TITLE: OPTIMISING NUTRITION DURING THERAPEUTIC HYPOTHERMIA: AN OBSERVATIONAL STUDY USING PROPENSITY SCORE MATCHING

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CONTENT:

There is limited evidence to inform provision of nutrition during therapeutic hypothermia in infants with hypoxic ischemic encephalopathy (HIE). Clinical practice is inconsistent. Enteral feeding is often withheld due to concerns for risk of necrotising enterocolitis (NEC) but evidence suggests that enteral feeding could be a beneficial adjunct to hypothermia. Parenteral nutrition may increase the risk of infection.

The aim of this study was to use propensity score methods to investigate the associations between the provision of both enteral nutrition (EN) and parenteral nutrition (PN) and rates of NEC, late infection, and survival in infants who underwent therapeutic hypothermia for HIE.

Retrospective cohort study of data held in the UK National Neonatal Research Database. Infants were included if born at ≥ 36 weeks gestational age (GA), between 01 Jan 2010 to 31 Dec 2017 and either received therapeutic hypothermia for 72 hours or died during treatment.

Propensity models were built for EN and PN analyses separately using a stepwise approach. Variables including birth weight, GA, sex, severity of hypoxia, severity of illness, and organisational factors were a priori selected for the propensity model. 1:1 matching was implemented where rates of NEC, late infection and survival were compared between (i) those who received EN in the first 3 days and those who did not, and (ii) those who received PN in the first 3 days and those who only received standard intravenous fluids.

From 2010 to 2017, 6031 infants received therapeutic hypothermia for HIE, mean (SD) gestational age was 39.4 (1.6) weeks and mean birth weight 3370 (627) grams; 55.2% were males and 45.5% were delivered by caesarean section. 3405 infants (56.5%) received EN in the first 3 days and 2740 infants (45.4%) received PN in the first 3 days.

Matching reduced the total sample size to 3226 for the EN analysis and 3142 for the PN analysis. Table 1 presents the results from these analyses. There was no evidence of an association between EN and NEC, although NEC was rare. Provision of both EN and PN were associated with moderately higher rates of survival at discharge, however PN was also associated with a slightly higher rate of late infection.

EN during therapeutic hypothermia was associated with higher survival rates and other benefits. PN was associated with higher rates of infection but a greater survival. Following hypoxic insult, hypothermia and EN may have a protective effect on the gut. Use of EN during therapeutic hypothermia appears safe. Although several clinical variables were used for matching, residual confounding cannot be excluded as an explanation for these results.

IMAGES:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=866e706fcbd3b4f3e0de32083f11cf82-MjAxOS0wNSM1Y2UyNjY2YmNjMz8h

Table 1: Results from the 1:1 matching analyses investigating association between (i) enteral feeding and (ii) parenteral feeding on outcomes including NEC, infection and survival.
CoI: None declared

This study is funded by the National Institute for Health Research (NIHR) Health Technology Assessment (HTA) Programme (Grant Reference Number 16/79/03). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.
ID: 237

TITLE: INDIVIDUALIZED GROWTH TRAJECTORIES FOR PRETERM INFANTS — ASSOCIATIONS WITH NEURODEVELOPMENT, BODY COMPOSITION AND BLOOD PRESSURE

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CONTENT:

Neurodevelopment, body composition, and cardiovascular diseases relate to growth during early life. Determining an individualized growth trajectory (GTC) provides neonatologists with a reference for weight gain of preterm infants. GTC trajectory based on GA, BW and sex was calculated for each infant and includes postnatal weight loss and median intrauterine growth rate adjusted for postnatal physiology and merges with WHO growth standards at term age (www.growthcalculator.org).

The study aims to analyze the association between long-term outcomes and the deviation of weight (ΔW) from the GTC.

This multicohort study includes data from 18,000 preterm infants with gestational age (GA) from 22 to 33 weeks from nine cohorts. The average birth weight (BW) was 1050 ± 300g and GA 27.8 ± 2.5 weeks.

The difference (ΔW) to individual weights at discharge and during NICU stay was assessed and the area under the curve (AUC) of ΔW from birth to discharge was calculated. ΔW at discharge was correlated with neurodevelopmental data from follow-up visits at 18 months, 5 and 7 years for Bayley scales, Wechsler Scales of Intelligence (WPPSI and WASI) plus weight, length, BMI, head circumference, hip-circumference, lean mass, fat mass, and blood pressure (BP). The association of ΔW-AUC on outcomes was analyzed using a sequential multinomial logistic regression adjusted for major NICU morbidities.

At 2 years, in infants <28 weeks cognitive, language and motor composite Bayley scale scores were related to ΔW (N= 3152, p<0.05). At 5 years, the total IQ and verbal IQ WPPSI scores were significantly related to ΔW at discharge (N= 1511, p<0.05). For deviations from the target trajectory less than -250g, higher growth and better neurodevelopment outcomes were positively related, above -250g neurodevelopment plateaued. (Figure) At 7 years, the verbal IQ WASI assessment correlated with ΔW (N= 582, p<0.05). In follow up, anthropometric measurements, lean mass, and fat mass were related to ΔW. The ΔW-AUC period before discharge had the most impact on outcomes. However, its effects diminished with age. BP tended to be higher in infants with high deviation from ΔW.

