

Carol Rees Parrish, RD, MS, Series Editor

Have You Passed Gas Yet? Time for a New Approach to Feeding Patients Postoperatively



Alison Saalwachter Schulman



Robert G. Sawyer

Most surgeons wait for the return of bowel function before starting oral diets for their postoperative patients. Current literature, however, suggests that this might not be necessary. Early postoperative feeding appears to be safe and, according to some studies, beneficial. Allowing patients more control over their diet likely contributes to overall patient satisfaction and reduces hospital length of stay, thus decreasing medical costs. For the average patient coming from home to the hospital for elective surgery, early postoperative feeding may be an ideal treatment strategy.

INTRODUCTION

Historically, surgeons have followed a strict protocol on when to start their patients on oral diets after major surgery, especially when involving the gastrointestinal tract or abdomen. Almost universally this involved keeping the patient strictly nothing per mouth for at least a couple of days. When the patient began to regain bowel function, usually defined as the passage of flatus or stool, a clear liquid diet was started. When the patient tolerated the clear liquids, a

Alison Saalwachter Schulman, M.D., former surgery resident at the University of Virginia. Robert G. Sawyer, M.D., University of Virginia Health System, Associate Professor, Departments of Surgery and Health Evaluation Sciences, Charlottesville, VA.

full liquid diet, consisting of foods such as oatmeal and pudding, was allowed. When these foods were tolerated, a regular diet was started, and only after being able to consume this, the patient was allowed, finally, to go home. Some people will read this and fondly reminisce about the past, while others will wonder why we are even talking about this in the past tense as it is current practice in their hospitals. This discrepancy leaves us to answer the potentially difficult question of whether or not earlier postoperative feeding is safe.

Presumably, surgeons have always had their patients' best interests in mind. Though largely unsupported in the literature, the traditional postoperative feeding protocol was believed to protect the patient. First, the idea of food passing the fresh anastomosis (in the case of bowel surgery) made surgeons somewhat

anxious. Could the bowel contents or associated peristalsis somehow disrupt the anastomosis? This is a very valid concern given the morbidity associated with an anastomotic leak. Second, with so many patients experiencing an ileus secondary to bowel manipulation and anesthesia, concern existed that the digestive tract would not tolerate the feedings, resulting in nausea, vomiting, and possibly aspiration. Thus, patients eagerly awaited the return of some bowel activity before being allowed to wet their whistles. Nonetheless, anastomotic leaks, prolonged ileus, and nausea still occurred.

As a medical student and later as a surgical resident rounding on patients who had recently undergone abdominal surgery, it became commonplace to discuss this vague "return of bowel function." Daily progress notes always included "advance diet when bowel function returns." What exactly was meant by "return of bowel function" anyway? Naturally, like so many medical terms, this was subject to much interpretation. Some patients were quite hungry and reported much rumbling inside their bellies. Some patients were feeling a little puny and managed only shocked expressions and fast denial of any type of "activity." Every morning each patient was asked if they had passed gas yet. Boy, do you get strange looks when you ask that question at 5 am. Some people, mostly men, would pause, think, and give you a straight up yes or no. Others would turn a little pink and say they were not sure. Some frail yet dignified women would startle with a, "certainly not!" And, of course, every so often someone would look very confused and say, "what?" to which you would reply in a louder voice (invariably waking up the roommate), "have you passed gas yet?" to which they would say, "WHAT?" and you would be forced to yell, "have you farted?" The answer was usually then a simple, "hmm, no, I don't think so." Clearly this was not the most scientific manner in which to assess bowel function.

