related adversities (school achievement and need for educational supports). In analyses that adjusted for potential confounders, Z-scores ≤ -1 on 11 of 18 cognitive outcomes were associated with SNAP-II in the highest category and 6 of 18 were associated with SNAP-II in the intermediate category. Odds ratios and 95% confidence intervals ranged from 1.4 (1.01, 2.1) to 2.1 (1.4, 3.1). Similarly, 2 of the 8 social dysfunctions were associated with SNAP-II in the highest category, and 3 of 8 were associated with SNAP-II in the intermediate category. Odds ratios and 95% confidence intervals were slightly higher for these assessments, ranging from 1.6 (1.1, 2.4) to 2.3 (1.2, 4.6).

Conclusion: Among very preterm newborns, physiologic derangements present in the first 12 postnatal hours are associated with dysfunctions in several neurodevelopmental domains at 10 years of age.

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