osmotic diuresis. In addition, especially in risky pediatric patients, hyperglycemia may cause cerebral ischemia. The aim of this study was to determine ideal glucose containing maintenance solution for maintaining normoglycemia in infants.

Materials and Methods: After obtaining Ethical Committee approval and informed consent from parents, 96 infants aged between 0 to 101 years undergoing major pediatric surgery were included into the study. Patients were randomly divided into three groups according to maintenance fluids before anesthesia induction (Group I: 10% Dextrose+ ringer lactate, Group II: 5% Dextrose+ ringer lactate, Group III: 2.5% Dextrose +ringer lactate). Blood glucose levels were determined by glucometer (OptiVue Xceed, Abbott, UK). If hyperglycemia (blood glucose level > 200 mg/dL) or hypoglycemia (blood glucose level < 40 mg/dL for neonate or < 50 mg/dL for infants) was observed, routine protocols were applied to provide normoglycemia. Hemodynamic parameters were also recorded throughout the study period. Descriptive variables were analyzed using Mann-Whitney U test and chi-square test as appropriate.

Results and Discussion: Groups were comparable with respect to demographic data and duration of anesthesia and surgery. Blood glucose levels were similar between groups. However, hyperglycemia was observed 47 % in Group I, 19% in Group II and 25% in Group III, (p< 0.05). Hypoglycemia was observed only in one patient in Group I. Hemodynamic parameters were similar between groups. The risks of hyperglyceremia and hypoglycemia during intraoperative period are well known for pediatric patients and have been evaluated in various studies. However, the ideal glucose concentration of maintenance fluid have not been defined yet. Therefore, especially in children at increased risk for intraoperative blood glucose derangements, frequent blood glucose monitoring is recommended.

Conclusion(s): We concluded that maintenance solution with 5 or 2.5 % glucose seems to be an appropriate choice for infants undergoing major pediatric surgery.

10AP2-7

Analysis of ESPEN guidelines on lipid and carbohydrate needs estimation in neonates

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Background and Goal of Study: Lipids and carbohydrates are the sources of nonprotein energy (NPE) in nutrition therapy. It is extremely important in neonates to coordinate lipid and carbohydrate components of NPE in specified proportion. There are also strict limits on lipid and glucose dosage that should be fulfilled necessarily in order to minimize complications. The goal of the study is to analyze relations between lipid and glucose doses at different values of NPE and to develop practical algorithm taking into account all ESPEN restrictions and guidelines on estimations of NPE, its components and corresponding lipid/glucose doses.

Materials and Methods: The study methods include mathematical analysis of linear equations system and graphical visualization of its solutions. Methods of mathematical modeling were also used to generate a set of real clinical conditions and to test the created algorithm that allows calculating lipid and glucose doses in patient-focused specified proportion.

Results and Discussion: NPE value (kcal/24h), calculated or specified, consists of 2 components provided by lipids and carbohydrates. The NPE value should be constant while doses of lipids and carbohydrates may change during therapy. If NPE value is constant lipid dose (LD) and dry glucose dose (GD) are functionally dependent and this relationship can be expressed with system of 2 linear equations. In these conditions increasing LD by 1 g/kg/24h requires decreasing GD by 2.25 g/kg/24h and if GD rises by 1 g/kg/24h LD should fall down by 0.44 g/kg/24h to preserve specified value of NPE. Each NPE value has its own minimal GD that often exceeds common recommended minimum. This specific minimum may be calculated by formula. The formula shows that minimal GD becomes higher with the increasing of NPE. To control glucose load the other 2 equations were developed. They connect glucose load with daily lipid dose. Using derived calculating schemes it is possible to define the conditions enabling to meet specified balance between 2 NPE components and not to break limits of daily LD and GD.

Conclusion(s): The analysis of ESPEN guidelines on PN in neonate with mathematical methods allowed developing easy practical algorithm for estimating neonate nonprotein energy, its lipid/carbohydrate components in balanced proportion and meet ESPEN restrictions on lipid and glucose dosage.

References:

ESPEN/ESPEGHAN Guidelines on paediatric parenteral nutrition.
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10AP2-8

Preoperative fasting in children: Impact of prior food on gastric emptying after drinking clear fluids - preliminary MRI data

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Background and Goal of Study: Gastric emptying half-life time in children after clear fluid intake was shown to be less than 30 minutes without prior food, i. e. after overnight fasting (1). The impact of prior food on gastric emptying half-life time and residual gastric contents volume at time of induction has to be examined.

Materials and Methods: After overnight fasting, healthy volunteers aged from 6 to 12 years had to drink 7 ml/kg of diluted raspberry syrup without (A) and 4 or 2 hours after breakfast (B/C) on three different days. Breakfast consisted of milk and cereals and was identical for a child on both occasions. Axial images covering the entire stomach were obtained by magnetic resonance imaging (MRI) after overnight fasting, immediately after drinking and then every 30 minutes for 2 hours. Gastric content volumes were determined in a blinded manner, related to body weight (GCV) and elimination half-life times (T1/2) calculated. Data are presented as median (range). Exact significance p for