

ORIGINAL RESEARCH

Early vs. delayed oral feeding after colorectal surgeries, a clinical trial

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Abstract

Background: The start of oral nutrition after colorectal surgery has always been an issue of debate. There is a long-standing practice of beginning oral feeding 4-5 days after surgery. However, in recent years a number of surgeons have questioned this method and in fact, have begun ordering immediate oral nutrition for their postoperative patients. The current article presents the findings of a clinical trial study, which compared the early and delayed start of oral feeding after colorectal surgery.

Materials and Methods: The present clinical trial recruited 52 patients undergoing colorectal anastomosis and divided these subjects into two groups. In the control group, oral feeding started 4-5 days after the operation. In contrast, the study group commenced oral nutrition soon after surgery. The outcomes for both groups were measured in terms of demographic data, anastomotic leakage rate, nausea and vomiting, the start of bowel movements, and complications.

Results: The two patient groups did not differ in their rates of ileus and diet intolerance ($p=1$). As for the factors of nausea and vomiting, there were no observed statistically significant differences between the study and control groups ($p=0.1$). The most critical outcome of the early and late start feeding groups was anastomotic leakage, for which there was no significant difference to report. The length of hospital stay was significantly shorter in the early feeding study group (3.56 days) than in the delayed feeding control group (7.36 days) ($p<0.001$). Defecation among patients receiving early oral nutrition was 2.8 days on the average, but 4.91 days among the control group patients, a statistically important difference ($p<0.004$).

Conclusion: While the early start of oral nutrition after colorectal surgery resection and anastomosis does not raise postoperative risks and mortality; it does reduce postoperative complications, the length of hospital stay, and final health care costs. As a result, early feeding after surgery can be considered as a viable alternative to delayed feeding.

Keywords: Oral feeding; Early, Delay; Colorectal anastomosis

Introduction

After a colorectal resection and anastomosis, there is a concern that the early start of oral feeding may be detrimental to patients. Due to the serious risks and complications of colorectal anastomotic leakage, surgeons are hesitant to begin oral feeding soon after surgery. As a result, patients are routinely kept on NPO an additional 4-5 days after the operation (1, 2) and only begin oral feeding once it is certain there is no leakage. Defying standard practice by their initiation of feeding immediately after surgery, Sagar et al., in 1979, reported good results in reducing hospital stays and improving metabolic status (2). After resection and anastomosis in upper GI surgeries and before the start of oral feeding, many centers perform a water-soluble contrast study to detect leakage. If none is found, a diet is begun (3, 4). This modality, however, is not applicable in colorectal anastomoses and so is not recommended. Surgeons, therefore, have two options in regard to the start of feeding after colorectal resection and anastomosis: either with a post-surgery delay of 4-5 days or the day after the operation. Each of these has its advantages and disadvantages, which the current article evaluates (5-8). Although some research has been carried out on this subject, there is still debate over which method should be considered as standard. As a regular practice, a number of centers continue to delay feeding while others do not. A related issue that has not yet received much attention is the overall costs incurred by either method. The present clinical trial addresses this factor along with the benefits and drawbacks of post-surgery early oral nutrition and delayed feeding.

Materials and Methods

This is a randomized ([1:1] balanced block randomization), single-blind, parallel-group clinical trial conducted at Birjand University of Medical Sciences in South Khorasan, Iran. The study has been assigned Registration Number IRCT20111211008375N15 by the Centre of Clinical Trials. It has complied with the guidelines of the Consolidated Standard of Reporting Trials (CONSORT) and was funded by Birjand University of Medical Sciences.

The present study's eligibility criteria were patients requiring a type of colectomy (partial or total) and whose age was between 25-55 years. The exclusion criteria consisted of: (1) diabetics, (2) patients with other specific diseases, (3) drug abusers, (4) patients suffering from malnutrition and cachexia, and (5) patients diagnosed with inflammation or peritonitis. The number of study patients totalled 52 and these were randomly divided into two groups of 26.

The current study was conducted from 2017 to 2018 in the general surgery ward of Birjand University of Medical Sciences. Patients underwent preoperative evaluation by an anesthesiologist. On the day before surgery, patients were prescribed laxative syrup in the morning and underwent a mechanical colon preparation in the evening. The patients were only given a refined liquid diet and then were on NPO that night. The next morning, they were transferred to the operating room and underwent a laparotomy in the supine position. According to the standard procedure performed for colorectal surgery, a complete or partial colectomy and anastomosis was performed with the one-layer Gambee technique (3-0 silk sutures). A drain was not utilized for any of the patients.

