

Original Article**A STUDY OF EARLY ENTERAL FEEDING VERSUS NIL BY MOUTH IN CASE OF RESECTION ANASTOMOSIS OR PERFORATION PRIMARY REPAIR**

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Abstract

Background ; A period of starvation (“nil by mouth”- NBM) is common practice after gastrointestinal surgery during which an intestinal anastomosis has been formed. So Early Enteral Feeding requires scrutiny in the term of indications ,success and failure to give benefit to patient.

Methodology; The study is carried out on in patients admitted in municipal general hospital of Ahmedabad . A total of 34 patients of intestinal resection anastomosis and perforation primary repair were included in the study and data were collected in the prescribed performa consisting details of patient’s history , clinical findings, operative findings, post operative course and complications, and outcome. **Results ;** Observation and analysis of the data of present series was interesting and important aspects were compared with standard series .Wound Infection was Common Complication in both group .Morbidity and Other Complications were significantly low in early Enteral feeding Group Patients. **Conclusion;** Early enteral feeding is safe, effective, feasible and cost effective in post operative patients of resection and anastomosis or perforation primary repair.

Key words; Enteral Feeding , resection and anastomosis

Introduction;

Nutritional support plays important role in wound healing and postoperative recovery and a poor nutritional status is strongly associated with delayed wound healing and longer hospital stays after surgery. In particular, after emergency gastrointestinal (GI) surgery, nutritional status is impaired and basal energy expenditure is elevated and thus, nutritional support is of considerable importance.

Several reports have emphasized that early enteral feeding should be started as soon as possible after resuscitation because the immunomodulatory effect of enteral feeding could assist recovery. Furthermore, enhanced recovery after surgery has been shown to improve postoperative recovery after elective GI surgery. However, patients that undergo emergency GI surgery have an edematous or ischemic bowel, and are at high risk of postoperative complications, such as ileus, obstruction, or anastomotic failure. For these reasons, the majority of surgeons are worry of early feeding after emergency GI surgery.⁽¹⁾

There is the traditional belief that the early feeding of patients who underwent intestinal resection and anastomosis can be dangerous and induces stress on anastomosis site and makes it prone to leakage, and most surgeons prefer to remaining their patients not permit oral (NPO) for 4-5 days post-operation but this is not proven yet, even without any feeding, about 2 L of gastrointestinal and pancreatic secretions enter the small bowel daily and transit from anastomosis site, thus feeding has not an important additional adverse effect on anastomosis site resting and even intestinal feeding has many positive effect on wound healing and reduction of sepsis .

Post-operative ileus is an important reason for remaining patients NPO in post-operative period, but post-operative ileus is a temporary and clinically unimportant physiologic response, small bowel movement return 4-8 h after surgery, On the other hand, early removal of nasogastric tube can reduce fluid and electrolytes loss and accelerates the resolution of post-operative ileus. ⁽²⁾

Resection and anastomosis is often done in malnourished patients and in severe cases, is known to increase the post operative morbidity. Additionally these surgical patients are subjected to post operative stress and hypercatabolic state; hence these patients require some form of early nutrition, enteral or total parenteral nutrition (TPN). Routinely after intestinal resection and anastomosis for various reasons nil by mouth is advised and oral/enteral feeding is started after passage of flatus and appearance of bowel sounds. Idea behind nil by mouth is to prevent postoperative nausea vomiting and to protect the anastomosis. ⁽³⁾

A period of starvation (“nil by mouth”- NBM) is common practice after gastrointestinal surgery during which an intestinal anastomosis has been formed. The stomach is decompressed with a nasogastric tube and intravenous fluids are given with oral feeding being introduced as gastric dysmotility resolves. The rationale of nil by mouth is to prevent postoperative nausea and vomiting and to protect anastomosis, allowing it time to heal before being stressed by food. It is, however, unclear whether deferral of enteral feeding is beneficial. ⁽⁴⁾

Postoperative dysmotility mainly affects stomach and colon but small intestine recovers within 4-8 hours after surgery. Hence feeding (lukewarm water) within first 24 hours after surgery is very well tolerated. 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 and diminishes the quality of healing whereas feeding reverses mucosal atrophy induced by starvation and increases Anastomotic collagen deposition and strength.

Experimental data in both animals and humans suggest that enteral nutrition is associated with an improvement in wound healing. Finally, early enteral feeding may reduce septic morbidity. ⁽⁵⁾ Thus early enteral feeding as opposed to conventional NBM and intravenous fluid approach, has received increasing attention in recent years. Through an evidence based review, we have evaluated whether early enteral feeding is merely a fashion or genuinely an advance. ⁽⁴⁾

Aims of the study;

Aim of the study was to compare the early commencement of postoperative enteral nutrition to traditional management that is no enteral nutrition in patients undergoing gastrointestinal surgery in respect to: (1) Appearance of bowel sounds (2) Passage of flatus and stool (3) Vomiting (4) Requirement of Nasogastric tube – Nasogastric aspiration (5) Post Operative Sequelae – Complications (6) Length of hospital stay (7) Mortality. The study and conclusions are important in the sense of assessing various aspects of this newer approach in context of present time.

