September 22nd, 2023 15:00 - 17:00

PARALLEL SESSION 27 - NUTRITION 4

ID 63. Glucose-regulatory hormones and growth in very preterm infants fed fortified human milk: secondary analysis of a randomized controlled trial

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Background: Both nutrition and hormones influence metabolism and growth in very preterm infants (VPIs). We investigated if plasma levels of glucose–regulatory hormones during the first weeks after very preterm birth were affected by type of nutrient fortifier, and their association with birth weight (appropriate/small for gestational age, AGA/SGA), postnatal age, enteral nutritional intake, and growth (ΔZ–scores from birth to 35 weeks postmenstrual age).

Methods: A total of 225 very preterm infants (VPIs, 26+0 to 30+6 weeks of gestation) were randomized to receive intact bovine colostrum (BC) or conventional fortifier (CF: PreNAN FM85 based on hydrolysed whey protein). Clinical outcomes were published

previously (Clin Nutr 42:773–783, 2023). Basal hormone concentrations were measured in plasma obtained before the start of fortification and after one or two weeks of fortification (postnatal age ~1, 2 and 3 weeks, respectively). Insulin–like growth factor–1 (IGF–1) concentrations were determined using an enzyme–linked immunosorbent assay (Mediagnost) and a metabolic hormone panel by electrochemiluminescence (Meso Scale Diagnostics).

Results: Compared with CF, infants who received fortification with BC showed higher glucagon–like peptide–1, gastric inhibitory polypeptide, glucagon, and leptin concentrations after start of fortification ($P<0.05$), with no significant changes in IGF–1, C–peptide, insulin, pancreatic polypeptide and glucose concentrations. After one week of fortification, higher daily enteral milk intake was associated with higher IGF–1, insulin and C–peptide concentrations, while higher total daily protein intake was associated with higher leptin concentration after two weeks fortification ($P<0.05$). Prior to fortification, leptin concentration was negatively associated with weight ΔZ–scores, while during fortification, IGF–1 concentration was positively associated with ΔZ–scores for weight and length ($P<0.05$). In AGA infants, hormone concentrations generally increased within one week of fortification start. Relative to AGA infants, SGA infants showed reduced IGF–1 and leptin concentrations ($P<0.05$).

Conclusion: Fortification of human milk with BC increased the plasma concentrations of several glucose–regulatory hormones in VPIs. Hormone concentrations also seem to be modified by enteral volume and protein intake, advancing postnatal age and SGA status. Concentrations of IGF–1 were positively, and leptin negatively, associated with growth. However, hormone concentrations were highly variable and only partially accounted for the overall variation in early postnatal growth.

PTS holds a patent related to bovine colostrum for infants (PCT/DK2013/050184) but has declined any share of potential revenue from commercial exploitation. All other authors declare no conflict of interest.

ID 867. The effect of higher Protein-Energy Intakes and Stimulation of Physical Activity on Growth of preterm infants: A Nested Design Randomized Clinical Trial.

Doctor Chiara Biagetti[1], Doctor Alessio Correani[1], Doctor Ilaria Giretti[1], Doctor Maria Paola Bellagamba[1], Doctor Rita D'Ascenzo[1], Doctor Beatrice Bartolomei[1], Doctor Ilaria Burattini[1], Doctor Enrica Ferretti[1], Doctor Annamaria Peretti[1], Doctor Domenico Galotto[1], Professor Paola Cogo[2], Professor Virgilio P. Carnielli[1]

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Background: Increasing protein and energy intake above the anabolic capacity of a given individual may result in increased lipogenesis and excessive fat deposition. We hypothesized that combining a physical stimulation program to increased nutritional intakes would have improved growth and body composition of preterm infants born before 32 weeks (W) of gestation.

Methods: We performed a pilot randomized controlled trial with a 2–by–2 factorial design involving infants born between 24+0W and 31+6W, who were randomly assigned to Standard Nutrition (N0: protein intake 3.6g/kg/d and energy intake 135kcal/kg/d) or Enhanced Nutrition (N+: protein intake 4.6g/kg/d and energy intake 145kcal/kg/d) and to Physical Stimulation (S+: flexion/extension of the 4 limbs and other motion exercises of the shoulder girdle and of the hips 4 times/day at least 5 days a week) or No Physical Stimulation (S0) from birth to 36W postmenstrual age (PMA). Growth and body composition (assessed by skinfold and ultrasound muscle and adipose tissue thickness measurements of limbs) were evaluated until 36W PMA.

Results: One hundred and twenty–seven infants met inclusion criteria and were included in the per protocol final analysis (N+S+=32; N+S0=33; N0S+=30; N0S0=32). No differences were found in demographics and in the main complications of prematurity between the groups. N+ patients showed improved weight gain from birth to 36W PMA (weight gain Birth–36W: 13.8±2.1 vs 12.4±2.3 g•kg–1•d–1, N+ vs N0 respectively, p=0.001; delta weight SDS birth–36W PMA: –0.7±0.5 vs –1.0±0.5, N+ vs N0 respectively, p=0.001). Physical stimulation was not associated with any clinically and statistically significant effect on growth. Neither the nutritional intervention, nor the physical stimulation program affected body composition until 36W PMA. No significant interaction was found between nutrition and physical stimulation on growth and body composition during the study period.

Conclusion: In very preterm infants (24+0–31+6 weeks), enhanced nutrition was associated with a higher weight gain from birth to 36W PMA but no other statistically and clinically significant differences were found. We could not demonstrate any growth advantage in receiving the physical stimulation program, nor there was any interaction between nutrition and physical stimulation.

