

Original Article

Early Enteral Feeding In Cases of Gastrointestinal Anastomosis and Perforation Suturing : A Prospective Study

Akshat Mishra¹, Girish D Bakhshi², Ajay H Bhandarwar³

Bowel Anastomosis and perforation suturing are among the commonest procedures performed by general surgeons worldwide in both elective and emergency settings. The traditional rule of thumb has been to keep these patients' nil by mouth in the postoperative period till the return of bowel sounds. The reasoning behind this practice was to protect the anastomotic site and provide the gut with rest till return of normal function. Recently, studies have shown that early enteral feeding not only hastens the return of bowel function but also significantly reduces the length of postoperative stay without causing any complications.

This prospective study was carried out on 100 patients undergoing resection and anastomosis and/or perforation suturing in either elective or emergency setting. Patients were randomly selected and divided into a study group and control group of 50 patients each. The patients in the study group received early enteral feeding, started within 8 hours postoperatively in the form of 50ml/hour. Patients in the control group were started on clear liquids once bowel sounds returned. Patients were then monitored for a multitude of postoperative conditions and complications while diet was gradually advanced in both groups.

From the study, it becomes apparent that patients receiving early enteral feeding showed a marginal improvement in postoperative nausea and vomiting. These patients reported significantly lower scores of postoperative pain on visual analogue scores and significant decrease in abdominal girth. The patients in the study group showed an early resolution from postoperative ileus as evidenced by earlier passage of flatus and stools. Their mobility was better with lesser days required to carry out daily tasks and attend the bathroom unassisted. The length of hospital stay was significantly shorter in the study group. Finally, the rate of postoperative complications were similar in both groups.

[J Indian Med Assoc 2021; 119(10): 42-6]

Key words : Gastrointestinal Anastomosis, Perforation Suturing.

Bowel anastomosis and perforation suturing are commonly performed procedures by general surgeons worldwide. While primary repair of perforations is largely done as emergency procedures, resection and anastomosis is commonly done in emergencies primarily for obstructive causes and electively for oncological aetiologies¹.

The traditional practice after major gastrointestinal surgeries is to keep the patient nil by mouth to prevent postoperative nausea and vomiting and protect the anastomotic site till return of bowel function. Recently emphasis has been given to initiating early enteral feeding within 6 to 24 hours in the postoperative period. Early enteral feeding is believed to reduce stress response, improve immunological response and promotes wound healing while significantly reducing septic complications after major abdominal

Editor's Comment :

- Early enteral feeding reduces stress response and improve immunological response.
- Early enteral feeding after GI anastomoses and perforation suturing is safe and well tolerated.

procedures². This is chiefly due to enterocyte growth stimulation which results in an improved mucosal barrier function and decreased bacterial translocation³.

The initiation of early enteral feeding hastens the return of bowel function and has an overall positive effect on the patients care by permitting early weaning from intravenous fluids and drugs, permits early mobility and significantly helps in reducing the postoperative length of hospital stay.

This study is an attempt to validate the methods for objectively assessing the effects of early enteral feeding initiated in patients undergoing bowel anastomosis and perforation suturing in both elective and emergency setting.

MATERIALS AND METHODS

This is a prospective study conducted over a period of 30 months from June 2018 to March 2021 at a tertiary care centre. The objective of the study was to

Department of General Surgery, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai 400008

¹MBBS, MS, Registrar and Corresponding Author

²MBBS, MS, DNB, MRCS, Ed UK, FACS, Professor and Unit Head

³MBBS, MS, FICS, FIAGES, FACS, Professor and Head

Received on : 26/03/2021

Accepted on : 05/10/2021

study the feasibility, safety and efficacy of early enteral feeding after gut anastomosis and/or perforation suturing and evaluation of tolerance of early enteral feeding, assessment of postoperative nausea, vomiting, postoperative ileus and complication and the length of hospital stay.

Inclusion criteria :

- All cases of patients undergoing exploratory laparotomy with resection anastomosis or perforation suturing in the gastrointestinal tract on an emergency or elective basis.
- Age group between 12 to 60 years males and non-pregnant females.
- Patients willingly giving consent

Exclusion criteria :

- Age of the patient below 12 years and above 60 years
- Pregnant women
- Patients not willing to participate in the study.