After fully awakening, the patients were transferred to the surgical ward and divided into one control and one study group. NG tubes were not utilized for any patients, as this is not routinely done in the ward. According to the standard method, patients in the delayed feeding control group were subjected to NPO for 3-5 days. When the patients established intestinal function, excreted feces, and exhibited no symptoms of anastomotic leakage (abdominal pain, distention, fever, nausea, and vomiting), they were given a fluid diet. The next day, a normal diet was started if it could be tolerated. The next day, if their condition was stable, control group patients could be discharged (usually on Day 7-9). As for the patients in the early feeding study group, they were first put on a liquid diet the morning after the operation. That evening, a normal diet would start and continue through the next day. On the following day (Day 3), the study group patients were usually discharged. Patients would be put on NPO if, at any time, vital signs were unstable or there were symptoms of intolerance to the diet. After discharge, all

patients were told to immediately notify the surgeon if any symptoms of intra-abdominal sepsis or anastomotic leakage were observed (abdominal pain, nausea, vomiting, and general toxicity).

Patient selection was determined by the patient's diagnosis and need for a colectomy and eligibility for the present trial study (Figure 1). Randomization was performed by balanced block randomization with a 1:1 allocation employing a random block size of 4. Blinding was not necessary for this investigation.

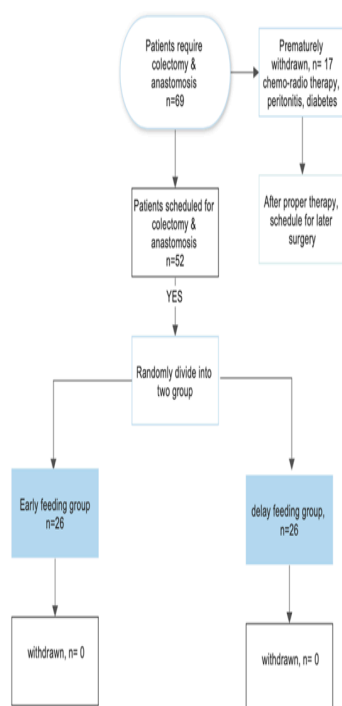


Figure 1 : Flowchart of patients in this study

Statistical analysis

SPSS version 22 performed the analyses and the independent t-test compared the continuous variables. A p-value of <0.05 was considered statistically significant.

Ethical considerations

The current study's procedure was entirely explained to all participants and consent forms were obtained. The study was also granted an ethics code by the Ethics Committee of Birjand University of Medical Sciences.

Conflict of interest and funding source

The present research does not pose any conflict of interest. Its source of funding is the

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Results

As shown in Table 1, there is no significant difference in the patients' demographic data (age, sex, and BMI). When comparing the results of both the control and study groups, the present work found that their rates of ileus and diet intolerance did not differ ($p=1$). Nausea and vomiting were other factors evaluated in both groups and there were no observed statistically significant differences between them ($p=0.1$). In regard to patient prognosis, the most critical factor was anastomotic leakage. Since only one patient (in the early feeding control group) experienced leakage, there was no significant difference to report between the two groups. The hospital length of stay was significantly shorter in the delayed feeding study group (3.56 days) than in the control group (7.36 days) ($p<0.001$). Defecation among patients in the early feeding study group was 2.8 days on the average, but 4.91 days among control group patients, a statistically important difference ($p<0.004$).

Table 1: Demographic data of patients

	Control group (N=25)	Investigation group (N=25)	P value
Gender			
F	13 (52%)	14 (56%)	1
M	12 (48%)	11 (44%)	
Age (years)	51.56±7.45	49.08±8.76	0.28

Table 2: Post operative complications

	Control group (N=25)	Investigation group (N=25)	P value
Ileus	3 (12%)	4 (16%)	1
Nausea and vomiting	9 (36%)	8 (32%)	1
Anastomosis leakage	1 (4%)	0 (0%)	1

Table 3: Hospital stay and defecation

	Control group (N=25)	Investigation group (N=25)	P value
Hospital stay	7.36±1.07	3.64±0.7	0.001>*
defecation	4.96±1.13	2.8±1.19	0.001>*

*Statistically significant

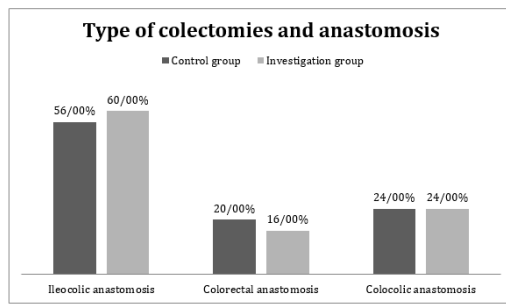


Figure 3: Comparison of operation type in two groups

Discussion

After GI tract resection and anastomosis, the two main clinical factors determining the start of oral feeding are defecation and the passing of gas. These two usually take a few days after surgery to establish and yet many surgeons still keep patients on NPO and in the hospital. In recent years, a number of surgeons have begun feeding very soon after surgery, even the same day of surgery. By dividing its patients into early and late start feeding groups, the present research could evaluate the benefits and drawbacks of these practices.

