

Is Early Oral Feeding Safe After Elective Colorectal Surgery?

A Prospective Randomized Trial

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Introduction

The routine use of a nasogastric tube after elective colorectal surgery is no longer mandatory. More recently, early feeding after laparoscopic colectomy has been shown to be safe and well tolerated. Therefore, the aim of our study was to prospectively assess the safety and tolerability of early oral feeding after elective "open" abdominal colorectal operations.

Materials and Methods

All patients who underwent elective laparotomy with either colon or small bowel resection between November 1992 and April 1994 were prospectively randomized to one of the following two groups: group 1: early oral feeding—all patients received a clear liquid diet on the first postoperative day followed by a regular diet as tolerated; group 2: regular feeding—all patients were treated in the "traditional" way, with feeding only after the resolution of their postoperative ileus. The nasogastric tube was removed from all patients in both groups immediately after surgery. The patients were monitored for vomiting, bowel movements, nasogastric tube reinsertion, time of regular diet consumption, complications, and length of hospitalization. The nasogastric tube was reinserted if two or more episodes of vomiting of more than 100 mL occurred in the absence of bowel movement. Ileus was considered resolved after a bowel movement in the absence of abdominal distention or vomiting.

Results

One hundred sixty-one consecutive patients were studied, 80 patients in group 1 (34 males and 46 females, mean age 51 years [range 16-82 years]), and 81 patients in group 2 (43 males and 38 females, mean age 56 years [range 20-90 years]). Sixty-three patients (79%) in the early feeding group tolerated the early feeding schedule and were advanced to regular diet within the next 24 to 48 hours. There were no significant differences between the early and regular feeding groups in the rate of vomiting (21% vs. 14%), nasogastric tube reinsertion (11% vs. 10%), length of ileus (3.8 ± 0.1 days vs. 4.1 ± 0.1 days), length of hospitalization (6.2 ± 0.2 days vs. 6.8 ± 0.2 days), or overall complications (7.5% vs. 6.1%), respectively, ($p = \text{NS}$ for all). However, the patients in the early feeding group tolerated a regular diet significantly earlier than did the patients in the regular feeding group (2.6 ± 0.1 days vs. 5 ± 0.1 days; $p < 0.001$).

Conclusion

Early oral feeding after elective colorectal surgery is safe and can be tolerated by the majority of patients. Thus, it may become a routine feature of postoperative management in these patients.

Adequate nutrition has always been a major goal of postoperative care. However, because of ileus, early oral feeding after abdominal surgery usually is avoided and routine nasogastric decompression has been used.¹ More recent studies showed that the routine use of a nasogastric tube after elective abdominal surgery²⁻⁴ and colorectal surgery⁵⁻⁷ may not be necessary. Regardless of the use of a nasogastric tube, oral feeding has been delayed until after the resolution of postoperative ileus.²⁻⁷ Recently, with the increased popularity of laparoscopic surgery, several authors showed that early feeding after laparoscopic colectomy is safe and tolerated by the majority of patients.⁸⁻¹³ Other studies clearly showed the advantages of early enteral nutrition in surgical patients in reducing septic complications and overall morbidity when compared with parenteral nutrition.¹⁴⁻¹⁷ Therefore, the aim of this study was to prospectively assess the safety, tolerability, and outcome of early oral feeding after elective abdominal colorectal procedures.

MATERIALS AND METHODS

All consecutive patients who underwent elective laparotomy with bowel resection between November 1992 and April 1994 were prospectively randomized into one of the following two study groups:

1. Group 1. Patients in the early feeding group began a clear liquid diet on the first postoperative day and advanced to a regular diet within the next 24 to 48 hours, as tolerated (absence of vomiting or abdominal distention).
2. Group 2. Patients in the regular feeding group were managed in the traditional way—nothing by mouth until the resolution of the ileus, then a clear liquid diet, followed by a regular diet as described for group 1.