Sample size and distribution :

- 100 patients
- Patients were divided in a study group and a control group comprising of 50 patients each.
- Randomisation was done on an odd-even basis.

Study design :

- Patients in the study group were started on an early enteral feeding protocol 8 hours after surgery. They were started on 50ml/hr of water/clear liquids on postoperative day 1, 8 hours after surgery. Clear liquids were continued on postoperative day 2. On postoperative day 3, unclear liquids/milkshakes were administered followed by a soft diet on postoperative day 4 and a full diet on postoperative day 5.
- Patients in the control group were started on oral feeding with clear fluids after resumption of bowel sounds confirmed on auscultation. Once tolerated, they were gradually shifted based on vital parameters and general physical condition to unclear liquids, soft diet and full diet in order.
- The patients were subjected to a thorough clinical workup which included appropriate laboratory and radiological investigations both prior and post-surgery as required.
- On each of the 5 days postoperatively, the patients in both the groups were monitored for abdominal girth, nausea and vomiting, and pain as per visual analogue scale. The passage of flatus and stools, ability to visit the washroom unassisted and ability to carry out routine tasks unassisted were also observed. Finally, the length of stay of the patients in each group was compared.

Data analysis :

All the data collected from the patients was compiled in a Microsoft Office Excel Sheet and analysed. Results are shown in a Tabular and Graphical format. Appropriate Statistical test was applied whenever necessary.

OBSERVATIONS

Age and Sex Distribution :

Mean age for patients was 36.58 years in the study group and 39.34 in the control group. Majority of the participants in the study belonged to the 4th decade of life. After applying unpaired T test, the p value was 0.281, hence both groups were comparable with respect to age distribution.

In both the groups, there were 17 female patients and 33 male patients. After applying the unpaired T test, the P value for sex wise distribution was 1, hence both groups were comparable in terms of sex-based distribution.

Nature of Surgery :

In the study group, 38 patients were operated in the elective setting while 12 patients were taken up in the emergency setting. In the control group, 36 patients were taken up in the elective setting while 14 patients were operated in emergency setting. After applying the student T test, the P value was 0.648, hence both groups were comparable in terms of nature of surgery performed.

Indication for Surgery :

The most common indication for surgery in both the groups was for ostomy closure with 17 patients in the study group and 18 patients in the control group. In terms of ostomy closure, 9 patients in the study group and 11 patients in the control group were operated for ileostomy closures. The second most common surgery performed in the elective setting was resection and anastomosis for carcinoma colon with 9 patients in both groups operated for the same. The most common surgery done in the emergency setting for both groups was perforation suturing for prepyloric perforation (6 in study group and 6 in the control group) (Table 1).

Assessment of Postoperative Parameters :

Postoperative Nausea and Vomiting —

In the control group, 19 patients developed nausea on POD 1 and by POD 5, two patients still complained of postoperative nausea. In the study group, 10 patients complained of nausea on POD 1 and no patient reported postoperative nausea beyond POD 3. On applying unpaired T test, there was significant

Table 1 — Comparison of demographic profile and baseline data of the study group and control group				
Parameter	Study Group	Control Group	P Value	Significance
Age (Mean) in years	36.58±12.477	39.34±12.98	0.281	Not significant
Sex (M/F)	33/17	33/17	1	Not significant
Nature for surgery :				
Elective	38	36	0.648	Not significant
Emergency	12	14		
Indication for Surgery :				
Bariatric Surgery	1	1	0.687	Not significant
Caecal perforation	1	1		
Carcinoma Colon	8	9		
Colostomy closure	4	5		
Enterocutaneous fistula	3	2		
Ileal Perforation	4	3		
Ileostomy closure	9	11		
Intussusception	2	0		
Jejunal perforation	1	2		
Prepyloric perforation	6	9		
Stricture	4	5		
Sigmoidostomy closure	4	2		
Carcinoma stomach	3	0		

reduction in postoperative nausea on POD 1,2 and 4.