Length of hospital stay

One of the main components of any clinical study conducted in a hospital setting is the possibility of reducing the length of hospital stay. In the current work, the hospital stay of the early feeding (study) group was 3.56 days, while it was 7.36 days for the late feeding (control) group. This statistically significant difference translated into many benefits as well. The final hospital costs and bed occupancy rate decreased by 58% and 45%, respectively. Although the incidence of long term hospitalization was not specifically addressed by the present paper, there have been several studies reporting on the many benefits to patients from shorter hospital stays: (1) reduction in the final cost of the stay, (2) lower incidence of infectious complications (urinary tract infection, pneumonia, and intravenous catheter infections), (3) decrease in the prevalence of DVT and PTE, and (4) mitigation of the psychological and emotional effects of long term admission (8-11).

Nausea and vomiting

In the present study, 75% of the patients in both groups tolerated the start of feeding. Of the patients in the early start group, three (11%) required insertion of an NG tube and

four (15%) in the late start group. In this regard, there was no statistically significant difference between the two groups. The frequency of nausea and vomiting among early and late start feeding patients was 21% and 25%, respectively. In their meta-analysis on 2,307 cases from 26 studies, Funa Yanget al. concluded that, compared to late postoperative feeding, early feeding is more effective in increasing serum albumin and prealbumin, thus leading to faster recovery of gastrointestinal function, better food tolerance, and a shorter hospital stay, especially for colon cancer patients (12). The 436-case study by Sarah B. Jochum et al. reported a significant reduction in the length of hospital stay, hospital costs, and 30-day morbidity rate for its early feeding group and no significant difference, in terms of adverse events and complications, between its study and control groups (7). Nematihonar et al. found that 93% of their patients tolerated early feeding, with no observed increase in early feeding outcomes, such as nausea, vomiting, distension, and systemic complications (8). Reissman et al. observed that 79% of patients tolerated early feeding. In their early and delayed feeding groups, the vomiting rate was 21% and 14% respectively (13). Another study witnessed a tolerance for an oral diet in 86% of its patients (a range of 73% to 100%) (14). In a similar study, Ortiz et al. reported a vomiting rate of 21.5% in the early feeding group which exceeded that of the traditional feeding group (15).

Anastomotic leakage

After resection and intestinal anastomosis, surgeons are most concerned about anastomotic leakage. The present study reported no cases of this in its early feeding study group as opposed to one patient in the late feeding control group, which is not statistically significant. In the early and late feeding groups of the Abid et al. study (5), leakage was seen in 3.57% and 32.1% of patients, respectively ($P=0.012$). Marvah et al. (16) observed 8% and 12% anastomotic leakage among patients in their early start and late start feeding groups, respectively. Another study showed a 20% versus 23% occurrence of anastomotic leakage in its early feeding group versus delayed feeding group, respectively (17).

As for the post surgery complication rate (e.g. bleeding, ileus, anastomotic leakage, SSI, and readmission), Fabian Grass et al. reported a significantly lower rate for its early feeding group in comparison to its late feeding group (18). In Sarah B. Jochum et al.'s 436-case study, there was no significant difference between early nutrition and delayed nutrition methods in regard to anastomotic leakage and serious complications (7). The research on 108 intestinal anastomosis patients by Nematihonar et al. concluded that there was no significant effect on anastomotic leakage by either early oral feeding or traditionally late oral feeding (19).

Defecation

In the current study, the first bowel movement after surgery was statistically significantly sooner for the early feeding study group than for the delayed feeding control group, thus indicating higher tolerance and the absence of gastrointestinal complications. The results of another clinical study showed a statistically significant difference in the time of the first defecation, which was 3.2 ± 0.59 days in the early oral feeding group versus 3.6 ± 0.66 days in the traditional oral feeding group ($p = 0.006$) (19). In Consoli et al.'s study, the first flatus passage was statistically earlier among the early feeding patients ($p < 0.05$) (10). The research by Ayman El Nakeeb et al. observed that the first defecation was significantly sooner in the early feeding group (postoperative day 4.1 ± 1.2) than in the later feeding group (postoperative day 4.9 ± 1.2 , P -value 0.005) (11). Da Fonseca LM et al. reported that the first flatus passage after elective colon surgery occurred significantly

earlier among patients in the early start feeding group ($1.5 [\pm 0.5]$ versus $2.0 [\pm 0.7]$ days; $p = 0.019$) (20).

Although the current work has not discussed the effects of metabolism and the strengthening of the immune system by early oral nutrition, many articles have reported on the effectiveness of early feeding in improving metabolic status as well as reducing septic complications and morbidity (21-24).

It should be noted that some investigations do not support the results of the present study. Although there is research supporting early postoperative enteral feeding, other randomized control trials (25-27) have produced mixed results, which do not concur with the benefits of early postoperative nutrition. Such studies discouraged early feeding due to poor results of patients who were intolerant of this protocol after major colorectal surgery. As these trials did not clearly establish the benefit of early enteral nutrition following colorectal surgery, the advantages and disadvantages of its commencement were controversial.

Conclusion

While the early start of oral nutrition after colorectal surgery resection and anastomosis does not raise postoperative risks and mortality, it does reduce postoperative complications, the length of the hospital stay, and the final health care costs. As a result, the early feeding after surgery can be considered as a viable alternative to delayed feeding.

Conflict of interest

Authors declare no conflict of interest.

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