

Early Feeding is Effective in Reduction of Postoperative Ileus after Open Bowel Surgery

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The effects of early feeding for postoperative ileus remain unclear. We evaluated whether the early feeding is safe and feasible in Japanese patients after open bowel resection, and whether early feeding can enhance the resolution of postoperative ileus. An early feeding protocol was applied to 23 patients (Group 1). As a control, we reviewed the charts of 25 consecutive patients who were operated on just before the protocol and whose diet was started by traditional methods (Group 2). Daily examination and interviews of patients were performed. The majority of the patients in Group 1 (87.0%) tolerated the early feeding. There were no major complications or mortality that was related to early postoperative feeding. There was a significant difference between Group 1 and Group 2 in the distributions of the time to passage of flatus (median 2 vs. 3 days, $p=0.002$), the time of the first bowel movement (median 3 vs. 5 days, $p=0.001$), and the length of postoperative hospital stay (median 15 vs. 22 days, $p<0.0001$). There was no significant difference in the frequency of postoperative complications between the groups ($p=0.44$). Early postoperative feeding protocol is safe and feasible for patients who are required colorectal surgery. Early feeding may promote the early resolution of postoperative ileus.

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Introduction

In last decade, postoperative management has been changed. Recent studies showed the safety and feasibility of early postoperative oral feeding after colorectal surgery.^{1,7} Nevertheless, the feasibility of the early feeding protocol for patients has been justified by only a few reports.⁸ The length of postoperative hospitalization after bowel surgery is longer in Japan than in Western countries because of various reasons, such as Japanese traditional management of oral intake after colorectal surgery, medical system and insurance system.

Traditional recommendations of postoperative feeding include the use of nasogastric tubes and advancing postoperative feeding after the resolution of ileus. However, routine use of nasogastric tubes after elective surgery is not indicated^{9,10} and does not reduce postoperative ileus. In a recent review of randomized clinical trials assessing the effect of early feeding on postoperative ileus, the ileus-reducing effect of early postoperative feeding was minimal and probably not of clinical significance.¹¹

This study was designed to examine whether early postoperative oral feeding can be effectively and safely applied to patients after open bowel resection. Furthermore, we evaluated whether early feed-

ing can enhance the resolution of postoperative ileus.

Subjects and Methods

From May 2002 to December 2002, an early postoperative feeding protocol was conducted at our department in 30 Japanese patients (Group 1) who underwent elective laparotomy with bowel resection. The protocol consisted of nasogastric tube removal with extubation. On postoperative day (POD) 2, clear liquid diet was started dependent on the presence of bowel sounds, and the absence of abdominal distension, nausea or vomiting. On POD 3, the diet was advanced to regular as tolerated. As a control group, we reviewed the charts of 33 consecutive patients with open bowel resections performed from October 2001 to April 2002. This was immediately before the initiation of the early feeding protocol (Group 2). These patients were treated in a traditional method of the routine use of nasogastric tube after surgery. The typical traditional management after surgery is as follows: the nasogastric tube is removed on POD 1; and water intake is allowed after the passage of flatus and/or bowel movement. Then a liquid diet is started on POD 5-7, with gradual increase to a regular

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diet over a period of 5 to 10 days.

All patients had a preoperative mechanical bowel preparation and oral antibiotics for one day before operation, along with perioperative intravenous antibiotics until POD 1 in Group 1 and until POD 3 in Group 2. The same two surgeons (SM, KK) performed surgical procedures, with occasional assistance from a resident in training. General anesthesia, supplemented with epidural anesthesia was used in both groups. The epidural local anesthesia was continued for analgesia without opioid for 3 to 5 days, postoperatively. Postoperative early assistance to mobilization was offered to all patients. Nasogastric tube was inserted postoperatively for patients who vomited twice in a 24-hour period. Daily examination and interviews of patients were performed with attention paid to bowel sounds, flatus, bowel movement, vomiting and tolerance of diet. Patients were discharged after they had a bowel movement and when they were able to ambulate without difficulty.

Difference in the frequency between the two groups was tested by Fisher's exact test and difference in the distribution of continuous variates such as time between the two groups was tested by Wilcoxon rank-sum test.