In the control group, 7 patients reported at least 1 episode vomiting on POD 1. No patient reported any episode of vomiting beyond POD 3. In the study group, 3 patients reported vomiting on POD 1. There were no reported episodes of vomiting beyond POD 1. On applying the unpaired T test, there was significant difference only on POD2.

Visual Analogue Scale for Postoperative Pain :

The mean visual analogue score for postoperative pain on POD 1 in control group was 6.08 and 5.16 in the study group. The mean scores from POD 2 to POD 5 were remarkably lower in the study group with the difference reaching statistical significance on applying the student T test.

Abdominal Girth —

The percentage decrease in abdominal girth in the next two postoperative days were 0.575% and 1.3% for the control group and 14.07% and 2.07% for the study group. On applying the student T test, there is significant difference between the two groups on all postoperative days.

Days Required to Visit the Bathroom Unassisted —

The earliest postoperative day for patients to visit the bathroom unassisted was POD 3 in the control group (16/50) and POD 1 in the study group (10/50). All patients were able to visit the bathroom unassisted by POD 7 in the control group and POD 4 in the study

group. On applying the student T test, there is significant difference between the two groups with patients in the study group able to visit the bathroom unassisted at a significantly faster rate than patients in the control group.

Days Required to Carry Out Daily Tasks Unassisted —

The earliest postoperative day for patients to carry out daily tasks unassisted was POD 4 in the control group (4/50) and POD 2 in the study group (6/50). All patients were able to visit the bathroom unassisted by POD 9 in the control group and POD 6 in the study group. On applying the student T test, there is significant difference between the two groups with patients in the study group able to carry out daily tasks unassisted at a significantly faster rate than patients in the control group.

Passage of Flatus and Stools —

The earliest postoperative day when patients were able to pass flatus and stools in the control group was POD 3 (3/50) and POD4 (4/50) respectively. In the study group, the earliest patients were able to pass flatus and stools was by POD 2 (16/50) and POD 2 (1/50). All in all, all patients were able to pass flatus and stools by POD 7 and POD 8 in the control group and POD 4 and POD 7 in the study group respectively.

On applying student T test, there is significant difference in terms of passage of flatus and stools between the two groups, hence it can be inferred that early enteral feeding is associated with an earlier passage of flatus and stools and earlier resolution of postoperative ileus.

Postoperative Fever —

12 the control group and 10 patients in the study group reported fever between POD 1 and POD 5. On applying student T test, there is no significant statistical difference between the two groups.

Surgical Complications :

2 patients in the control group and 1 patient in the study group developed intraabdominal abscess that needed either percutaneous drainage or re-exploration. 8 patients in the control group and 5 patients in the study group developed superficial skin dehiscence. The difference between the two groups in terms of surgical complications does not reach statistical significance.

Length of Postoperative Hospital Stay :

The minimum postoperative stay was 7 days for the

control group and 5 days for the study group. The mean length of hospital stay was 12.36 days for the control group and 8.78 days for the study group with the difference reaching statistical significance on applying the student T test (Table 2).

DISCUSSION

Traditionally, conventional feeding practices in the postoperative patient undergoing major gastrointestinal surgeries dictates keeping the patient nil per oral for a prolonged duration till the return of normal gut motility. The dictum believes that keeping the patient nil per oral would provide the gut with adequate rest which would aid in anastomotic site and wound healing. This practice is still regarded as safe and commonly practiced worldwide. Recently, this approach has been intensely questioned and multiple studies have shown no significant advantage in delaying postoperative feeding in patients undergoing major gastrointestinal surgery. In a meta-analysis conducted by Lewis et al [4], consisting of 13 trials, the key message was that there was no obvious benefit in keeping patients nil by mouth with early enteral feeding assisting in reducing septic complications and length of stay while improving wound healing.

In the present study, the two groups were statistically comparable in terms of age and sex distribution. Majority of the patients in both groups underwent surgery in the elective setting. The most common indication for surgery in both groups was for ostomy closure with majority being ileostomy closure. Resection of colonic malignancies were the second most common elective procedures while repair of prepyloric perforation was the most common procedure done in emergency. The groups were statistically comparable in terms of nature and indications for surgery.

