Early Feeding after Digestive Surgery: Is it Safe?

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ABSTRACT

Withholding nutrients following surgery until the resolution of intestinal function is not supported by scientific evidence. Early feeding after surgery consisted of a liquid diet within 24 hours after surgery, followed by the gradual increase of food consistency and amount until patients can tolerate solid feeding. However, the safety and efficacy of the procedure are still unclear.

Keywords: Digestive surgery, early feeding, nutrient

Introduction

The use of a nasogastric tube with avoidance of fluids or nutrients intake (nil by mouth) until the resolution of postoperative ileus, have traditionally become a routine practice of postoperative rehabilitation program.1 Avoidance of nutritional intake is believed to be necessary to prevent postoperative complications, such as bowel obstruction, aspiration pneumonia, nausea, vomiting, and protect surgical anastomoses from intestinal movement. Ileus paralytic is one of the postoperative side effects that are unavoidable. Flatulence and/or passage of stools signal resolution of postoperative ileus.2 However, this practice is not supported by scientific evidence.

Early nutrition after surgery is defined by administering a liquid diet within 24 hours after surgery, followed by the gradual increase of consistency and amount of foods until patients can tolerate solid food. It is estimated that over 70% of patients take early feeding after major abdominal surgery.3 The symptoms range from cramps to abdominal pain, nausea, and vomiting. The etiology is multifactorial, involving disturbance of enteric and central nervous systems, hormonal influences, and a neurotransmitter and local inflammation.4 Normal electrical activity of the stomach, small intestine, and colon are disturbed following a surgery.4 The rationale behind ‘nil by mouth’ is to prevent nausea and vomiting and give the anastomosis time to heal, lowering the risk of anastomotic leakage and wound dehiscence.5 In contrast to popular belief, it is unclear whether deferral of enteral feeding is beneficial for such a purpose.

Accompanying standard practice of ‘nil by mouth, nasogastric tube decompression is thought to be necessary to prevent gastric distension, PONV, reduce the risk of pulmonary aspiration, anastomotic leak, wound dehiscence, and infection, and to facilitate the earlier return of bowel function and hospital discharge.6 Routine practice of nasogastric decompression after abdominal surgery have also been questioned. The earliest meta-analysis of 26 RCTs found that abdominal distension and vomiting were significantly more common in selective nasogastric tube placement groups than routinely decompressed patients.6 However, other complications thought to be associated with its placement were either less common (pneumonia, atelectasis, fever) or not significantly different (aspiration, wound dehiscence, wound infection, anastomotic leak) in selective decompressed patients.5 There is, however, a lack of data on which specific cases the use of nasogastric tubes...
may be appropriate.

**Body Response to Surgical Injury and the Rationale of Early Postoperative Feeding**

The stress response is initiated after several insults, including infection, hypoxemia, hypovolemia, and tissue injury. Following surgical trauma, there are apparent endocrine and metabolic changes in the body, resulting from the activation of the sympathetic nervous system and increased secretion of pituitary hormones. Activation of sympathetic nervous systems results in the release of epinephrine and norepinephrine, which promote gluconeogenesis, inhibit insulin release, reduce glucose uptake by cells, and increase free fatty acid mobilization and oxygen consumption.7 Release of catecholamine cause inhibition of alpha-2-adrenergic of pancreatic B cells, resulting in lack of insulin and peripheral insulin resistance, along with reduction of glucose uptake by cells, may result in hyperglycemia; failure to control hyperglycemia may results in increased morbidity and mortality.7 Pituitary hormones also affect target organs, and the production of secondary hormones results in increased protein breakdown, gluconeogenesis in the liver, and lipolysis.7

Several studies have found that nutrition immediately improves nutrition intake and even further limits detrimental metabolic responses caused by surgery.8,9 This benefit has even seen in malnourished individuals; a randomized controlled trial previously tested the benefit of early feeding after surgery; although the early nutrition group had a higher number of malnourished individuals compared to fasting groups, they still had a better recovery, reflected by a shorter hospital stay, lower incidence of diarrhea, despite similar complication rate.10 Commencement of early intake of food after surgery also enhances anastomosis healing by increasing local blood flow and peristalsis, thus stimulating intestinal motility and enhancing postoperative ileus resolution.8

A 13-year prospective observational study of 927 patients sought to determine the effect of surgical manipulation on patients undergoing elective colorectal surgery. Using mesenteric lymph nodes (MLN) sampling, bacterial translocation (BT) was found in 130 of 927 patients (14%), with postoperative sepsis was more common in patients with confirmed BT compared to normal MLN findings (42.3 % vs. 19.9%; p value< 0.001). Even further, the study also described that preoperative total parenteral nutrition (TPN) (p-value: 0.001) and emergency surgery (p-value: 0.015) were independently associated with BT.11 Bacterial translocation is a fundamental basis of ‘gut origin sepsis’, which proposes that gut-associated microorganism is often responsible for sepsis in surgical patients.

