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Assessment of Preoperative Fasting Time in Elective General Surgery

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Abstract

The aim of this review was to investigate the preoperative fasting time in elective surgical patients. We conducted a systematic literature review of preoperative fasting time in elective general surgery. Studies published in January 1990 to May 2013. "Starvation", "fasting", "adult" and "elective general surgery" key words used for this study. The search was limited to articles publish in English and Turkish. Twelve (n=12) studies were included in the review (randomized controlled trial n=6, cross-sectional n=5, non-randomized trial n=1). The mean duration of fasting is 12-14 hours for solid and liquids. Preoperative drinking doesn't increase the risk of aspiration, regurgitation or related morbidity compared with the standard fasting policy. Patients often fast for longer than required. Appropriate preoperative fasting improves postoperative outcome.

Keywords: Adults, elective surgery, fasting, starvation

1. Introduction

The standard practice of a non per os or a *nil per os* (NPO), meaning "nothing by mouth," preoperative fasting regimen has been applied in patients undergoing elective surgical procedures (Sendelbach, 2010; Bopp et al., 2011). This standard practice in health care system is a worldwide reality (Tudor, 2006; Crenshaw, 2011). The preoperative fasting has been accepted at the beginning of anesthetic practice to prevention of regurgitation/aspiration (Ludwig et al., 2013; Gunawardhana, 2012). Fasting before surgery decreases morbidity and mortality related to aspiration during general anesthesia (Anderson and Comrie, 2009). In the literature reported that pulmonary aspiration occurs only rarely as a complication of general anaesthesia

(Gunawardhana, 2012). Preoperative fasting is a necessary patient safety, but the duration is significant (Tudor, 2006). In many health institutions, the patient remains fasting for much longer, about 12 to 16 hours (Aroni et al., 2012). Additionally, fasting can be prolonged when surgery is delayed. Hence, fasting period may be extended further (Pexe-Machado et al., 2013).

Prolonged fasting causes several adverse effects (Protic et al., 2010; Gunawardhana, 2012) and affects patients' physical and psychological well-being such as increased patient discomfort, irritability, anxiety, headache, dehydration, emesis, hypovolemia, and hypoglycemia (Anderson and Comrie, 2009). While fasting duration, patients may become thirsty, hungry, anxious, drowsy, or dizzy (Blanchard, 2012, Crenshaw, 2011). Prolonged fasting leads to an increase in catabolic pathways that might increase the risk of certain postoperative complications (Yagci et al, 2008; Gunawardhana, 2012). Postoperative insulin resistance can be occur after operation and long fasting time may aggravate this resistance (Faria et al., 2009) and a weakened immune system (Blanchard, 2012). The incidence of postoperative nausea and vomiting increase with prolonged fasting (Tudor, 2006).

Based on current literature, on preoperative fasting recommend two hours for clear fluids and six hours for solids in most elective surgical patients (Gunawardhana, 2012). Updates guidelines are recommended only for healthy patients undergoing elective surgery (Crenshaw and Winslow, 2002). Often, intake of clear fluids such as water, black coffee, tea, or fruit juice without pulp is allowed until two hours before anesthesia (Hausel et al., 2001). Clear liquids leave the stomach almost immediately, while solids may remain in patient's stomach for significantly longer periods (Crenshaw, 2011). The American Society of Anesthesiologists (ASA) recommends that healthy patients be allowed to have clear liquids for up to two hours before elective surgery (Table 1) (Blanchard, 2012).

Table 1. American Society of Anesthesiologists Preoperative Fasting Guidelines for

Healthy Patients

Ingested material	Minimum fasting period in hours
Clear liquids	2
Breast milk	4
Infant formula	6
Nonhuman milk	6
Light meal	6
Regular meal	8

The European Society of Clinical Nutrition and Metabolism recommends that carbohydrate-loading liquids two hours before surgery has been suggested to prevent thirst, hunger, the anxiety caused by surgery (Blanchard, 2012; Protic et al., 2010). In a systematic review, researchers found that patients who drank clear liquids before surgery had no more risk of vomiting, aspiration, or associated morbidity during anesthesia or sedation than patients who were fasted overnight (Brady et al., 2003).