In the present study, the study group were started on clear fluids orally or via a nasogastric tube 8 hours after surgery at 50ml/hour, with gradual progression to unclear fluids and milk shakes on postoperative day 3 and soft and full diet on postoperative day 4 and 5 respectively. In contrast, the control group was started on clear liquids only after resumption of bowel sounds postoperatively and gradually progressed based on clinical recovery to further diet advancements.

In the present study, the study group reveals significant difference from the study group in postoperative nausea only on the early postoperative days while no such distinction can be made between

Table 2 — Comparison of postoperative parameters among the two groups

Parameter	Study Group	Control Group	P Value	Significance
Postoperative Nausea :				
POD 1	10	19	0.047	Significant
POD 2	3	10	0.037	Significant
POD 3	2	4	0.24	Not Significant
POD 4	0	4	0.041	Significant
POD 5	0	2	0.153	Not significant
Postoperative Vomiting :				
POD 1	3	7	0.182	Not significant
POD 2	0	5	0.022	Significant
POD 3	0	2	0.153	Not Significant
POD 4	0	0	-	
POD 5	0	0	-	
Visual Analogue Scale for Postoperative Pain (Mean) :				
POD 1	5.16	6.0	<0.001	Significant
POD 2	4	5.24	<0.001	Significant
POD 3	3.42	4.28	<0.001	Significant
POD 4	2.8	3.34	<0.001	Significant
POD 5	2.12	2.64	<0.001	Significant
Abdominal Girth (In cm) :				
POD 1	75.26	80	0.036	Significant
POD 2	74.18	79.54	0.017	Significant
POD 3	73.7	78.96	0.019	Significant
Days Required to go to Bathroom Unassisted (Mean) :				
	2.1±0.7354	4.16±0.9971	<0.001	Significant
Days Required to Carry Out Daily Tasks Unassisted (Mean) :				
	3.74±0.9649	5.90±1.165	<0.001	Significant
Passage of Flatus (n) :				
POD ≤3	40	3	<0.001	Significant
POD >3	10	47		
Passage of Stools (n) :				
POD ≤4	28	4	<0.001	Significant
POD >4	22	46		
Postoperative Fever (n) :				
	10	12	0.629	Not significant
Surgical Complications (n) :				
	6	8	0.274	Not significant
Postoperative Stay In Days (Mean) :				
	8.78±6.431	12.36±4.881	0.002	Significant

the two groups in terms of vomiting. However, there are no increased numbers of such cases in the study group. In a study conducted by Hartsell *et al*⁶, the results are similar. Hence, it can be concluded that early enteral feeding is not associated with an increase in postoperative nausea and vomiting.

The two groups show significant difference in terms of postoperative pain and abdominal girth with the study

group showing markedly lower mean scores for postoperative pain during the first 5 postoperative days as well as a greater percentage decrease in abdominal girth. Hence, patients receiving early enteral feeding show a better recovery profile in comparison to patients on traditional delayed feeding.

In the present study, the mean number of days taken by patients in the study group to visit the bathroom unassisted is 2.1 days with a standard deviation of 0.7354, while that for the control group is 4.16 days with a standard deviation of 0.9971 with the difference reaching statistical significance. For the time taken to carry out daily tasks unassisted, the mean number of days taken by the patients in the study group is 3.74 days with a standard deviation of 0.9649 and for the control group is 5.90 days with a standard deviation of 1.165 with the difference reaching statistical significance. In terms of early mobilisation, patients in the early enteral feeding arm of the study show an earlier return to daily activity and a faster recovery time postoperatively. As early mobilisation and quicker recovery in the postoperative phase are key components of the ERAS protocol⁶, this study is in tune with the current practices advocated all over the world.