ASSESSING BOWEL SOUNDS

It would seem that there should be some objective manner of assessing bowel function. Every medical student is taught to start each and every abdominal exam with his or her stethoscope, patiently listening in each quadrant for bowel sounds. The physicians of yesteryear were able to allegedly make diagnoses

based on the character of such sounds. We still learn that high-pitched, tinkling sounds suggest bowel obstruction, for example. However, with the advent and, one could easily say, overuse of computed tomography and other radiographic imaging, the art of listening to bowel sounds has deteriorated into an exercise done for the sake of completeness. Additionally, bowel sounds may or may not be present with either bowel activity or inactivity. Investigators in one early postoperative feeding study found no relation between the presence of bowel sounds and the passage of flatus (1). Looking at this issue from a physiological standpoint, one might expect to hear noise when the bowel musculature made any type of movement. It turns out that the bowel, even in the presence of a prolonged ileus, moves. It is just not effectively moving its contents in an antegrade direction (2). It is possible to hear all kinds of activity, which might merely represent the bowel trying to figure out the direction in which it hopes to propel its contents.

Unfortunately, there seems to be no good manner to accurately assess the true return of bowel function and patients have been left with dry mouths and empty stomachs so that we can do no harm. For many patients this does not pose a significant problem. Many Americans enter the hospital standing to benefit from some weight loss. However, losing 5% of your body weight (3), particularly when your body is undergoing the significant stress of surgery and is depending on good nutrition to aid in wound healing and immune function, is not necessarily what we are trying to achieve. Based on anthropometric measurements, of 200 patients undergoing elective gastrointestinal surgery, 34% had a clinically significant (greater than five percent of body weight) weight loss from the immediate preoperative period until an oral diet was resumed on average about seven days postoperatively (3). In a separate study of 75 patients, almost 90% experienced some weight loss postoperatively (4). Additionally, some patients, particularly those coming in for a cancer-related procedure, are malnourished at presentation and there is no question that immediate postoperative or, in some cases, preoperative specialized nutrition support in the form of parenteral or enteral nutrition can be beneficial (5,6). Why should the same not carry over to patients who can take an oral diet?

LAPAROSCOPIC SURGERY AND EARLY FEEDINGS

With the increasing ability to perform surgeries laparoscopically came the much-touted benefit of earlier feeding postoperatively. Patients undergoing laparoscopic procedures were presumed to have had less surgical trauma and less bowel manipulation and thus were fed earlier than those undergoing open procedures. The criteria for the return of bowel function became less important and more patients were allowed early diets, likely related more to when they felt hungry or wanted to eat. It turns out that they did fine. Some surgeons began to notice that these patients were being treated differently than open procedure patients in the postoperative period yet, in many ways, their surgical experiences had not been that different (7). A study (N = 40) was performed that compared the time to oral intake after laparotomy and laparoscopy-assisted surgery and found no difference between the surgical approaches in tolerating oral intake, incidence of emesis, or use of nasogastric decompression (8). Thus, the idea of early postoperative feeding was born and quickly gained momentum.

EARLY POST-OP FEEDING IN GYNECOLOGY PATIENTS

As surgeons began feeding patients earlier in the postoperative period, they found that the patients had satisfactory outcomes and, in some cases, actually fared better. Several studies were performed, many of these well-executed randomized trials that compared early postoperative feeding to the traditional, waiting for the "return of bowel function," approach (Table 1). Several such studies have been performed in the gynecological surgery population. Steed and colleagues (9), randomized 96 patients undergoing major abdominal surgery to conventional, nothing by mouth until return of bowel function, (defined as presence of bowel sounds, passage of flatus or stool), or a subjective "sensation of hunger" or liquids on the first postoperative day, followed by a regular diet once 500 mL of clear liquids was tolerated. The authors demonstrated a significantly decreased hospital length of stay in the study group. Interestingly, there were no differences noted between the groups in the number of episodes of emesis, ileus, or other postoperative complications includ-

ing infectious complications. A similar trial by Schilder and colleagues (10) confirmed the decreased length of stay, but demonstrated a higher incidence of vomiting in the study group although the authors stated that this was not associated with any adverse outcomes. A randomized controlled trial of 254 gynecological oncologic surgery patients receiving either clear liquids or a regular diet as the first postoperative meal on postoperative day one, failed to demonstrate differences between the two groups in multiple endpoints such as incidence of emesis, infectious morbidity, and operative complications (1). These investigators were also able to start oral pain medications earlier, contributing to more consistent pain relief via less frequent dosing and perhaps an earlier hospital discharge.

