Newly-developed Fermented Infant Formulas, Combining scGOS/lcFOS with Lactofidus™, Show Equivalence of Weight Gain in Healthy Infants: A Randomized, Controlled, Double-blind, Multicenter, Intervention Study

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Introduction: Fermented infant formulas (IF) and IFs with a prebiotic mixture of short-chain galacto-oligosaccharides and long-chain fructo-oligosaccharides (scGOS/lcFOS, ratio 9:1) have been shown to support a healthy digestive system during infancy. In this study, we aimed to demonstrate the safe use of newly-developed IF in which fermented IF (with 15% or 50% Lactofidus™) is used in combination with a specific mixture of scGOS/lcFOS (0.8g/100ml, ratio 9:1).

Methods: The study was performed in accordance with the guidelines for growth studies. Healthy, term infants aged 0-28 days were randomized to receive one of the following IFs: Active1) IF with scGOS/lcFOS and 50% Lactofidus™; Active2) IF with scGOS/lcFOS and 15% Lactofidus™; Control1) IF with scGOS/lcFOS; Control2) IF with 50% Lactofidus™; The primary outcome was equivalence in weight gain (g/day) from baseline until 17 weeks of age. The mean difference in weight gain between groups was estimated by ANOVA correcting for sex. Weight gain between groups was considered equivalent when the two-sided 90%-CI of the difference in the means fell within the equivalence margins of +/- 3 g/day.

Results: A total of 298 infants completed the study visits per protocol. All estimates and 90%-CI fell within the equivalence margins when comparing Active1 with Control1 (-0.55 g/day; -2.24 to 1.13 g/day); Active2 with Control1 (-0.22 g/day; -1.92 to 1.48 g/day); and Active1 with Control2; (-0.95 g/day; -0.77 to 2.67 g/day). Regarding adverse events, active products performed at least as good as controls.

Discussion: This study shows that weight gain in infants receiving a formula with scGOS/lcFOS and Lactofidus™ during the first 4 months of life is equivalent to that of infants receiving a control formula. Hence, the newly-developed infant milk formulas combining scGOS/lcFOS with Lactofidus™ support adequate growth and are well-tolerated.
Substrate Utilization in Ventilated Critically Ill Children: A Longitudinal Study

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Background: In critically ill children, adequate nutritional support is associated with decreased mortality and morbidity. Nutritional needs may be influenced by the metabolic stress, treatments, fever, etc. which makes difficult the acute determination of macronutrients needs. If energy needs have been documented, macronutrients utilization during the stay remains unknown.

Objective: The aim of this study was to determine substrate utilization during the first week of hospitalization in ventilated critically ill children.

Methods: Children with expected mechanical ventilation ≥ 72 hours and a FiO2 ≤ 60% were consecutively included. Energy expenditure, respiratory quotient (RQ) and substrate utilization were calculated from the values of oxygen consumption and carbon dioxide production measured by indirect calorimetry and from total urinary nitrogen measured by chemoluminescence daily. A total of 328 measurements were performed. Macronutrients intakes were recorded using a computerized information system (MetaVision, Imdsoft). Macronutrients balances were then calculated as the difference between oxidation and intakes. The RQ was also compared with the RQ of the macronutrients administered (RQmacr).

Results: We included 63 children, 34 boys and 29 girls with a median age (IQR) of 21 (0-103) months. Energy, protein and lipids balances remained negative during the first week of hospitalization while carbohydrates balance was positive from the first day. On average, energy expenditure was 54±10 kcal/kg/d and energy balance was -9±16 kcal/kg/d. Protein, lipids and carbohydrate oxidation were 1.4±0.4 g/kg/d, 3.1±1.5 g/kg/d and 5.1±2.8 g/kg/d, respectively. The mean balance was -0.4±0.6g/kg/d for proteins, -1.9±1.8g/kg/d for lipids and +1.8±3.1g/kg/d for carbohydrates. RQ measured was lower than RQmacr calculated (0.81±0.06 versus 0.92±0.05).

Conclusion: In our group of ventilated critically ill children, we observed a slight lipolysis and catabolism during the first week of hospitalization. The carbohydrate oxidation was insufficient, probably due to a reduced oxidation capacity and insulin resistance in metabolic stress conditions.
Ketamine During Upper Gastrointestinal Endoscopy in Children: A Prospective Study of 314 Cases

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Introduction: Ketamine is a general anesthetic agent, whose pharmacological properties are both original and complex, frequently used in pediatric resuscitation. Outside of this context and particularly during the endoscopy, the safety of this agent in children has not yet been investigated in depth.

Objective: To document the safety profile of this agent during upper gastrointestinal endoscopy.

Materials and Methods: Prospective study including all children aged 16 years who received ketamine in first line sedation during upper gastrointestinal endoscopy over a period of 2 years (from January 2011 to December 2012) with the exclusion of those who have contraindication. A standardized form of exploitation was established for this purpose, including the clinical data of the patient, the indication of endoscopy, the drug’s dosage, procedure’s duration, possible side effects classified as major and minor, recovery time and satisfaction of both operator and parents.