Results

In Group 1, 7 patients were excluded from the study: 3 patients did not have a preoperative bowel preparation because of preoperative ileus due to primary obstructive lesion and/or nasogastric tube; 3 patients had combined surgery (1 gynecologic surgery, 1 nephrectomy, and 1 abdominal wall resection); and 1 patient had total proctocolectomy for ulcerative colitis. In Group 2, 8 patients were excluded from the study: 5 patients did not have a preoperative bowel preparation; and 3 patients had combined surgery (1 gynecologic surgery, 1 total gastrectomy, and 1 pancreato-duodenectomy). Therefore, 23 patients in Group 1 and 25 patients in Group 2 were evaluated.

The age of subjects in Group 1 including 12 males and 11 females varied from 21-90 years with the quartiles of (47, 66, 74) years, while that in Group 2 including 14 males and 11 females varied from 53-87 years with the quartiles of (62, 69, 73) years, but there was no significant difference in the age distribution between the groups ($p=0.17$). There was also no significant difference between the groups in the distribution of surgical procedure type ($p=0.27$), the length of surgery ($p=0.50$) or the length of anesthesia ($p=0.67$) (Table 1).

Out of 23 patients of Group 1, 20 (87.0%) tolerated the early postoperative feeding protocol. Table 2 presents clinical features of patients in the two groups. There was no significant difference between the two groups in the frequency of vomiting or nasogastric tube re-insertion. Liquid diet was started significantly earlier in Group 1 than in Group 2 ($p<0.0001$). The time to passage of flatus was significantly earlier in Group 1 than in Group 2 ($p=0.002$), and the postoperative time to the first bowel movement was also significantly shorter in Group 1 than in Group 2 ($p=0.001$). The time from surgery to discharge was also significantly shorter in Group 1 than in Group 2 ($p<0.0001$).

There was no mortality in either group. Complications related to

colorectal surgery were observed in 5 (21.7%) patients of Group 1 and 7 (28.0%) patients of Group 2, but the frequency did not significantly differ between the two groups ($p=0.74$). The breakdown of complications is presented in Table 3; none in Group 1 had anastomotic leak.

Table 1. Surgical findings in patients by group

Item	Group 1 (n=23)	Group 2 (n=25)
Surgical Procedures		
Segmental colonic or small bowel resection	15 ^a	10
Low anterior resection	7	12
Abdomino-perineal resection	1	3
Operation time (hours)	(2.6, 3.8, 4.6) ^b 1.5-6.5 ^c	(3.0, 3.3, 4.1) 0.9-7.7
Anesthesia time (hours)	(4.0, 5.5, 6.3) 3.1-9.6	(4.2, 5.2, 6.1) 1.7-9.4

^aNumber of patients.

^bEach triplet gives the sample quartiles, i.e., the 25th, 50th and 75th percentiles.

^cMinimum-Maximum.

Table 2. Postoperative clinical features by group

Item	Group 1 (n=23)	Group 2 (n=25)	<i>p</i> -value ^d
Vomiting	3 (13.0) ^a	1 (4.0)	0.26
Nasogastric tube insertion	1 (4.3)	1 (4.0)	0.90
Time to start liquid diet (days)	(2, 2, 3) ^b 2-4 ^c	(5, 6, 7) 4-8	<0.0001
Time to the first flatus (days)	(2, 2, 3) 1-5	(3, 3, 4) 1-5	0.002
Time to the first bowel movement (days)	(2, 3, 4) 1-6	(4, 5, 6) 2-10	0.001
Hospital stay after surgery (days)	(12, 15, 20) 8-96	(21, 22, 25) 16-74	<0.0001

^aNumber of patients (percentage in parentheses).

^bEach triplet gives the sample quartiles, i.e., the 25th, 50th and 75th percentiles.

^cMinimum-Maximum.

^dThe first two were by Fisher's exact test and the rests were by Wilcoxon rank-sum test.

Table 3. Number of patients by complication related to colorectal surgery and group

Complication	Group 1	Group 2
Pelvic abscess	0	1
Wound infection	1	1
Pneumonia	1	1
Atelectasis	2	1
Small bowel obstruction	1	1
Anastomotic leak	0	2
All	5	7

Discussion

In this study, the protocol was employed as clear liquid diet starting POD 1 depending on patient's physical status and symptoms. Although the time to start of liquid diet was significantly earlier in Group 1 than Group 2, a large portion of the patients (87.0%) in Group 1 tolerated the early postoperative oral feeding, and the frequency of vomiting and nasogastric tube re-insertion was similar to that in Group 2. Our early postoperative feeding protocol was considered permissible in tolerating diet, and the frequency of vomiting and re-insertion of nasogastric tube as compared to traditional methods.

