

Abstract from Current Literature

Admission Hypothermia in Very Preterm Infants and Neonatal Mortality and Morbidity

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Journal of Pediatrics. August 2016;175:61-67.

Objective: To investigate the association between body temperature at admission to neonatal intensive care and in-hospital mortality in very preterm infants, stratified by postnatal age of death. Moreover, we assessed the association between admission temperature and neonatal morbidity.

Study design: In this cohort study from 19 regions in 11 European countries, we measured body temperature at admission for infants admitted for neonatal care after very preterm birth (<32 weeks of gestation; n = 5697) who were followed to discharge or death. Associations between body temperature at admission and in-hospital mortality and neonatal morbidity were analyzed by the use of mixed effects generalized linear models. The final model adjusted for pregnancy complications, singleton or multiple pregnancy, antenatal corticosteroids, mode of delivery, gestational age, infant size and sex, and Apgar score <7 at 5 minutes.

Results: A total of 53.4% of the cohort had a body temperature at admission less than 36.5°C, and 12.9% below 35.5°C. In the adjusted model, an admission temperature <35.5°C was associated with increased mortality at postnatal ages 1-6 days, (risk ratio 2.41; 95% CI 1.45-4.00), and 7-28 days (risk ratio 1.79; 1.15-2.78) but not after 28 days of age. We found no associations between admission temperature and neonatal morbidity.

Conclusion: Admission hypothermia after very preterm birth is a significant problem in Europe, associated with an increased risk of early and late neonatal death.

Lung Ultrasound for Diagnosing Pneumothorax in the Critically Ill Neonate

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Journal of Pediatrics. August 2016;175:74-78.

Objectives: To evaluate the accuracy of lung ultrasound for the diagnosis of pneumothorax in the sudden decompensating patient.

Study design: In an international, prospective study, sudden decompensation was defined as a prolonged significant desaturation (oxygen saturation <65% for more than 40 seconds) and bradycardia or sudden increase of oxygen requirement by at least 50% in less than 10 minutes with a final fraction of inspired oxygen $e^{*}0.7$ to keep stable saturations. All eligible patients had an ultrasound scan before undergoing a chest radiograph, which was the reference standard.

Results: Forty-two infants (birth weight = 1531 ± 812 g; gestational age = 31 ± 3.5 weeks) were enrolled in 6 centers; pneumothorax was detected in 26 (62%). Lung ultrasound accuracy in diagnosing pneumothorax was as follows: sensitivity 100%, specificity 100%, positive predictive value 100%, and negative predictive value 100%. Clinical evaluation of pneumothorax showed sensitivity 84%, specificity 56%, positive predictive value 76%, and negative predictive value 69%. After sudden decompensation, a lung ultrasound scan was performed in an average time of 5.3 ± 5.6 minutes vs 19 ± 11.7 minutes required for a chest radiography. Emergency drainage was performed after an ultrasound scan but before radiography in 9 cases.

Conclusions: Lung ultrasound shows high accuracy in detecting pneumothorax in the critical infant, outperforming clinical evaluation and reducing time to imaging diagnosis and drainage.

Effects of Breastfeeding on Respiratory Symptoms in Infancy

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Journal of Pediatrics. July 2016;174:111-117.

Objective: To assess the impact of potential risk factors on the development of respiratory symptoms and their specific modification by breastfeeding in infants in the first year of life.

Study design: We prospectively studied 436 healthy term infants from the Bern-Basel Infant Lung Development cohort. The breastfeeding status, and incidence and severity of respiratory symptoms (score) were assessed weekly by telephone interview during the first year of life. Risk factors (eg, pre- and postnatal smoking exposure, mode of delivery, gestational age, maternal atopy, and number of older siblings) were obtained using standardized questionnaires. Weekly measurements of particulate matter <10 μ g were provided by local monitoring stations. The associations were investigated using generalized additive mixed model with quasi Poisson distribution.

Results: Breastfeeding reduced the incidence and severity of the respiratory symptom score mainly in the first 27 weeks of life (risk ratio 0.70; 95% CI 0.55-0.88). We found a protective effect of breastfeeding in girls but not in boys. During the first 27 weeks of life, breastfeeding attenuated the effects of maternal smoking during pregnancy, gestational age, and cesarean delivery on respiratory symptoms. There was no evidence for an interaction between breastfeeding and maternal atopy, number of older siblings, child care attendance, or particulate matter <10 μ g.

Conclusions: This study shows the risk-specific effect of breastfeeding on respiratory symptoms in early life using the comprehensive time-series approach.

Vitamin D Deficiency and Parathyroid Response in Critically-ill Children: Association with Illness Severity and Clinical Outcomes

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Indian Pediatr 2016; 53: 479-484.

Objective: To determine the prevalence of vitamin D deficiency in critically ill children, and to study its association with parathyroid response, severity of illness and clinical outcomes.

Design: Prospective observational study.

Setting: Medical Pediatric Intensive Care Unit of a tertiary care centre of Northern India.

Participants: 154 children in-patients: August 2011-January 2013.

Main outcome measures: Vitamin D deficient children were (serum 25-hydroxy vitamin D <20 μ g/mL) divided into "parathyroid-responder" [serum parathyroid hormone >65 pg/mL with 25(OH)D<20 μ g/mL and/or calcium corrected for albumin <8.5 mg/dL] and "non parathyroid-responder." Illness severity was assessed by Pediatric Index of Mortality-2 (PIM-2) score at admission. Biochemical parameters, illness severity scores and clinical outcomes were compared between parathyroid-responders and non-parathyroid-responders.

Results: Vitamin D deficiency and hypocalcemia were observed in 125 (83.1%) and 91 (59%) children, respectively at admission. There were no differences in illness severity score at admission, mortality rate and length of stay between vitamin D-deficient children and 19.8% of non-vitamin D-deficient children. Among Vitamin D-deficient children, parathyroid-responders had higher PIM-2 score at admission compared to non-parathyroid-responder [12.8(7.4,20.6) vs. 6.5 (2.5,12.2), $P=0.01$]. However, there were no differences in other clinical outcomes between two groups.

Conclusion: Critically ill children have high prevalence of vitamin D deficiency. Parathyroid gland response secondary to hypocalcemia or vitamin D deficiency is impaired in critical illness.