Results: 314 children were included in this study, the average age of our patients was 5 years and 10 months, ketamine was used only in 98% of cases and associated mediazolam in 2% of cases. Loading dose were 0.5 mg / kg and total dose were 1,2mg/kg on average. Effective sedation was noted in all cases. Minor side effects were: hypersalivation (48%), vomiting (12%), and agitation in wake-up (6%). Major side effects were found in only two patients, one presented a convulsion of short duration and the other transient laryngospasm.

Conclusion: Ketamine provides good sedation during upper gastrointestinal endoscopy with an exceptional risk of anesthetic accident. However, recommended doses should be prescribed and safety measures should be taken during the operation.
Study of the Nutritional Management of Preterm and Low Birth Weight Infants in a Level 2 Neonatal Unit

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Background: There is ongoing research in the field of neonatal nutrition. There is no set unified guidance on growth and optimizing weight gain in neonates.

Objective: Our aim was to review the nutritional management of preterm and low birth weight infants on our local unit. The study period was from October 2010 until September 2011.

Methods: The study included premature infants with birth gestational age ≤32 weeks and/or birth weight ≤1,500 grams. Stillbirths and deaths in ≤48 hours of life were excluded. Infants who required transfer or hospitalization in more than 2 units were also excluded. The neonatal course, outcome as well as clinical response to their nutritional needs were studied.

Results: 36 babies were identified of which 16 were excluded (table 1). The mean length of stay was 38.4 days. There was regular monitoring of weight gain.

<table>
<thead>
<tr>
<th>Gestation</th>
<th>&gt;32/40</th>
<th>≤32/40</th>
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<tbody>
<tr>
<td>&gt;1,500 grams BW</td>
<td>0</td>
<td>6</td>
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<tr>
<td>1,000-1,500 grams BW</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>&lt;1,000 grams BW</td>
<td>0</td>
<td>2</td>
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Table 1: 2 babies developed chronic lung disease. 8 babies had at least one suspected or true septic event. 8 babies were treated conservatively for suspicion of necrotizing enterocolitis.

The mean weight on admission was 1,318 grams and 1,941 grams at discharge. The mean period of establishing enteral feeds was 10.9 days. 13 babies received total parenteral nutrition with mean duration of administration 9.4 days. In most cases appropriate clinical decisions were made in response to poor weight gain (table 2).
Table 2: There was discrepancy between the time of introduction of parenteral (mean of 3.2 days) and enteral nutrition (mean of 2.75 days). 3 babies were only receiving clear intravenous fluids until day 5 of life. Only 20% of babies were breastfeeding at discharge. There was overall minimal dietician’s input.

Conclusions: Reinforce prompt initiation of total parenteral nutrition when clinically indicated. Encourage breast feeding as the main nutritional component. Involve specialists’ input early in the nutritional management of such babies.
The Iceberg of Celiac Disease: Association between Celiac Antibodies and Growth in Children at 5 Years of Age. The Generation R Study

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Background: ‘The iceberg of celiac disease’ (CD) includes children with latent or potential CD, characterised by positive or intermediate serology and no villous atrophy; or a later development of villous atrophy. Positive levels of antibodies against tissue transglutaminase (anti-tTG, a marker of celiac disease) have been associated with reduced weight and bone mass density. However, effects of intermediate levels are not known. Adverse effects are likely, since intermediate levels in pregnant women have been associated with reduced birth weight.

Objective: To assess associations between levels of anti-tTG and length, weight, BMI and bone mass density in children at 5 years of age.

Methods: In a population-based prospective cohort study, serum samples were collected at 5 years of age and analysed for anti-tTG levels (n=3,415). Children with known celiac disease, or with a low or gluten free diet were excluded from analysis. Based on anti-tTG level, children were categorized into 3 groups: negative (1.00 U/ml, n=3,234), intermediate (1.00 to 6 U/ml, n=137), or positive anti-tTG (6 U/ml, n=33). Data on length, weight and BMI were obtained at the 5 years visit. SDS for growth characteristics were obtained using Dutch reference growth charts. Bone mass density was measured by Dual-energy X-ray absorptiometry (DEXA). Multivariable linear regression models with adjustment for birth weight, gestational age, breastfeeding, socioeconomic status, and timing of gluten introduction were performed.

Results (preliminary): A negative trend for bone mass density was observed among the anti-tTG groups. The anti-tTG level within the positive group was significantly associated with low bone mass density at 5 years of age. Length, weight and BMI were not associated with positive or intermediate tTG-IgA levels.

Conclusion: Anti-tTG levels are associated with bone mass density. Therefore, undiagnosed celiac disease has consequences for bone mineral density at 5 years of age.