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Section on Neonatal-Perinatal Medicine

ARTICLES OF INTEREST – February 2020

Assessment of extubation readiness using spontaneous breathing trials in extremely preterm neonates
Shalish W, Kanbar L, Kovacs L, et al. *JAMA Pediatr.*

To assess accuracy of comprehensive clinical event combinations in predicting successful extubation compared with clinical judgment alone, the authors analyzed data from 259 neonates (BW<1250g) from 5 NICUs enrolled in the Automated Prediction of Extubation Readiness (APEX. In total, 41 602 Spontaneous Breathing Trial (SBT) definitions were generated, demonstrating sensitivities of 51- 100% (median 96%) and specificities of 0- 72% (median 22%). Youden indices for all SBTs ranged from 0 to 0.32 (median 0.17), suggesting low accuracy. The SBT with highest Youden index defined SBT pass as having no apnea (with desaturation requiring stimulation) or increase in oxygen requirements by 15% from baseline and predicted extubation success with a sensitivity of 93% and a specificity of 39%. The authors concluded that extremely preterm neonates commonly show signs of clinical instability during ET-CPAP and the accuracy of multiple clinical event combinations to define SBTs is low.

Lower versus traditional treatment threshold for neonatal hypoglycemia
van Kempen AAMW, Eskes PF, Nuytemans DHGM, et al. *N Engl J Med.*

In a multicenter, randomized, noninferiority trial involving 689 otherwise healthy newborns born at > 35 weeks of gestation and identified as being at risk for hypoglycemia, the authors compared two threshold values for treatment of asymptomatic moderate hypoglycemia (lower threshold: 36mg/dl or 2mmol/l vs traditional threshold: 47mg/dl or 2.6 mmol/l). Psychomotor development at 18 months was the outcome assessed with the Bayley Scales of Infant and Toddler Development with 7.5 points (one half the SD) representing a clinically important difference. Cognitive and motor outcome scores were similar in the two groups (mean scores [±SE], 102.9±0.7 [cognitive] and 104.6±0.7 [motor] in the lower-threshold group and 102.2±0.7 [cognitive] and 104.9±0.7 [motor] in the traditional-threshold group. The authors concluded that in otherwise healthy newborns with asymptomatic moderate hypoglycemia, a lower glucose treatment threshold (36 mg/dl) was non-inferior to a traditional threshold (47 mg/dl) with regard to psychomotor development at 18 months.

Techniques to communicate better with parents during end-of-life scenarios in neonatology
Lizotte MH, Barrington KJ, Sultan S, et al. *Pediatrics.*

Clinician communication skills were evaluated in a simulated neonatal resuscitation in which the sim patient died. Evaluators were made up of NRP instructors, simulation confederates (sim parents), medical staff, bereaved parents, and other hospital staff. Thematic analysis was conducted on evaluator responses to open-ended questions. Characteristics of good communicators during and after the resuscitation were reported. Common signs of good communication included: acknowledging the

parents, using the infant's name, preparing the parents for death in stepwise fashion, simple and concrete language (included words such as "death," "dying," or "dead"), a clear decision to stop resuscitation without asking permission, reassuring the death was not the parents' fault, and offering support for next steps. Examples of behaviors to avoid were provided. Described positive behaviors are easy to teach and learn can help clinicians interact with bereaving parents in a compassionate way.

Lung function of adults born at very low birth weight
Yang J, Kingsford RA, Horwood J, et al. *Pediatrics.*

The authors evaluated lung function at 26-30 years in a New Zealand cohort of 226 VLBW infants and 100 term controls born in 1986. Lung function tests were spirometry, plethysmographic lung volumes, diffusing capacity of the lung for carbon monoxide, and single-breath nitrogen washout (SBN2). The VLBW cohort was born in the era prior to surfactant therapy. The VLBW adults were more likely to report wheezing in the past 12 months, but other self-reported respiratory problems were not different. The majority of VLBW adults had normal spirometry, but they had a higher incidence of airflow obstruction, gas trapping, reduced gas exchange, and higher ventilatory inhomogeneity. Adults with history of BPD had more significant impairment. They conclude the pulmonary effects of VLBW are mild but persist into adulthood; these patients should be monitored long-term.