EARLY POST OPERATIVE FEEDING IN THE GENERAL SURGERY PATIENT

General surgeons, meanwhile, were performing similar trials. Two studies in which colorectal surgery patients were assigned to early or traditional postoperative feedings showed early feeding to be safe (11,12). Bufo and colleagues (11) also demonstrated a reduced hospital length of stay for those patients receiving early feedings. Another colorectal surgery study involved patients randomized to receive liquids on the first postoperative day followed by a regular diet after 1000 mL had been tolerated or to receive a traditional postoperative feeding course. It was concluded that the early feeding was safe and tolerated, although no reduction in hospital length of stay was demonstrated (13). Similar results were seen in a trial of patients undergoing elective small or large bowel surgery who were randomized to either clear liquids or traditional feedings on the first postoperative day. While almost 80% of the study group patients tolerated the clear liquids, no significant differences were found in rates of emesis, nasogastric tube reinsertion, ileus resolution, length of stay, or overall complications (14). A smaller study of colorectal patients compared a regular diet on the first postoperative day to traditional feedings and found no differences in tolerance and a trend towards a shorter length of stay (15). Finally, a meta-analysis was performed to investigate early postoperative feed-

(continued on page 86)

(continued from page 84)

Table 1
Clinical trials comparing early to traditional postoperative feeding.
Conclusions refer to authors' interpretation of early postoperative feeding.

<i>Lead author</i>	<i>Randomized</i>	<i>N</i>	<i>Type(s) of surgery</i>	<i>Definition of early feeding</i>
Binderow (15)	Yes	64	Colonic or ileal resections	First postoperative morning
Bufo (11)	No	38	Colorectal	Immediately postoperative
Choi (12)	No	41	Colonic resections	Postoperative day (POD) two
Hartsell (13)	Yes	58	Colorectal	POD one
Pearl (1)	Yes	254	Gynecological oncologic	POD one if patient did not have nausea, vomiting, or distention
Reissman (14)	Yes	161	Colon or small bowel	POD one
Schilder (10)	Yes	96	Abdominal gynecological	POD one
Steed (9)	Yes	96	Abdominal gynecological	POD one

POD = Postoperative day.

ing, evaluating studies of both enteral nutrition support and oral feeding. With 11 studies and over 800 patients, the authors were able to conclude that early feeding is not only safe, but also beneficial (16). They found statistically significant decreases in infectious risk and hospital length of stay and also noted a decrease in the rate of anastomotic leaks, wound infections, pneumonia, intra-abdominal abscesses, and mortality for patients fed orally or via tube within 24 hours of gastrointestinal surgery. Because the effects of enteral nutrition support factored into these data, the results are less applicable to the current discussion. It is important to note, though, that a trend towards reduced hospital length of stay was noticed. Earlier patient discharge clearly reduces health care costs.

While the aforementioned studies certainly demonstrate the safety of early postoperative feedings, most of these protocols started patients on a clear liquid diet and only advanced them to a regular diet after the liquids had been tolerated either for a set amount of

time or a set volume of consumption. Another study was performed that randomized abdominal surgery patients to either clear liquids or a regular diet as the first oral intake after surgery. Over 200 patients were included and the investigators found no difference in the tolerance of the two diets (17). Additionally, the patients fed a regular diet had a higher caloric intake.

