



## A COMPARATIVE STUDY BETWEEN EARLY AND STANDARD ENTERAL FEEDING AFTER BOWEL SURGERY.

### General Surgery

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### ABSTRACT

**Background :** As per routine protocol, patients operated for resection and anastomosis of intestine, are kept nil per os till intestine starts functioning. But evidence from clinical studies and animal experiments suggests that initiating enteral feeding early is beneficial to patient. Enteral nutrition, especially early enteral nutrition, could effectively increase the blood flow of gut mucosa, stimulate the intestinal motility, maintain the gut integrity, decrease the incidence of infectious complications, ameliorate patient's outcome after surgery.

**Methods :** The comparative study includes 80 cases of intestinal resection and anastomosis, operated at Krishna Institute of Medical Sciences, Karad, Maharashtra, India, from August 2018 to July 2019 from which randomly 40 patients were selected for conventional nil per os approach and rest of 40 patients were given early enteral feeding within 1st 24 hours post operatively.

**Results :** In the study most common age group, who undergone surgery in both case and control groups was between 51-60 years with male predominance in both groups. Most common surgery performed was right hemicolectomy for bowel malignancy in both groups. Case group had statistically significant low rate of wound infection, paralytic ileus and post-operative pain with less hospital stay. No significant difference in incidence of anastomotic dehiscence, intra-abdominal abscess or pneumonia was found.

**Interpretation and Conclusion :** Early oral feeding is safe and if associated with careful selection and multimodal postoperative care promotes faster convalescence following bowel surgery.

### KEYWORDS

Enteral nutrition, nil per os, postoperative ileus, emergency intestinal surgery

### INTRODUCTION

Nutritional support is beneficial during the met-abolic and inflammatory phase, assisting in the amelioration of a patient's outcome after sur-gery [1-3]. Early start of oral nutrition is promot-ed in most patients undergoing gastrointestinal surgery and is an important part of fast-track surgery protocols [4]. Enteral nutrition (EN), especially early enteral nutrition (EEN), could effectively increase the blood flow of gut muco-sa, stimulate the intestinal motility, maintain the gut integrity, prevent bacterial and endo-toxin translocation, and decrease the incidence of infectious complications [5-7]. Furthermore, EEN within the first 24 hours postoperatively is beneficial and is even associated with reduced mortality rate in comparison to no caloric intake. [8]

In addition, EN has been recommended in several studies to be started after the surgery as soon as possible, because EN allows patien-ts for a faster recovery [9]. However, this early approach is not successful per se in all patients. Early start of EN is generally delayed after sur-gery because of a number of factors including postoperative nausea and vomiting, and a potential possibility of postoperative complica-tions, such as ileus, obstruction, or anastomot-ic leakage.

Post operative dysmotility mainly affects stomach and colon but small intestine recovers within 4-8 hours after surgery.[10] Hence feeding within first 24 hours after surgery is very well tolerated.[11,12] Contrary to widespread opinion, evidence from clinical studies and animal experiments suggests that initiating feeding early is advantageous. In animals, starvation reduces the collagen content in anastomotic scar tissue[13,14] and diminishes the quality of healing.[14,15] whereas feeding reverses mucosal atrophy induced by starvation[16] and increases anastomotic collagen deposition and strength.[17] Experimental data in both animals and humans suggest that enteral nutrition is associated with an improvement in wound healing[18] Finally, early enteral feeding may reduce septic morbidity. Based on these findings present study is designed.

### OBJECTIVES

This study was conducted to compare the feasibility, safety and efficacy of early enteral feeding versus nil per os (delayed enteral feeding) after elective intestinal resection and anastomosis and emergency traumatic intestinal perforation repair with resection and anastomosis.

### MATERIAL AND METHODS

This prospective randomized comparative study was carried out at Krishna Institute and Medical Research Centre, Karad, Maharashtra, India, for a duration of 1 year ranging from August 2018 till July 2019. A total of 80 patients of intestinal resection & anastomosis were included in the study. From these, 40 patients were randomly offered conventional nil per os approach and other 40 patients were selected randomly for early enteral feeding within 1st 24 hours postoperatively after taking their written informed consent. Approval from the local ethical committee was obtained regarding the study.

### Patient selection

**Inclusion criteria-** Patients above the age of 13 years, American Society of Anesthesiologists (ASA) classification ASA 1-4, and undergoing primary repair or resection anastomosis of small bowel.