METHODOLOGY;

34 patients of intestinal resection-anastomosis and perforation primary repair ,after taking institutional ethical committee approval and written informed consent, admitted in one of the municipal general hospitals of Ahmedabad city, India, were studied during period of two years, ie.From August 2016 to October 2018.

From these, 17 patients were randomly offered conventional nil by mouth approach and other 17 patients were selected randomly for early enteral feeding within 1st 72 hours postoperatively.

All the patients were fulfilling following **inclusion criteria**:

*Patients were selected preoperatively from age group between 12-70years.

*Patients of both sex were included in both group randomly.

☑All elective small and large intestinal resection and anastomosis were included.

☑ All ileostomy or colostomy closure, in which more than half of the circumferencial luminal defect present were included in our study.

☑ Emergency bowel perforation presented were included.

Exclusion Criteria:

☑ Age <12 and >70 year.

Pre operatively all planned surgical patients were given minimum three days of chest physiotherapy and spirometry exercise in >50 years of age group.

All routine blood investigations were done. All patients were blood transfused whose Hb was less than 10 gm%. Preoperative prophylactic antibiotic⁽⁶⁾ injection ceftriaxone(dose according to weight) was given 45 minutes before surgery.

Post operative all patients were monitored for vital signs, bowel sounds, drain output, Ryle's tube output, pain and respiratory system examination. Chest physiotherapy was given as indicated and early ambulation was advised to all patients.

Post operatively 17 patients were offered Ryle's tube blockade and enteral feeding within first 72 hours, starting with sips of water as decided pre operatively in randomly selected patients. Ryle's tube was taken out as patients tolerate liquids in first 72 hours.

Other 17 patients were kept nil by mouth 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.

Observations:

In our study of 34 patients most common age group in early and late enteral feeding was 21-30 years and there were 5(29.4%) in early enteral feeding group and 5(29.4%) in late enteral feeding group.

Table 1: Age group of patients

Category	Number		Percentage(%)	
Age(Years)	Early	Late	Early	Late
11-20	3	3	17.64	17.64
21-30	5	5	29.41	29.41
31-40	2	2	11.76	11.76
41-50	4	3	23.52	17.64
51-60	2	2	11.76	11.76
61-70	1	2	5.88	11.76
Total	17	17	100	100

In our study of 34 patients there were 13(76.5%) male in early and late enteral feeding each. There were 4(23.5%) female in early and late enteral feeding group each.

BMI: In early enteral feeding group average BMI was 22 and in late enteral feeding 24 which was comparable in both the groups.

Table 2: Comorbid Conditions

Comorbid Conditions	Number	Percentage(%)
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	Early	Late	Early	Late
T.B	1	1	5.88	5.88
Diabetes	1	1	5.88	5.88
Hypertension	1	1	5.88	5.88
Steroids	1	0	5.88	--

In our study of 34 patients comorbid conditions were Hypertension, Diabetes, Tuberculosis in both the groups and 1 patient in early enteral feeding group was on steroid for ulcerative colitis and there was no statistically difference.

In our study 4 patients of early enteral feeding group had emergency surgery and 13 had planned surgery whereas 6 patients of late enteral feeding group had emergency surgery and 11 had planned surgery which was comparable to each other.

In our study both early and late enteral feeding group had 3 patients of ileostomy closure each. Ileo-Ileal resection anastomosis was performed in 3 patients of early enteral feeding group and 4 patients of late enteral feeding group. Other surgeries performed were ileal perforation primary repair, Transverse colostomy closure, Jejunum-Jejunal Resection anastomosis, Cystogastrostomy, Lateral pancreaticojejunostomy, Ileo-Ascending resection anastomosis, Roux-En-Y Hepatico-Jejunostomy.

Table 3: Type of Surgery

Type of Surgery	Number		Percentage (%)	
	Early	Late	Early	Late
Ileostomy Closure	3	3	17.64	17.64
Ileal Perforation Primary Repair (Traumatic/Enteric)	Traumatic-3 Enteric-1	Traumatic-2 Enteric-1	23.52	17.64
	Total=4	Total=3		
Transverse colostomy Closure	3	--	17.64	--
Ileo-Ileal Resection Anastomosis	3	4	17.64	23.52
Jejunum-Jejunal Resection Anastomosis	1	3	5.88	17.64
Cysto-gastrostomy	1	--	5.88	--
Lateral Pancreaticojejunostomy	1	1	5.88	5.88
Roux En Y Hepaticojejunostomy	1	1	5.88	5.88
Ileoascending Resection Anastomosis	--	2	--	11.76
Total	17	17	100	100

Post Operative Assessment

☑ Regaining of Bowel Function

In our study average day of appearance of peristalsis was day 2 in early enteral feeding group and day 3 in late enteral feeding group. In early feeding group patients had early passage of stool (day 4) as compared to late enteral feeding (day 5.7).

In our study 11 patients out of 17 had hypoproteinemia in post operative period whereas only 6 patients out of 17 had hypoproteinemia which was significant.