Patients who underwent emergency laparotomy or any laparoscopic procedures were excluded from this study. All of the patients had their nasogastric tubes removed immediately after surgery and were monitored for vomiting, abdominal distention, length of ileus, tolerance of regular diet, length of hospitalization, and complications. The nasogastric tube was reinserted after two episodes of vomiting of more than 100 mL over 24 hours in the absence of bowel movements. The resolution of postoperative ileus was defined as having a bowel movement in the absence of abdominal distention and vomiting. The same criteria for discharge were used in

Table 1. SURGICAL PROCEDURES

	Group 1: Early Feeding	Group 2: Regular Feeding
Segmental colonic, rectal or small bowel resection	46	50
Restorative proctocolectomy with ileoanal pouch	17	7
Stoma closure	13	19
Total proctocolectomy	4	3
Stoma creation	0	2
Total	80	81

both groups and included tolerance of regular diet and bowel movements. The patients in both groups were discharged home only after they had had a bowel movement and were tolerating regular diet for at least 24 hours. Postoperative pain management was similar in both groups and included a patient-controlled analgesic intravenous pump with meperidine hydrochloride 1 mg/mL solution 300 mg to 400 mg/24 hours for 48 to 72 hours, followed by intramuscular meperidine 50 mg to 100 mg or administration of propoxyphene napsylate (100 mg by mouth) combined with acetaminophen (650 mg) 4 to 6 times daily. Statistical analysis included Fisher's exact test, and paired t test (InStat, Graphpad Software Inc., San Diego, CA, 1993) with a p value of less than 0.05 considered significant. Values were calculated as mean and standard error of mean.

RESULTS

Between November 1992 and April 1994, 161 consecutive patients were studied. Group 1 (early feeding) included 80 patients, 34 males and 46 females, with a mean age of 51 years (range 16–82 years), and group 2 (regular feeding) was comprised of 81 patients, 43 males and 38 females, with a mean age of 56 years (range 20–90 years). The groups were matched for surgical procedures as shown in Table 1; the results are shown in Table 2. The majority of the patients in group 1 (79%) tolerated the early feeding schedule. Vomiting was more common in this group (21% vs. 14%, respectively) but this difference was not statistically significant. There were no significant differences in the rates of nasogastric tube reinsertion (11% vs. 10%), length of ileus (3.8 ± 0.1 vs. 4.1 ± 0.1), length of hospitalization (6.2 ± 0.2 vs. 6.8 ± 0.2), or complications (7.5% vs. 6.1%) ($p > 0.05$). However, the regular diet was tolerated by patients in the early feeding group significantly earlier than those in the regular feeding group (2.6 ± 0.1 vs. 5 ± 0.1 ; $p < 0.001$).

The morbidity is shown in Table 3. There was no sig-

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Table 2. COMPARISON OF RESULTS AFTER EARLY AND REGULAR POSTOPERATIVE FEEDING

	Early Feeding	Regular Feeding	p Value
Tolerated early feeding	79%	—	
Vomiting	21%	14%	>0.05
Nasogastric tube reinsertion	11%	10%	>0.05
Resolution of ileus (days, range)	3.8 ± 0.1 (1–8)	4.1 ± 0.1 (1–9)	>0.05
First meal ingestion (days, range)	2.6 ± 0.1 (2–8)	5 ± 0.1 (2–10)	<0.001
Length of hospital stay (days, range)	6.2 ± 0.2 (2–12)	6.8 ± 0.2 (3–12)	>0.05

nificant difference in overall morbidity rate between the groups (7.5% vs. 6.1%, respectively) and there was no mortality in either group. None of the patients in the early feeding group had pulmonary complications, and the single anastomotic leak occurred in the regular feeding group in a patient with Crohn's disease who underwent an ileocolic resection.

DISCUSSION

The historic myth of mandatory routine nasogastric tube decompression after abdominal and colorectal surgery already has been refuted.²⁻⁷ In a recent survey of the members of the American Society of Colon and Rectal Surgeons, only 30% still routinely use nasogastric tubes.¹⁸ This study is challenging another traditional dictum of feeding patients after colonic or bowel resection only after the resolution of their postoperative ileus. Although it has not been prospectively studied, this dictum was based on the assumption that oral feeding (liquids or solids) may not be tolerated in the presence of ileus and may also put at risk the recently constructed intestinal anastomosis. However, small intestinal motility followed by gastric motility has been shown to return earlier than colonic motility.¹⁹⁻²¹ The present study questions the need to postpone oral feeding until after the resolution of colonic ileus. As was shown, the majority of patients who were fed earlier tolerated the gradual dietary advancement (liquids followed by solids) before their first postoperative bowel movement. These patients tolerated a regular diet at a mean of 2.6 days after surgery, whereas their ileus resolved completely only 3.8 days after surgery. The early feeding did not affect the length of ileus, which was similar in both groups (3.8 and 4.1 days, respectively). The fact that the patients in the early feeding group tolerated a regular diet significantly earlier than the patients in the regular feeding group (2.6 days