**Exclusion criteria-** Patients below the age of 13 years or above the age of 70 years, ASA 5, undergoing gastroduodenal surgery, ileostomy, colostomy, or emergency trauma cases with multiple visceral injuries and severe contamination.

Post operatively 40 patients were offered nasogastric tube blockade and enteral feeding within first 24 hours, starting with sips of water as decided pre operatively in randomly selected patients. Nasogastric tube was taken out as patients tolerate liquids in first 24 hours. Other 40 patients were kept nil per os until the passage of flatus and appearance of active bowel sounds. The outcomes were compared in the terms of post operative pain, paralytic ileus, anastomotic dehiscence, wound infection, pneumonia and intra abdominal abscess, length of hospital stay after operation.

### RESULTS

Case group was designed as patients kept in early enteral feeding group and control group was designed as patients kept in nil per os group.

- In this study of 80 patients, most common age group in case and control group was 51-60 years and there were 10(25%) in case group and 10(25%) in control group (Table 1).

**Table 1: Age distribution**

Category	Number		Percentage	
	Case	Control	Case	Control
0-10	00	00	00	00
11-20	04	05	10	12.5

21-30	09	10	22.5	25
31-40	06	05	15	12.5
41-50	05	06	12.5	15
51-60	10	10	25	25
61-70	06	04	15	10
Total	40	40	100	100

- In this study of 80 patients, there were 22(55%) male in case group and 30(75%) male in control group. There were 18(44%) female in case group and 10(25%) females in control group (Table 2).

**Table 2: Sex distribution**

Category	Number		Percentage	
	Case	Control	Case	Control
Male	22	30	55	75
Female	18	10	44	25
Total	40	40	100	100

In this study of 80 patients, maximum number of cases were of intestinal malignancy in both the groups, 12(30%) patients in cases group and 10(25%) patients in control group.

**Table 3 : Diagnosis**

Diagnosis	Number		Percentage	
	Cases	Controls	Cases	Controls
Intestinal perforation	9	5	22.5	12.5
Intestinal obstruction	5	7	12.5	17.5
Malignancy	12	10	30	25
Ileostomy	8	7	20	17.5
Colostomy	5	9	12.5	22.5
Volvulus	1	2	2.5	5

In this study of 80 patients, most commonly performed procedure in case (10 patients) group was right hemicolectomy and control (9 patients each) group was right hemicolectomy and colostomy closure (Table 4).

**Table 4: Procedures**

Category	Number		Percentage	
	Case	Control	Case	Control
Right hemicolectomy	10	9	25	22.5
Left hemicolectomy	00	01	00	2.5
IA anastomosis	05	02	12.5	5
DJ anastomosis	00	01	00	2.5
JJ anastomosis	03	01	7.5	2.5
II anastomosis	09	10	22.5	25
Ileostomy closure	08	07	20	17.5
Colostomy closure	05	09	12.5	22.5

In this study of 80 patients, among the cases group, 1 patient developed surgical site infection, 1 patient had intra-abdominal abscess, and 1 patient had vomiting secondary to ileus. Among the control group, 2 patients developed anastomotic dehiscence, 7 patients developed surgical site infection, 2 patients developed pneumonia, 2 patients developed intra-abdominal abscess, 2 patients developed vomiting, 8 patients developed ileus.

**Table 5: Complications**

Category	Number		Percentage	
	Case	Control	Case	Control
Anastomotic dehiscence	00	02	00	5
Wound infection	01	07	2.5	17.5
Pneumonia	00	02	00	5
Intra-abdominal abscess	01	02	2.5	5
Vomiting	01	02	2.5	5
Paralytic ileus	02	08	5	20

In this study of 80 patients, most of the patients (38 patients) discharged on 7th post op day in case group. While 25 patients discharged on 7th post op day, 6 on 10th post op day, 2 on 11th post op day, 5 on 14th post op day (Table 6).

**Table 6: Length of hospital stay**

Category	Numbers		Percentage	
	Case	Control	Case	Control
Length of hospital stay (days)				

7	38	25	95	62.5
8	00	00	00	00
9	01	00	2.5	00
10	01	06	2.5	20
11	00	02	00	5
12	00	02	00	5
13	00	00	00	00
14	00	05	00	12.5

**DISCUSSION**

In this study, we included benign and malignant etiologies for resection and anastomosis of small and large intestines. And the most common procedure done was right hemicolectomy.