Passage of flatus and stools is an age old but reliable indicator of resolution from postoperative ileus (POI). POI is defined as inhibition of propulsive bowel activity following surgery that usually manifests with obstipation, nausea, vomiting and abdominal distension. It has generally been accepted that despite the numerous advances in the field of medicine, POI is considered an acceptable outcome following gastrointestinal surgeries. For the patient, POI serves as a severe distress that is responsible for significantly delaying recovery and increasing the length of hospital stay. In the present study, more than 40 patients in the study group were able to pass first flatus on or before the 3rd postoperative day while only 3 patients were able to do so in the control group. Similarly, 28 patients in the study group and only 4 patients in the control group were able to pass their first stools on or before the 4th postoperative day with the difference reaching statistical significance. Hence, early enteral feeding is associated with the faster recovery from postoperative ileus as documented by a much early passage of flatus and stools than delayed conventional feeding. Similar findings were corroborated by a similar study conducted by Pragatheeswarane *et al*⁷. This could be attributed to stimulation of bowel peristalsis by early feeds.

In the present study, the incidence of postoperative fever and postoperative complications is similar in both groups. Tian *et al*⁸, El Nakeeb *et al*⁹ and Vaishnani *et*

*al*¹⁰ have all reviewed the same findings in their studies with no significant differences between the early enteral feeding and traditional group. The present study did not report any increased number of cases with the same and hence early feeding is not associated with an increased number of complications.

Majority of the studies reviewing the efficacy of early enteral feeding have kept the length of hospital stay as the primary outcome. In the present study, the mean duration of postoperative stay was 8.78 ± 6.431 days in the study group and 12.36 ± 4.881 days in the control group with the difference reaching a statistical significance. A shorter hospital stay provides an improved quality of life to the patient, is psychologically better and has cost benefit to the hospital.

In conclusion, early enteral feeding after gastrointestinal anastomosis and perforation suturing in both the elective and emergency setting is safe, well tolerated by the majority of patients and significantly reduced the length of postoperative ileus, length of postoperative stay and improves clinical outcomes. Thus, it should be considered the norm and not the exception in present day surgical practice.

REFERENCES

- 1 Bajwa, Rajbir, Navjot Brar — A prospective randomized controlled study: early enteral nutrition following gastrointestinal surgery. *International Surgery Journal [Online]* 2017; **4(10)**: 3249-56
- 2 Herbert G, Perry R, Andersen HK, Atkinson C, Penfold C, Lewis SJ, *et al* — Early enteral nutrition within 24 hours of lower gastrointestinal surgery versus later commencement for length of hospital stay and postoperative complications. *Cochrane Database Syst Rev* 2018; **24(10)**: CD004080. Update in: *Cochrane Database Syst Rev*. 2019 Jul 22;7:CD004080.
- 3 Sigalek DL, Mackenzie SL, Hameed SM — Enteral nutrition and mucosal immunity: implications for feeding strategies in surgery and trauma. *Can J Surg* 2004; **47**: 109-16.
- 4 Lewis SJ, Andersen HK, Thomas S — Early enteral nutrition within 24 h of intestinal surgery versus later commencement of feeding: a systematic review and meta-analysis. *J Gastrointest Surg* 2009; **13**: 569-75.
- 5 Hartsell PA, Frazee RC, Harrison JB, Smith RW — Early Postoperative Feeding After Elective Colorectal Surgery. *Arch Surg* 1997; **132**: 518-21.
- 6 Ljungqvist O, Scott M, Fearon KC — Enhanced Recovery After Surgery: A Review. *JAMA Surg* 2017; **152**: 292-8.
- 7 Pragatheeswarane M, Muthukumarassamy R, Kadambari D — Early Oral Feeding vs. Traditional Feeding in Patients Undergoing Elective Open Bowel Surgery—a Randomized Controlled Trial. *J Gastrointest Surg* 2014; **18**: 1017-23.
- 8 Tian Y, Zhu H, Gulack BC, Alganabi M, Ramjist J, Sparks E, *et al* — Early enteral feeding after intestinal anastomosis in children: a systematic review and meta-analysis of randomized controlled trials. *Pediatr Surg Int* 2021; **37**: 403-10.
- 9 El Nakeeb A, Fikry A, El Metwally T, Fouda E, Youssef M, Ghazy H, *et al* — Early oral feeding in patients undergoing elective colonic anastomosis. *Int J Surg* 2009; **7**: 206-9.
- 10 Vaishnani BV, Bhatt J, Singh R, Juneja IA — A Prospective Comparative Study Of Early Versus Traditional Oral Feeding After Gi Surgeries. *Int J Res Med* 2016; **5**: 32-5.