Preoperative fasting is established a procedure before surgery, however, it is still debated optimal preoperative fasting time (Taniguchi et al., 2012). Therefore, the aim of this review was to investigate the preoperative fasting time in elective surgical patients.

2. Material and methods

We conducted a systematic literature review of preoperative fasting time (duration, and drink of permitted) in elective general surgery. Studies published in January 1990 to May 2013, in Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, EBSCH Ohost, Ovid, Proquest, Blackwell-synergy and Cochrane Library databases were searched for study. Key words; “starvation”, “fasting”, “adult” and “elective surgery” used for this research. The search was limited to articles publish in English and Turkish. Data collection occurred during the period of June and July, 2013. All randomized controlled, cross sectional and review studies for mainly adults have examined (n=34). The eligible studies were independently determined by authors. Twelve (n=12) papers were included in the study (randomized controlled trial n=6, cross-sectional n=5, non-randomized controlled trial=1).

3. Results

The long preoperative fasting period is still common practice in the most studies. The median duration of fasting is 14 h for solid, 12 h for liquids. Preoperative drinking doesn't increase the risk of aspiration, regurgitation or related morbidity compared with the standard fasting policy. Preoperative carbohydrate-rich fluids improved preoperative thirsty, hunger, and anxiety in patients and enhanced patient comfort. It doesn't alter the amount or pH of gastric contents (Table 2).

Table 2. Studies investigating the fasting time in elective surgery and characteristics of the studies

Study	Method	Study groups	Fasting time	Results
Gunawardhana, 2012	Cross-sectional	235 patients 118 healthcare workers	The mean duration of fasting was 13.86 hours (range 8–18) for solids and 12.68 hours for liquids (4 – 18).	Most patients felt mild to moderate hunger and thirst. Patients undergoing routine surgery fast for unnecessarily long periods. Failure of implementation of guidelines is mainly due to inadequate knowledge and poor attitude among ward staff.
Dock-Nascittiento et al. 2011	Randomized controlled trial	Fasted group, n=12 Carbohydrate group, n=12 Glutamine group, n=15	Fasted group= traditional fasting time	The abbreviation of preoperative fasting for 2 hours with carbohydrate and L glutamine- rich drink was safe and was not associated with complications during the induction of anesthesia.
Yagci et al. 2008	Randomized controlled trial	Fasted group, n=36 Carbohydrate group, n=34	Fasted group= traditional fasting time	Preoperative plasma glucose levels were found to remain significantly higher in patients who had received the carbohydrate-rich fluid. The preoperative intake of carbohydrate-rich fluids does not alter the amount or pH of gastric contents.
Helminen et al. 2009	Randomized controlled trial	Fasted group, n=73 Carbohydrate group, n=70 I.V. glucose infusion group, n=67	Fasted group= traditional fasting time	During the waiting period before surgery, the carbohydrate-rich drink group was less hungry than the fasting group. In the fasting group, thirst, hunger, mouth dryness, weakness, tiredness and anxiety increased. Both intravenous and oral carbohydrate caused a significant increase in glucose and insulin levels. The carbohydrate-rich drink group experienced decreasing thirst but increasing hunger and mouth dryness.
Hausel et al. 2005	Randomized controlled trial	Fasted group, n=58 Carbohydrate group, n=55 Plecebo group (flavored water), n=59	Fasted group= traditional fasting time	The incidence of postoperative nause and vomiting was lower in the carbohydrate group than in the fasted group
Crenshaw and winslow, 2002	Cross-sectional	155 patients	Patients fasted from liquids and solids for an average of 12 and 14 hours, respectively.	