vs. 5 days, respectively) may be related to the earlier resolution of gastric and intestinal ileus, whereas colonic motility was still absent. Another safety issue relates to the potential for pulmonary complications after vomiting. In theory, early oral intake could be associated with a higher incidence of pneumonia because of aspiration during attempts to force oral intake against an ileus. However, to the contrary, the early postoperative pulmonary complication occurred in a patient in group 2.

The safety of early oral feeding after laparoscopic colorectal procedures was reported by several authors.^{8-10,13} Because of the minimally invasive technique, laparoscopic enthusiasts believed it may reduce the postoperative ileus and, therefore, advocated early feeding. However, this feeling was not confirmed by others.²²⁻²⁴ In a recent study in which laparoscopic and open colorectal procedures were compared, no differences in the length of postoperative ileus or tolerance of diet were noted.²⁵

Although one of the potential advantages of early postoperative feeding is shorter hospital stay, this feature was not demonstrated in the present study because both groups of patients were kept in the hospital until their ileus completely resolved and they tolerated regular diet for 24 hours. Because the early feeding did not significantly shorten the length of ileus, it also did not significantly shorten the length of hospitalization, which was only 0.6 days shorter in the early feeding group. This length of hospitalization advantage was not as profound as it may have been at other centers because early discharge is routinely practiced at Cleveland Clinic Florida. This approach differs from that noted at other centers where the mean length of stay after colorectal surgery ranges from 11 to 14 days.^{26,27}

Even in the laparoscopic setting, although the majority of patients have been fed relatively early, the overall length of hospitalization has not been impressively short. In a collective series from the literature of 506 patients who underwent laparoscopic colectomy, the mean hospital stay was 6.8 days (Table 4).^{9-11,13,24,28-39} This length of hospitalization was similar to that noted in group 2 and 0.6 days longer than that seen in group 1.

Based on this study, the criteria for discharge of pa-

Table 3. COMPLICATIONS

Early Feeding	No.	Regular Feeding	No.
Pelvic abscess	1	Pelvic abscess	1
Intestinal obstruction	1	Pneumonia	1
Urinary tract infection	2	Anastomotic leak	1
Wound infection	2	Urinary tract infection	1
		Wound infection	1
Total	6 (7.5%)		5 (6.1%)

Table 4. MEAN LENGTH OF HOSPITALIZATION AFTER LAPAROSCOPIC COLECTOMY

Author	No. of Patients	Mean Hospitalization (Days)
Lointier ²⁸	6	10
Milsom ²⁹	9	7
Tate ³⁰	11	12.3
Van Ye ³¹	14	9.1
Corbitt ¹⁰	17	4.0
Vara-Thorbeck ³²	18	7.6
Larach ²⁴	18	8.4
Franklin ³³	19	7.4
Quattliebaum ³⁴	20	4.4
Scoggin ³⁵	20	5
Peters ³⁶	24	4.8
Musser ³⁷	24	8.5
Etienne ³⁸	35	9
Senagore ³⁹	38	7
Monson ²⁷	40	8
Phillips ⁹	51	4.6
Zucker ¹³	65	4.4
Wexner ¹¹	74	7
Total	506	6.8
Present study (open colorectal procedures)		
Regular feeding	81	6.8
Early feeding	80	6.2

tients after elective open colorectal procedures may be questioned. Because the majority of patients did tolerate the early feeding schedule with regular diet at a mean of 2.6 days after surgery, they could have been discharged to await the first bowel movement while at home. With the continuous increase in medical care cost, this approach may prove to be both safe and beneficial. An even more extreme approach was recently advocated after laparoscopic colectomy, in which patients were discharged on a liquid diet with instructions to advance their diet at home as tolerated.⁴⁰ Finally, another potential advantage, although difficult for quantitative measurement, is the feeling of well-being of the patients who are orally fed. The positive psychological impact of feeding after surgery may have an important role in the recovery process.

Thus, early oral intake after elective abdominal colorectal surgery is safe and can be tolerated by the majority of the patients. It may become a routine feature of management after elective colorectal surgery.

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