Abstract from Current Literature

Measurement of neonatal heart rate using handheld Doppler ultrasound

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Objective: This pilot study aimed to determine whether handheld Doppler ultrasound is feasible and reliable for measuring neonatal heart rate (HR) when compared with ECG.

Setting: Stable newborns were recruited from the neonatal intensive care unit and postnatal ward between July 2014 and January 2015 at Royal North Shore Hospital, Sydney, Australia.

Interventions: Each newborn had their HR recorded every 15 s over 145 s using four different modalities: ECG, counted audible Doppler (AD) over 10 s, pulse oximetry (PO) and the Doppler display (DD).

Outcome measures: The correlation and variation between each modality and ECG.

Results: 51 newborns with a median gestational age of 38 weeks (27–41) and a mean weight of 2.78 kg (0.82 to 4.76) with a median postnatal age of 3 days (0–87) were studied. There was a mean difference of 0.69 bpm (95% CI “2.9 to +1.5) between AD-HR and ECG-HR with good correlation between modalities (r=0.94, p<0.01). The median time to achieve AD-HR was 3 s (1–45). The mean difference between DD-HR and ECG-HR was 5.37 bpm (95% CI “12.8 to +2.1) with moderate correlation (r=0.37, p=0.04). The mean difference between PO-HR and ECG-HR was 0.49 bpm (95% CI “1.5 to +0.51) with good correlation (r=0.99, p<0.01). The variability between AD-HR and ECG-HR decreased with decreasing weight.

Conclusions: AD-HR correlates well with ECG-HR. Further research in the delivery room is recommended before using AD-HR in this area.

Neonatal hypoglycaemia: Learning from claims

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On behalf of NHS Improvement Patient Safety Programme ‘Reducing Term Admissions to Neonatal Units’

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Objectives:Neonatal hypoglycaemia is a potential cause of neonatal morbidity, and on rare but tragic occasions causes long-term neurodevelopmental harm with consequent emotional and practical costs for the family. The organisational cost to the NHS includes the cost of successful litigation claims. The purpose of the review was to identify themes that could alert clinicians to common pitfalls and thus improve patient safety.

Design: The NHS Litigation Authority (NHS LA) Claims Management System was reviewed to identify and review 30 claims for injury secondary to neonatal hypoglycaemia, which were notified to the NHS LA between 2002 and 2011.

Setting:NHS LA.

Patients:Anonymised documentation relating to 30 neonates for whom claims were made relating to neonatal hypoglycaemia. Dates of birth were between 1995 and 2010.

Interventions:Review of documentation held on the NHS LA database.

Main outcome measures:Identifiable risk factors for hypoglycaemia, presenting clinical signs, possible deficits in care, financial costs of litigation.

Results:All claims related to babies of at least 36 weeks’ gestation. The most common risk factor for hypoglycaemia was low birth weight or borderline low birth weight, and the most common reported presenting sign was abnormal feeding behaviour. A number of likely deficits in care were reported, all of which were avoidable. In this 10-year reporting period, there were 25 claims for which damages were paid, with a total financial cost of claims to the NHS of £162 166 677.

Conclusions:Acknowledging that these are likely to be the most rare but most seriously affected cases, the clinical themes arising from these cases should be used for further development of training and guidance to reduce harm and redivert NHS funds from litigation to direct care.

Diagnosis of Cystic Fibrosis: Consensus Guidelines from the Cystic Fibrosis Foundation

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The Journal of Pediatrics, February 2017; 181: S4-15. e1.

Objective: Cystic fibrosis (CF), caused by mutations in the CF transmembrane conductance regulator (*CFTR*) gene, continues to present diagnostic challenges. Newborn screening and an evolving understanding of CF genetics have prompted a reconsideration of the diagnosis criteria.

Study design: To improve diagnosis and achieve standardized definitions worldwide, the CF Foundation convened a committee of 32 experts in CF diagnosis from 9 countries to develop clear and actionable consensus guidelines on the diagnosis of CF and to clarify diagnostic criteria and terminology for other disorders associated with *CFTR*mutations. An a priori threshold of ≥80% affirmative votes was required for acceptance of each recommendation statement.

Results: After reviewing relevant literature, the committee convened to review evidence and cases. Following the conference, consensus statements were developed by an executive subcommittee. The entire consensus committee voted and approved 27 of 28 statements, 7 of which needed revisions and a second round of voting.