Table 2. Studies investigating the fasting time in elective surgery and characteristics of the studies (continue)

Study	Method	Study groups	Fasting time	Results
Hausel et al. 2001	Randomized controlled trial	Fasted group, n= 83 Carbohydrate group, n=78 Plecebo group, n=84	Fasted group= traditional fasting time	During the waiting period before surgery, the carbohydrate treated group was less hungry and less anxious than both the other groups. Trend analysis showed consistently decreasing thirst, hunger, anxiety, malaise, and unfitnes in the carbohydrate group the placebo group experienced decreasing unfitnes and malaise, whereas nausea, tiredness, and inability to concentrate increased. In the fasted group, hunger, thirst, tiredness, weakness, and inability to concentrate increased.
Khoyratt et al. 2010	Cross-sectional	200 patients	The median fasting time for food was 12 hours and for liquids 7 h.	
Faria et al., 2009	Randomized controlled trial	Fasted group, n=10 Carbohydrate group, n=11	Fasted group= traditional fasting time	Abbreviation of the period of preoperative fasting and administration of a carbohydrate beverage diminishes insulin resistance and the organic response to trauma.
Power et al., 2012	Non-randomised case-control study	Fasted group, n = 29 Short-fast group n=21	Fasted group= traditional fasting time	
Pearse and Rajakulendran, 1999	Cross-sectional	153 patients	Mean length of fast for solids was 15 h and for fluids 12 h	
Dolgun et al., 2011	Cross-sectional	145 patients	solid food an average of 13.53 hours and liquid for 12.21 hours.	Patients' preoperative fasting and fluid restriction times are longer than suggested

4. Discussion

Preoperative fasting is mandatory before general anesthesia to reduce the volume and acidity of the stomach contents, prevention of aspiration, vomiting, regurgitation and aspiration (Manchikanti et al., 2011; Ludwig et al., 2013). The risk of aspiration also has been reduced with the use of suitable anesthetic technique as well as the use of improved anesthetic agents (Blanchard, 2012). In the current study found that preoperative fasting time is too long. In recent years, preoperative fasting has been revised and prolonged periods of fasting time is mostly considered as unnecessary (Manchikanti et al., 2011). Most patients were instructed to remain NPO after midnight (Crenshaw, 2011). A long preoperative fasting is common practice in general anesthesia (Anderson & Comrie, 2009). At the study of Furrer et al. (2006) the mean preoperative fasting times were 12.8+/-3.4 h for fluids and 15.5+/-4.4 h for solids. Bothamley and Mardell (2005) reported that the majority of patients were fasted more than

eight hours for food. Overnight fasting can cause considerable discomfort in some patients in the form of hunger, thirst, tiredness and weakness before Surgery (Helminen et al., 2009). Power et al. (2011) stated that preoperative thirst, headache and nausea decreases those who had a shorter fast. Furrer et al. (2006)'s study, the most important factor for preoperative discomfort is long wait, tenseness, anxiety, thirst and hunger. It is clear that "nil by mouth after midnight" is still common practice in elective surgery patients. It is necessary to improve fasting time.

Today, health care professionals have changed their guidelines and recommend intake of clear fluids until two hours before anesthesia (Manchikanti et al., 2011). In this review, most studies have concluded that the preoperative consumption of carbohydrate - containing fluids is safe. The clear liquids, both children and adults is recommended before a two-hour. A soft diet and milk, a six-hour fast and for meals that include fried foods, fats or meat is accepted for children and adults (Aroni et al., 2012). Protic et al. (2010) reported that preoperative feeding two hours before surgery had no influence on the gastric emptying rate, indicating that preoperative feeding does not increase the risk of gastric-content aspiration and can be given safely. Bopp et al. (2011) showed that clearly that the preoperative oral intake of 200 mL of a standard carbohydrate drink decreased preoperative thirst and hunger, resulting in increased comfort and satisfaction with anesthesia care in surgery patients. Health care professionals, especially nurses should use this information to enhance the comfort and safety of healthy patients scheduled for surgical procedures. So, the necessary protocols needed to appropriate fasting time so potential risks will reduced.

5. Conclusions and Implications

Patients often fast for longer than required. Appropriate preoperative fasting improves postoperative outcome. Education is one of the important for staff members, patients and their family members for improving preoperative fasting guidelines. The effect of reduced preoperative fasting increases patient' comfort and improve patient postoperative recovery. More research is needed to determine of the optimal fasting time.

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