Achieving growth at the GTC improves neurodevelopment. The GTC should be further calibrated in a prospective study to find the appropriate ΔW for optimum neurodevelopment without gaining excess fat mass.
Relation between Neurodevelopment and ΔW (deviation from the target weight) at 5 years

COI: None declared
ID: 355

TITLE: TRAJECTORIES OF FAT MASS ACCRETION AMONG PRETERM COMPARED TO TERM INFANTS DURING THE FIRST 6 MONTHS ON POSTNATAL LIFE

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CONTENT:

It is recommended that preterm infants achieve “rates of growth and composition of weight gain for a normal fetus of the same postmenstrual age”. At term, however, preemies have higher %fat mass (FM) (15-22%) than newborn term infants (13-16%). It is currently unclear whether this trend increases during the following months or whether it reflects postnatal adaptation to the extrauterine environment. Therefore, it is aim of this study to compare dynamics of FM accretion of preterm and term infants up to early infancy.

In this prospective, observational study length, weight and body composition (air-displacement plethysmography) were measured in preterm and term infants from birth to six months corrected. Percentiles were calculated using GAMLSS; analysis was stratified by gestational age at birth (group A: 32w) were extrapolated using information from Ziegler’s reference fetus. Trajectories of preterm infants were then compared to term infants by shifting curves along the x-axis (Fig 1) for best fit.

Body composition was measured in 512 infants (n=252 preterm; n=260 term) and a total of 1088 measurements. Though groups started at different gestational ages (Fig 1) and %FM, FM trended towards a similar average mean of 23% for all groups. The dynamics to reach this %FM was comparable amongst all groups. For example, at 40 weeks postmenstrual age infants born at <28 weeks had FM of 21%, and at 45 weeks levelled out to 24% and for other gestational ages, infants achieved FM of 24 to 26% by 50 weeks. From 50 weeks onwards, maximum %FM remained constant at approximately 24 to 26% for all infants. Median %FM trajectories for all preterm infants had their best fit with term infants when data points were shifted by 5.8, 4.5, and 1.2 weeks for groups A, B, and C, respectively (Fig 1). Preterm infants had less lean mass but caught up toward 70 weeks postmenstrual age.

This study confirms that preterm infants experience increased %FM at an earlier postmenstrual age than term infants. However, dynamics of FM accretion is similar in all groups of though with different gestational ages at birth. Therefore it could be hypothesized that postnatal changes in FM accretion is a physiological process induced by the transition to the extrauterine environment, such as thermo-management, nutritional sources.

IMAGES: https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=fd5ee5f73c2909787dfe51a2f851c330-MjAxBq5wNMS1Y2UyNjY2YzM5MDdj

Figure 1: Comparison of median trajectories for percent fat mass.
Hutton: No Answer. | Salhab el Helou: No - Financial Interest | Katherine Morrison: Yes - Financial Interest; Akcea Pharmaceuticals: Advisory Committee Membership | Christoph Fusch: No Answer.
ID: 761
TITLE: ARE LOW MATERNAL SERUM VITAMIN D LEVELS ASSOCIATED WITH POOR OUTCOME IN THE NEONATAL AND CHILDHOOD PERIOD?
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CONTENT:

Vitamin D is an important steroid hormone with a crucial role in calcium homeostasis, immunity, and glucose metabolism. It is sourced from ultraviolet B light and diet. Vitamin D deficiency is a global health problem and leads to considerable morbidity. An increasing area of concern surrounds the role during pregnancy. There is growing evidence that maternal vitamin D deficiency may influence neonatal outcomes such as gestation, birthweight and infant anthropometric measurements. There is also a smaller body of research suggesting impact in later life. This study aims to evaluate the effect of maternal serum vitamin D levels on neonatal and infant outcome, within a diverse ethnic population.

A retrospective, observational study of 1453 women originally recruited to the Born in Bradford project (BiB). Mother-offspring pairs were prospectively recruited between March 2007-December 2010 in Bradford, West Yorkshire. Antenatal serum vitamin D levels were taken at 26-28 weeks gestation and analysed using liquid chromatography. A baseline questionnaire of maternal demographics was performed. Follow up explored health indicators and development over time. Women were excluded in the case of stillbirth or missing co-variable data. Multiple regression was used to address the relationship with neonatal variables, while general linear modelling (GLM) explored interaction with childhood outcome. Ethical approval was obtained from the Born in Bradford Scientific Steering and Executive Group.

1285 women were eligible for inclusion. 46.1% were Pakistani, 39.6% White British and 18.3% of other ethnic origin. The mean vitamin D level was 31.7nmol/L. Only 5.9% Pakistani women had sufficient vitamin D levels. Deficient antenatal serum vitamin D was associated with reduced birthweight on adjusted analyses (p<0.05). Low maternal vitamin D level was associated with reduced head circumference in Pakistani infants (p<0.01). Pakistani children were more likely to present to medical services and had reduced scores on the Early Years Foundation Stage Profile (EYFSP). Higher maternal vitamin D levels in White British mothers were associated with improved overall communication score in the EYFSP on multiple regression analyses (p<0.05). This study did not identify any significant findings between maternal vitamin D level and skinfold thickness or behaviour at school entry level.

This study provides improved knowledge of the potential roles of vitamin D deficiency during pregnancy in an ethnically diverse population. Antenatal serum vitamin D deficiency is associated with adverse effects both immediately after birth and extending into early childhood. Findings support existing research. Large-scale trials are advocated to explore relationships further, particularly in relation to neurocognitive development.

COI: None declared