Outcomes at 18 to 22 months of corrected age for infants born at 22 to 25 weeks of gestation in a center practicing active management
Watkins PL, Dagle JM, Bell EF, et al. *J Pediatr.*

This retrospective study evaluated a cohort of 255 infants born at 22-25 weeks gestation between 2006 and 2015 at a single institution. Neurodevelopmental outcomes were available for 169 of 214 survivors (78.9%). The authors found that survival to hospital discharge of those surviving to NICU admission was 78% (55/70; 95% CI, 69%-88%) at 22-23 weeks and 89% (159/178; 95% CI, 84%-93% at 24-25 weeks; P = .02). No or mild neurodevelopmental impairment in surviving infants was 64% (29/45; 95% CI, 50%-77%) at 22-23 weeks and 76% (94/124; 95% CI, 68%-83%; P = .16) at 24-25 weeks.

The effect of extended continuous positive airway pressure on changes in lung volumes in stable premature infants: A randomized controlled trial
Lam R, Schilling D, Scottoline B, et al. *J Pediatr.*

This prospective trial evaluated 44 infants born at ≤32 weeks of gestation requiring ≥24 hours of CPAP. Infants were randomized to 2 weeks of extended continuous positive airway pressure (eCPAP) versus CPAP discontinuation (dCPAP). The infants randomized to eCPAP vs dCPAP had a greater increase in FRC from randomization through 2 weeks (12.6 mL vs 6.4 mL; adjusted 95% CI, 0.78-13.47; P = .03) and from randomization through discharge (27.2 mL vs 17.1 mL; adjusted 95% CI, 2.61-17.59; P = .01).

Inhaled nitric oxide as an adjunct to neonatal resuscitation in premature infants: a pilot, double blind, randomized controlled trial
Sekar K, Szyld E, McCoy M, et al. *Pediatr Res.*

The authors sought to determine if adding inhaled NO (iNO) decreases supplemental oxygen exposure in preterm infants requiring positive pressure ventilation (PPV) during resuscitation and to study the effects of iNO on heart rate (HR), oxygen saturation (SpO2), and need for intubation during the first 20 minutes of life. To this end, 28 infants 25 0/7-31 6/7 weeks' gestational age requiring PPV with supplemental oxygen during resuscitation were randomized to receive either oxygen (FiO2-0.30) + iNO at 20 ppm (iNO group) or oxygen (FiO2-0.30) + nitrogen (placebo group). Cumulative FiO2 and rate of exposure to high FiO2 (>0.60) were significantly lower in the iNO group. There were no differences in

HR, SpO2, and need for intubation. Administration of iNO as an adjunct during neonatal resuscitation is feasible without side effects.

Physiological effects of high-flow nasal cannula therapy in preterm infants (PDF)
Liew Z, Fenton AC, Harigopal S, et al. *Arch Dis Child Fetal Neonatal Ed.*

This is a prospective randomized crossover study comparing nCPAP and High-flow nasal cannula (HFNC) in clinically stable preterm infants with birth weights 500g – 1900g. The infants were randomized to either first receive HFNC and then nCPAP, or nCPAP first and then HFNC. The study showed that increasing flows from 2 to 8 L/min significantly increased PEEP (mean 2.3–6.1 cm H2O) while reducing nasopharyngeal end-expiratory CO2, thereby supporting dead space washout. Infants <1000g received higher PEEP at the same HFNC flow than those >1000g. The authors conclude that HFNC therapy produces clinically significant PEEP with large variability at higher flow rates.