What is most apparent from these studies is that early postoperative feeding is not only safe but, per some studies (1,11,12,16), beneficial. While most of these studies, as expected, required patients to partake in relatively strict feeding protocols, some allowed patients to have a choice in what they ate and when they ate it. Perhaps allowing patients more control over their intake would allow a smooth transition between the literature and clinical practice. Oftentimes the body knows best when it is safe and comfortable to eat and when this is not the case. Some patients may feel hunger within hours of surgery and be able to quickly tolerate a normal diet. Another patient might

<i>Definition of bowel function</i>	<i>Study groups</i>	<i>Conclusions</i>
Bowel movement without distention, nausea, vomiting	Regular diet versus traditional	Possible to use
Return of bowel sounds or flatus	Regular diet versus another surgeon's patients	Safe and tolerated
Historical controls	Clear liquids POD two and regular diet on POD three versus historical controls	Safe and effective
Resolution of the postoperative ileus	Liquids POD one and regular diet after tolerating 1L in 24hours versus traditional	Safe
N/A	Clear liquid versus regular diet as first postoperative meal	Safe and efficacious
Bowel movement without distention or vomiting	Clear liquids followed by regular diet versus traditional	Safe and tolerated
Bowel sounds, flatus or bowel movement, or subjective hunger (2 of these must be met)	Clear liquid diet POD one and regular diet after tolerating 500mL versus traditional	Safe and effective
Bowel sounds, flatus or bowel movement, or subjective hunger (2 of these must be met)	Clear liquid diet POD one and regular diet after tolerating 500mL versus traditional	Safe

not feel hungry at all. This patient may respond this way because of a complication from their surgery, for example, a leaking anastomosis yet to be identified. Patients subconsciously may better identify the return of bowel function than a physician (particularly those with less experience) listening to bowel sounds, or a "polite" patient being asked by a stranger if she had passed gas. Since it appears that early postoperative feeding of liquids and solids is safe, patients might benefit from having a variety of foods made available if desired.

POST OPERATIVE ILEUS

In order to help patients regain the desire to eat, oftentimes one must try to avoid the development of an ileus. While many physicians advocate early ambulation, this has not been shown to decrease the incidence of ileus (18,19). That being said, early ambulation does decrease the incidence of atelectasis and venous

thromboses while promoting the maintenance of muscle mass and, thus, should always be encouraged. Perhaps, too, the psychological effects of ambulating and thus mimicking a healthier state, will extend to the desire to eat. What is an accepted way to reduce the incidence of ileus is the use of thoracic epidural continuous infusion analgesia, rather than systemic opioids, for pain control (18,20,21). Additionally, food intake may stimulate colonic motility (gastrocolic reflex) in early postoperative patients as it does in healthy controls (22). Finally, Disbrow and colleagues (23) demonstrated that using physiologically active suggestions could shorten the length of the postoperative ileus after abdominal surgery. They randomized patients to receive five minutes of preoperative teaching that either provided specific instructions stressing the return of bowel function or reassurance with non-specific instructions. Patients who received the specific instructions had a significantly shorter time to return of intestinal function and left the hospital ear-

lier, demonstrating that a certain mindset can contribute to a less morbid postoperative course.

While much evidence suggests that early postoperative feeding is safe, some authors express concern. In two separate studies evaluating bowel motor activity following elective abdominal aortic aneurysm repair, investigators found that while there was bowel motor activity within six hours of surgery, this was not coordinated and decreased in intensity from normal controls (2,24). This, along with delayed bowel barium transit time, led one author (24) to conclude that this would lead to a high rate of intolerance of enteral feeding. While these physiological data are important, larger, prospective randomized controlled trials have shown that patients do tolerate early oral nutrition, and in fact it may stimulate the initiation of peristalsis. Additionally, noninvasive monitoring of the stomach following abdominal surgery has failed to demonstrate gross abnormalities in antral myoelectrical and motor activity on the first two postoperative days (25).

CONCLUSIONS

Recent studies support the use of early postoperative feeding even for patients following bowel surgery. Like most medical advances, however, it will take several years before this necessarily becomes the accepted norm. Physicians and surgeons should strongly consider feeding patients earlier after surgery both for patient comfort and, potentially, earlier hospital discharge, ultimately reducing overall hospital costs. ■

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