Ultrasound assessment of gastric volume in adults after drinking carbohydrate-containing fluids two hours before anesthetic induction

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Background and goals of Study: Gastric Ultrasound is an important tool in the assessment of gastric volume and content. Perioperative aspiration of gastric contents is a rare complication of anaesthesia, however, leading to devastating consequences. The fasting guidelines goal is to reduce this risk. On the other hand, prolonged fasting increases insulin resistance and worsens the response to surgical trauma. In addition, symptoms such as nausea, vomiting, hunger, thirst and anxiety are also related to prolonged fasting. After the 80's, several evidence-based protocols recommended the ingesting of oral carbohydrates up to 2 hours before elective surgery. The aim of this study is to evaluate the gastric residual volume after the intake of 200ml of a carbohydrate-containing beverage two hours before anesthetic induction.

Material and Methods: 90 patients, between 18 and 65 years old, ASA I or II, BMI < 35 kg/m², scheduled for laparoscopic cholecystectomy or maxillofacial surgeries were evaluated. Each subject was randomized to intake 200 mL of a beverage containing 12.5% maltodextrin (**carbohydrate group**) or to be fasting for at least 8 hours (**control group**). Before induction of general anaesthesia, the gastric volume was assessed in RLD, by ultrasound (curved low-frequency transducer) using the two diameter method and applying to the gastric volume formula validated by Perlas¹.

$$CSA = \frac{(AP \times CC \times \pi)}{4}$$

$$GV (ml) = 27.0 + 14.6 \times CSA - 1.28 \times \text{age}$$

Results and Discussion: Demographics are presented in Table I. The results showed significant reduction in gastric volume in the carbohydrate group (108.55 ± 72.90 vs 46.00 ± 40.32 ; $p < 0.05$). It was noticed reduced hunger, thirst and anxiety in the carbohydrate group, however there was no difference in incidence of nausea and vomiting between the two groups. There were no reports of pulmonary aspiration. The intake of clear carbohydrate drinks containing maltodextrins, seems to empty readily and predictably from the stomach, ensuring patient's safety. Gastric ultrasound is a practical point-of-care diagnostic tool that allows anesthesiologists to evaluate the patient's gastric content and volume and thus the aspiration risk.

Table I: Demographics data

	Control Group	Carbohydrate Goup	p
Age	36.02 ± 11.94	37.60 ± 15.03	0.58
Weight (kg)	71.35 ± 11.45	69.53 ± 10.72	0.43
High (cm)	1.65 ± 0.07	1.65 ± 0.08	0.96
BMI	26.04 ± 3.20	25.52 ± 3.84	0.69

Conclusion: Carbohydrate fluids ingested 2 h before anesthetic induction demonstrates reduced gastric volume compared to fasting and does not increase the risk of complications related to the perioperative regurgitation and aspiration of gastric contents. Besides, symptoms such as hunger, thirst and anxiety may be minimized by fasting abbreviation.

References:

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