Although there are still controversies regarding this phenomenon’s pathophysiological mechanism, there is a growing presumption that postoperative sepsis associated with BT is more likely to affect immunocompromised individuals. However, following surgery, there is a production of proinflammatory cytokines owing to the activation of innate immunity. The essential cytokines related to surgical trauma is IL-6, with a peak circulating value within 12 to 24 hours after surgery.

The presence of proinflammatory cytokines may predispose to septic infection, which particularly important in cancer patients.7 Early nutritional intake within 24 hours after surgery was previously described to be able to reduce bacterial colonization and translocation, thus may reduce the risk of sepsis;11-15 a meta-analysis of 9 RCTs found a reduced risk of any infection in patients getting early enteral nutrition within 24 hours following gastrointestinal surgery (RR: 0.72 [0.54–0.98]; p-value: 0.036), with no significant evidence of heterogeneity between studies.11 Other meta-analyses of early nutrition following digestive surgery found a direction of effect toward reduced risk of infection compared to fasted patients.14-15 The later studies tested those effects on patients undergoing colorectal surgeries.

Postoperative ileus prevents early hospital discharge of patients undergoing abdominal surgery. Surgeons accept that the first passage of flatus and bowel sound is the clinical sign of recovery from intestinal dysmotility. One rather old experimental study using liquid barium and barium-filled gelatin capsule given to patients undergoing gastrointestinal surgery found that disturbance in function differs according to the site. It was found that there is an impairment in gastric and colonic motility up to 24 hours and 3 to 5 days, respectively, following digestive surgery. Interestingly, however, small bowel motility was returned after 4 to 8 hours.16 thus preserving small bowel absorption capacity and its ability to handle upper gastrointestinal fluid secretion, which physiologically may take up to 2 L/day. Recent RCT on 60 patients who underwent colorectal anastomosis concluded that 93% were able to tolerate early feeding, with significantly quicker flatus (mean(SD): 2.7 ± 0.7 days vs. 3.9 ± 0.7 days; p value<0.0001) and stool passage (mean(SD): 3.9 ± 0.9 days vs. 5.4 ± 0.8; p value<0.0001) in early feeding group compared to the fasted group.17

Many attempts to reduce the incidence of PONV exist, including modification of anesthesia techniques, use of medications that work on a variety of receptor sites, pre-surgical carbohydrate load, and acupuncture procedure.18 Interestingly, a Cochrane systematic review and meta-analysis of 6 trials concluded that the risk of vomiting is 27% higher in post-surgical patients undergoing early feeding than fasted patients (RR: 1.27 [1.01 – 1.61]; p-value: 0.045; I2: 92%).19 This analysis included all studies assessing the effect of early feeding on patients undergoing all types of digestive surgery, although most participants underwent colorectal surgery. Interestingly, another meta-analysis that sought to determine only the effect of oral feeding on patients with post-elective colorectal surgery failed to find the difference.14 It should be noted that studies incorporated in the meta-analysis were small, with medium evidence of heterogeneity between studies.

Other than previously described benefits, it is also worth noticing that early feeding has been associated with shorter hospital stay13,17 and lower mortality rate in many studies,11 perhaps the most important two indicators about patient recovery and safety. However, controversies remain regarding the benefits of early feeding (Table). In essence, early nutritional intake within 24 hours after digestive surgery reduces the risk of infection and non-infection-associated complications, length of hospital stay, and mortality. Although some studies did not show significant differences between interventions, there is a trend towards positive effects on the risk of anastomotic dehiscence, intra-abdominal abscess, and death, along
with digestive function returns, in favor of early nutrition intake. In contrast, early feeding is associated with PONV, especially in studies that assessed all types of enteral feeding, while no difference was found in studies that assessed oral feeding.

Some results have to be interpreted with caution as heterogeneity among studies was significant. Some results were even low-quality evidence (Table). However, incorporating early feeding and perioperative nutrition and other treatment for surgical patients in ERAS (Enhanced Recovery After Surgery) protocol shows that the combination of treatment may show significant benefits. In essence, a nasogastric tube should not be in essence, a nasogastric tube should not be inserted by default, but instead replaced by early feeding, when possible.

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