Characteristics and short-term outcomes of neonates with mild hypoxic-ischemic encephalopathy treated with hypothermia
Goswami IR, Whyte H, Wintermark P, et al. *J Perinatol.*

The authors present a retrospective cohort study of neonates ≥ 35 week gestation and ≥ 1800 g admitted with a diagnosis of Sarnat stage 1 encephalopathy. Infants who were treated with hypothermia were more likely outborn with lower Apgar scores, and required extensive resuscitation compared to those that were not treated. They had longer duration of respiratory support and longer hospital stay, but with lower odds of brain injury on MRI. The authors conclude that hypothermia may be beneficial in neonates with mild HIE despite higher length of stay.

rhIGF-1/BP3 preserves lung growth and prevents pulmonary hypertension in experimental BPD
Seedorf G, Kim C, Wallace B, et al. *Am J Respir Crit Care Med.*

The authors evaluated if postnatal treatment with rhIGF-1/BP3 improves lung growth and prevents pulmonary hypertension in antenatal BPD/chorioamnionitis rat models. They found that postnatal rhIGF-1/BP-3 treatment restored alveolar structure and prevented right ventricular hypertrophy compared with placebo injections and also preserved lung structure and prevented RVH after postnatal hyperoxia. They conclude that rhIGF-1/BP-3 treatment may be a novel strategy for the prevention of BPD in preterms.

A novel endogenous antimicrobial peptide CAMP211-225 derived from casein in human milk
Wang X, Sun Y, Wang F, et al. *Food Funct.*

CAMP211-225 is a novel peptide that occurs at higher levels in preterm milk than in term milk. The authors found the compound to have antimicrobial activity against E. Coli and to reduce ileal mucosa damage in an experimental NEC mice model. They conclude that CAMP211-225 may have potential value in the prevention and treatment of neonatal infections.

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Neuropsychological outcomes at 19 years of age following extremely preterm birth
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Frequency-following response among neonates with progressive moderate hyperbilirubinemia
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Significance of abnormal umbilical artery doppler studies in normally grown fetuses (PDF)
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Educational perspectives: palliative care education in neonatal-perinatal medicine fellowship (PDF)
https://neoreviews.aappublications.org/content/neoreviews/21/2/e72.full-text.pdf
Iron nutrition, erythrocytes, and erythropoietin in the NICU: erythropoietic and neuroprotective effects (PDF)
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Updates on assessment and monitoring of the postnatal growth of preterm infants (PDF)
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Intravenous lipid emulsions in the NICU (PDF)
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Case 1: newborn who cannot open eyes (PDF)
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Case 2: conjugated hyperbilirubinemia in a late preterm neonate (PDF)
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Case 3: emesis in a term infant with dysmorphic features (PDF)
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Intrapartum challenge of fetal growth restriction (PDF)
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A newborn with a large posterior head mass (PDF)
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Stockholm preterm interaction-based intervention (SPIBI) - study protocol for an RCT of a 12-month parallel-group post-discharge program for extremely preterm infants and their parents (PDF)
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Cerebral disorders in the first 7 years of life in children born post-term: a cohort study (PDF)
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Neonatal sepsis and its association with birth weight and gestational age among admitted neonates in Ethiopia: systematic review and meta-analysis (PDF)
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Cognitive function in metformin exposed children, born to mothers with PCOS – follow-up of an RCT (PDF)
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Comparative study between Fenton and intergrowth 21 charts in a sample of Lebanese premature babies (PDF)
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Dynamics of toxigenic Clostridium perfringens colonisation in a cohort of prematurely born neonatal infants (PDF)
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Application of the adenosine triphosphate sensitivity assay in infantile vascular anomalies (PDF)
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Temporal association between serious bleeding and immunization: vitamin K deficiency as main causative factor (PDF)
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Delayed initiation of enteral feeds is associated with postnatal growth failure among preterm infants managed at a rural hospital in Uganda (PDF)
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Risk factors for low cardiac output syndrome in children with congenital heart disease undergoing cardiac surgery: a retrospective cohort study (PDF)
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Comparison of frequency-domain and continuous-wave near-infrared spectroscopy devices during the immediate transition (PDF)
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