Livingston and Passaro define ileus as the functional inhibition of propulsive bowel activity, irrespective of pathologic mechanism. Many factors are believed to contribute to paralytic ileus, including intra operative bowel manipulation, anesthetic agents, peri-operative use of narcotics and post-operative sympathetic hyperactivity and electrolyte imbalance. Early enteral feeding induces bowel motility. In this study, 2 patients (5%) had paralytic ileus in case group and 8 patients (20%) had paralytic ileus in control group, all of which were managed conservatively. P value was 0.038. Data suggested that early enteral feeding was found to decrease incidence of paralytic ileus.

Major surgery induces a systemic immuno-inflammatory response with increased concentrations of C-reactive protein. (As a marker of inflammatory response) CRP was higher immediately after the operation and recovered better after enteral nutrition in comparison to the late enteral nutrition group. Therefore, early enteral nutrition may also reduce the inflammatory response and thereby reduce post-operative ileus.

Andersen and colleagues[19] conducted a systematic 2006 review of 13 randomized trials totaling 1173 patients undergoing gastrointestinal surgery. There were no significant differences between restricted and ad lib postoperative diets, but the findings also suggested that there was no advantage to dietary restriction. Also, although not reaching statistical significance, the direction of effect in the analysis also indicated that earlier feeding may reduce the risk of postoperative complications.

On the one hand, patients with emergency gastrointestinal surgery have an edematous or ischaemic bowel, anastomosis healing is usually delayed, which can result in anastomotic disruption or leakage. On the other hand, poor enteral intake can lead to malnutrition or delayed bowel mucosa growth and increase post-operative morbidity and mortality. Recently, Enteral nutrition has been recommended to be initiated as early as possible unless contraindicated by several guidelines [20,21].

Osland *et al.* [22] showed in a meta-analysis that compared with traditional postoperative feeding practices, EEN (early enteral nutrition) was associated with reductions in total complications, and does not negatively affect clinical outcomes such as anastomotic dehiscence, resumption of bowel function, hospital length of stay, or mortality.

Another meta-analysis showed that enteral feeding that started within 24 hours after the surgery may be of benefit, such as assisting in a reduction of infection risk or reduction of length of hospital stay [24]. In addition, Petra *et al.* [23] demonstrated in a randomized controlled trial that EEN is associated with reduction in length of stay and anastomotic leakage in patients undergoing elective rectal surgery.

However, these results primarily focused on elective gastrointestinal surgery, and few studies have addressed the beneficial effects of EEN after emergency gastrointestinal surgery.

Hyung *et al.* [24] demonstrated that early feeding within 48 hours was feasible after emergency gastrointestinal surgery and was associated with reductions in length of stay in the intensive care unit and pulmonary complications.

Furthermore, Navneet *et al.* [25] demonstrated in a prospective study that early enteral feeding through a nasogastric tube was well tolerated by patients with non-traumatic perforation peritonitis and helped to improve energy and protein intake, reduce the amount of nasogastric

aspirate, the duration of postoperative ileus, and the risk of serious complications. Another prospective study showed immediate postoperative feeding is feasible in patients with non-traumatic intestinal perforation and peritonitis, and reduces septic morbidity [26].

## CONCLUSION

In summary, the study under discussion here adds to information available from several prior studies indicating that early oral feeding is safe and does not increase morbidity or mortality. From present study, it can be concluded that, early enteral feeding significantly reduces the incidence of wound infection, paralytic ileus and pain in post-operative patients of resection and anastomosis of intestine. No significant increase the incidence of anastomotic dehiscence, intra-abdominal abscess, or pneumonia was found in patients put on early enteral feeding after resection and anastomosis of intestine, as the sample size was small.

Post operatively early enteral feeding is well tolerated in the presence of co-morbid conditions also and may also be beneficial. Early enteral feeding significantly reduces the length of hospital stay in the post-operative patients of resection and anastomosis of intestine due to less post-operative pain, less complications and improvement in general well being.

So, early enteral feeding is safe, effective and feasible in post-operative patients of resection and anastomosis of small and large intestine, however, we suggest that a prospective and multi-centre study be undertaken to strengthen our findings.

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