Nothing to declare

ID 36. EARLY INTRAVENOUS NUTRITION, HYPOPHOSPHATAEMIA AND REFEEDING SYNDROME IN EXTREMELY LOW BIRTHWEIGHT BABIES: A COHORT STUDY

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Background: In extremely low birthweight babies (ELBW, <1000 g) higher nutritional intakes are associated with hypophosphataemia, refeeding syndrome and increased morbidity and mortality. We investigated whether increased early phosphate intake and enhanced biochemical monitoring are associated with a reduction in these outcomes.

Methods: Prospective cohort study in two Auckland neonatal intensive care units (NICUs) comparing ELBW babies born before (2014–2018; Cohort 1) and after (2020–2021; Cohort 2) intravenous nutrition (IVN) protocol changes to increase phosphate intake and biochemical monitoring. Cohort 1 were participants in a randomised controlled trial of early increased amino acid intake. Cohort 2 were identified prospectively.
Data were retrieved from the trial database or prospectively from electronic medical records. Groups were compared using the χ2 test, pooled t test and nominal logistic or standard least squares regression analysis. Refeeding syndrome was defined as concurrent hypophosphataemia (serum phosphate <1.4 mmol.L–1) and hypercalcaemia (serum calcium >2.8 mmol.L–1) and severe hypophosphataemia as serum phosphate <0.9 mmol.L–1.

Results: Baseline characteristics were similar in Cohort 1 (n=149) and 2 (n=100). Serum phosphate concentrations were significantly higher in Cohort 2 than Cohort 1 (median (IQR): day 3, 1.9 (0.6) vs 1.5 (0.7) mmol.L–1; p=0.0001); day 5, 1.8 (0.5) vs 1.4 (0.5) vs mmol.L–1; p <0.0001). The incidence of hypophosphataemia was lower in Cohort 2 than Cohort 1 (day 3, 46% vs 14% (p=0.0003); day 5, 57% vs 19% (p<0.0001). On day 5, in Cohort 2 refeeding syndrome decreased from 16% to 2% (p=0.003) and hypophosphataemia from 12% to zero (p=0.0003) compared with Cohort 1. Hypercalcaemia was similar in the two cohorts. Patent ductus arteriosus (PDA), culture–proven late–onset sepsis (LOS), and probable early– (pEOS) and late– (pLOS) onset sepsis were all significantly decreased in Cohort 2 compared with Cohort 1 (PDA 22% vs 38%, p=0.003; LOS, 25% vs 36%, p=0.046; pEOS, 25% vs 56%, p<0.0001; pLOS 27% vs 61%, p<0.0001). Other clinical outcomes were similar in the two cohorts.

Conclusion: Revised IVN protocols to increase early phosphate intake and enhance biochemical monitoring are associated with a lower incidence of hypophosphataemia, refeeding syndrome and associated co–morbidities. Whether these associations are causal requires further investigation.

None declared

ID 90. FEEDING VERY LOW BIRTH WEIGHT (VLBW) INFANTS WITH PRETERM DONOR MILK AS A SUPPLEMENT TO MOTHER'S OWN MILK HAS A POSITIVE IMPACT ON PROTEIN INTAKE AND GROWTH

Dr Giannoula Gialeli[1], Dr Anastasia Kapetanaki[1], Dr Ourania Panagopoulou[1], Dr Panagiota Vourna[1], Dr George Liosis[1], **Professor Tania Siahanidou**[2]

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Introduction. Feeding very low birth weight (VLBW) preterm infants with human milk has contributed to increased survival and improved neurodevelopment. When mothers' own milk (MOM) is not available, pasteurized donor milk from human milk banks is the best alternative according to current recommendations. Donor milk is mainly derived from mothers delivering at term (TDM) and is less enriched in protein compared to preterm milk, at least during the first weeks after birth. As adequate protein intake is imperative for growth, we hypothesized that feeding VLBW infants with preterm donor milk (PDM), when MOM is not available or insufficient, may positively influence protein intake and, consequently, the infants' growth. The aim of this study was to evaluate whether MOM supplementation with PDM instead of TDM has any beneficial effects on protein intake and growth in VLBW infants.

Methods. In this randomized, controlled, double–blind study, 120 VLBW infants were allocated into two groups. In Group A (n=43), infants were fed with MOM supplemented with PDM, whereas infants in Group B (n=77) were fed with MOM supplemented with TDM, at least for the first three weeks of life (donor milk period). Infants with congenital anomalies, chromosomal disorders, metabolic diseases or fed with formula during the donor milk period were not eligible to participate. A breast

milk fortifier was added in human milk when feeds exceeded 50 mL/Kg/day. Protein concentration in human milk was measured regularly using a MIRIS Human Milk Analyzer. Infants' growth (body weight, length and head circumference) during the donor milk period and at discharge was also assessed.

Results. Protein intake was higher in Group A than in Group B at initiation of milk fortification (p=0.006), as well as during the 3-week donor milk period (p=0.023) and throughout hospitalization (p=0.014). Moreover, Group A presented higher Δz-score for body weight (p=0.019) and head circumference (p=0.001) from birth to the end of donor milk period, and higher mean body weight at discharge (p=0.047), compared to Group B.

Conclusion. When donor milk is required, preterm donor milk has a positive impact on protein intake and growth in VLBW infants.

None declared