Recent improvements in anesthetic and surgical techniques have facilitated substantial reductions in convalescence and hospital stay after major surgical procedures. Although the definitions about the resolution of postoperative ileus were different, some studies have described that the early feeding did not affect the length of postoperative ileus.^{1,2,7} However, the effects of feeding in these studies may have been masked by concomitant systemic analgesia counteracting a potential benefit of early feeding.¹² Although the present study was not a randomized trial, the results of the study indicating a significant reduction in time to both passage of flatus and the first bowel movement in Group 1 suggest that the early postoperative oral feeding will promote the resolution of ileus.

To minimize the frequency of postoperative infectious complications, we employed preoperative oral antibiotics bowel preparation and perioperative intravenous antibiotics protocol. Although Group 1 patients have administered perioperative intravenous antibiotics for 2 days, complications related to infection were similar to Group 2 patients who have been administered perioperative intravenous antibiotics for 4 days, suggesting the safety as well as the cost-effectiveness of the protocol for Group 1.

There were no major complications or mortality related to early postoperative oral feeding. These results are similar to published frequencies of complication after elective open surgery.^{13,14} Two patients (each in Groups 1 and 2) developed small bowel obstruction before discharge and required re-operation due to both adhesional ileus and long hospitalization. The small bowel obstruction in the patient in

Group 1 was caused by surgery itself and was not related with the early oral feeding protocol. Although the length of postoperative stay in Group 1 (median-15 days) was longer than that in Western studies (4 to 6 days),^{1-3,9-11} our protocol will be well tolerated and will shorten the length of hospital stay in Japanese patients.

In conclusion, the early postoperative feeding protocol is safe and feasible for patients undergoing colorectal surgery. Moreover, early feeding may be effective in the reduction of postoperative ileus after open bowel resection.

References

1. Reissman P, Teoh TA, Cohen SM, Weiss EG, Noguera JJ, Wexner SD. Is early oral feeding safe after elective colorectal surgery? A prospective randomized trial. *Ann Surg* 222: 73-77, 1995
2. Binderow SR, Cohen SM, Wexner SD, Noguera JJ. Must early postoperative oral intake be limited to laparoscopy? *Dis Colon Rectum* 37: 584-39, 1994
3. Fronzo LA, Cymerman J, O'Connell TX. Factors affecting early postoperative feeding following elective open colon resection. *Arch Surg* 134: 941-946, 1999
4. Choi J, O'Connell TX. Safe and effective early postoperative feeding and hospital discharge after open colon resection. *Am Surg* 62: 853-856, 1996
5. Bufo AJ, Feldman S, Daniel GA, Lieberman RC. Early postoperative feeding. *Dis Colon Rectum* 37: 1260-1265, 1994
6. Petrelli NJ, Cheng C, Driscoll D, Rodriguez-Bigas MA. Early postoperative oral feeding after colectomy: An analysis of factors that may predict failure. *Ann Surg Oncol* 8: 796-800, 2001
7. Ortiz H, Armendariz P, Yarnoz C. Is early postoperative feeding in elective colon and rectal surgery? *Int J Colorect Dis* 11: 119-121, 1996
8. Kawamura YJ, Uchida H, Watanabe T, Nagawa H. Early feeding after oncological colorectal surgery in Japanese patients. *J Gastroenterol* 35: 524-527, 2000
9. Sagar PM, Kruegener G, MacFie J. Nasogastric intubation and elective abdominal surgery. *Br J Surg* 79: 1127-1131, 1992
10. Cheatham ML, Chapman WC, Key SP, Sawyers JL. A meta-analysis of selective versus routine nasogastric decompression after elective laparotomy. *Ann Surg* 221: 469-478, 1995
11. Holte K, Kehlet H. Postoperative ileus: a preventable event. *Br J Surg* 87: 1480-1493, 2000
12. Carli F, Trudel JL, Belliveau P. The effect of intraoperative thoracic epidural anesthesia and postoperative analgesia on bowel function after colorectal surgery. A prospective, randomized trial. *Dis Colon Rectum* 44: 1083-1089, 2001
13. Delaney CP, Zutshi M, Senagore AJ, Remzi FH, Hammel J, Fazio VW. Prospective, randomized, controlled trial between a pathway of controlled rehabilitation with early ambulation and diet and traditional postoperative care after laparotomy and intestinal resection. *Dis Colon Rectum* 46: 851-859, 2003
14. DiFronzo LA, Yamin N, Patel K, O'Connell TX. Benefits of early feeding and early hospital discharge in elderly patients undergoing open colon resection. *J Am Coll Surg* 197: 747-752, 2003