Conclusions: It is recommended that diagnoses associated with CFTR mutations in all individuals, from newborn to adult, be established by evaluation of CFTR function with a sweat chloride test. The latest mutation classifications annotated in the Clinical and Functional Translation of CFTR project (http://www.cftr2.org/index.php) should be used to aid in diagnosis. Newborns with a high immunoreactive trypsinogen level and inconclusive CFTR functional and genetic testing may be designated CFTR-related metabolic syndrome or CF screen positive, inconclusive diagnosis; these terms are now merged and equivalent, and CFTR-related metabolic syndrome/CF screen positive, inconclusive diagnosis may be used. International Statistical Classification of Diseases and Related Health Problems, 10th Revision codes for use in diagnoses associated with CFTR mutations are included.

Weight Gain and Height Growth during Infancy, Childhood, and Adolescence as Predictors of Adult Cardiovascular Risk

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The Journal of Pediatrics, January 2017; 180:53-61. e3

Objectives: To investigate independent relationships of childhood linear growth (height gain) and relative weight gain to adult cardiovascular disease (CVD) risk traits in Asian Indians.

Study design: Data from 2218 adults from the Vellore Birth Cohort were examined for associations of cross-sectional height and body mass index (BMI) and longitudinal growth (independent conditional measures of height and weight gain) in infancy, childhood, adolescence, and adulthood with adult waist circumference (WC), blood pressure (BP), insulin resistance (homeostatic model assessment-insulin resistance [HOMA-IR]), and plasma glucose and lipid concentrations.

Results: Higher BMI/greater conditional relative weight gain at all ages was associated with higher adult WC, after 3 months with higher adult BP, HOMA-IR, and lipids, and after 15 years with higher glucose concentrations. Taller adult height was associated with higher WC (men â = 2.32 cm per SD, women â = 1.63, both *P* < .001), BP (men â = 2.10 mm Hg per SD, women â = 1.21, both *P* d" .001), and HOMA-IR (men â = 0.08 log units per SD, women â = 0.12, both *P* d" .05) but lower glucose concentrations (women â = Š0.03 log mmol/L per SD *P* =.003). Greater height or height gain at all earlier ages were associated with higher adult CVD risk traits. These positive associations were attenuated when adjusted for adult BMI and height. Shorter length and lower BMI at birth were associated with higher glucose concentration in women.

Conclusions: Greater height or weight gain relative to height during childhood or adolescence was associated with a more adverse adult CVD risk marker profile, and this was mostly attributable to larger adult size.

Neurocognitive Function in Children with Primary Hypertension

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Objective: To compare neurocognitive test performance of children with primary hypertension with that of normotensive controls.

Study design: Seventy-five children (10-18 years of age) with newly diagnosed, untreated hypertension and 75 frequency-matched normotensive controls had baseline neurocognitive testing as part of a prospective multicenter study of cognition in primary hypertension. Subjects completed tests of general intelligence, attention, memory, executive function, and processing speed. Parents completed rating scales of executive function and the Sleep-Related Breathing Disorder scale of the Pediatric Sleep Questionnaire (PSQ-SRBD).

Results: Hypertension and control groups did not differ significantly in age, sex, maternal education, income, race, ethnicity, obesity, anxiety, depression, cholesterol, glucose, insulin, and C-reactive protein. Subjects with hypertension had greater PSQ-SRBD scores (P = .04) and triglycerides (P = .037). Multivariate analyses showed that hypertension was independently associated with worse performance on the Rey Auditory Verbal Learning Test (List A Trial 1, P = .034; List A Total, P = .009; Short delay recall, P = .013), CogState Groton Maze Learning Test delayed recall (P = .002), Grooved Pegboard dominant hand (P = .045), and Wechsler Abbreviated Scales of Intelligence Vocabulary (P = .016). Results indicated a significant interaction between disordered sleep (PSQ-SRBD score) and hypertension on ratings of executive function (P = .04), such that hypertension heightened the association between increased disordered sleep and worse executive function.

Conclusions: Youth with primary hypertension demonstrated significantly lower performance on neurocognitive testing compared with normotensive controls, in particular, on measures of memory, attention, and executive functions.