Table 4: Post Operative Complications

Complications	Number		Percentage(%)	
	Early	Late	Early	Late
Vomiting	2	1	11.76	5.88
Paralytic Ileus	0	2	--	11.76
Wound Infection	2	7	11.76	41.20
Abdominal Distension	0	1	--	5.88
Intra abdominal Collection	0	1	--	5.88
Anastomotic dehiscence	0	1	--	5.88
Pneumonia	0	4	--	23.5
DVT	0	0	--	--

In our study 7 patients of late enteral feeding had wound infection whereas only 2 patients of early enteral feeding had wound infection; 4 patients of late enteral feeding had pneumonia whereas no patients of late enteral feeding developed pneumonia; other complications such as paralytic ileus, abdominal distension, intraabdominal collection and Anastomotic dehiscence were observed in late enteral feeding group which were absent in early feeding group. In Early enteral feeding 2 patients had vomiting but none of them required re-insertion of Ryle's tube which can be an accidental finding.

Visual Analogue Score (VAS)

In our study out of 34 patients VAS Score was 5 in most patients of early enteral feed and 6 in most patients of late enteral feed on post operative day 1. VAS was 4 in most patients of early enteral feed and 5 in most patients of late enteral feed in post operative day 2. VAS was 3 in most patients of early enteral feed and 4 in most patients of late enteral feed in post operative day 3. VAS was 1 in most patients of early enteral feed and 2 in most patients of late enteral feed in post operative day 5. VAS was 0 in most patients of early enteral feed and 1 in most patients of late enteral feed in post operative day 7.

Average Post Operative Hospital stay in early enteral feed is 8.6 days whereas in late enteral feed it is 13 days.

Discussion,

Nutritional support has by convention been delayed for 5-7 days after surgery in previously well nourished hospitalized patients. TPN then may be initiated if the patient is intolerant to enteral intake. There is an emerging consensus, however, that early nutritional support benefits high risk surgical patients. Major surgery or injury induces hyper metabolic, catabolic state in which, if not supported by exogenous substrates, excessive skeletal muscle proteolysis occurs, followed by depletion of crucial circulating and visceral proteins. Clinical and basic researches have confirmed that acute protein malnutrition impairs wound healing⁽⁷⁾, vital organ function and immunocompetence. Indeed this is the rationale for providing early nutritional support but determining who the appropriate candidate are and what the preferred route of substrate delivery is have been difficult issue to resolve.⁽⁵⁾

In our study we included both emergency and planned surgeries of resection anastomosis or perforation primary repair. In our study both the groups of early and late enteral feeding were comparable demographically.

As previously mentioned systemic and local factors may affect outcomes after resection and anastomosis. In comorbid conditions like history of T.B.; Diabetes; Hypertension were prepared preoperatively in both groups according to their co-morbid conditions. No difference was found in complication rates of early and late enteral feeding groups with co-morbid conditions. But early enteral feeding didn't seem to be harmful in these patients and may be beneficial in patients with hypoproteinemia.

In our study 4 patients of early enteral feeding group had emergency surgery and 13 had planned surgery whereas 6 patients of late enteral feeding group had emergency surgery and 11 had planned surgery. Miettinen P, Laitinen S, Makela J et al. "Bowel Preparation" is unnecessary in open small and large bowel surgery. A prospective randomized study of 250 patients of colorectal anastomosis were followed with 100 patients offered bowel preparation and rest offered no bowel preparation pre operatively, there is no significant difference in Anastomotic dehiscence (6.8% in case group and 7% in control group)⁽⁸⁾ In our study the average day appearance of peristalsis, flatus and stool in early enteral feeding group was earlier than the late enteral feeding group which correlated with the study of Ayman et al⁽⁹⁾. In late enteral feeding usual policy is to start enteral feeding after passing peristalsis, flatus, stool.

By comparison we can say that if in ileal perforation though inflammation present we can start early enteral feeding and no difference in complication seen as compared to late enteral feeding.

Post operative pain : In our study pain was scored according to " Visual Analogue Scale" from post op day 1-7. We found that patients of early enteral feeding had less post operative pain than late enteral feeding group which may be due to improved general well being of patient's pain perception in early enteral feeding group compared to late enteral feeding group. Our study correlated with the study

done by Jenish Y. Sheth et al. ⁽³⁾ Patients who undergo GI surgery have an edematous or ischemic bowel,

and are at high risk of postoperative complications, such as ileus, obstruction. ⁽¹⁰⁾ **Complications after Operation:**

Paralytic Ileus: In our study 2 patients of late enteral feeding (11.76%) had paralytic ileus whereas no patient had paralytic ileus in early enteral feeding group. Data suggestive that early enteral feeding found to decrease incidences of paralytic ileus. In Reissman⁽¹¹⁾ et al study no statistical significance was found in both the groups but early enteral feeding didn't seem to increase the incidence of ileus.

Wound Infection: Experimental data in both animals and humans suggest that enteral nutrition is associated with an improvement in wound healing. Wound infection is common complication after resection anastomosis of bowel. In our study 2 patients (11.76%) had wound infection in early enteral feeding and 7 patients (41.20%) had wound infection in late enteral feeding which is statistically significant. That correlate with Ayman At el study⁽⁹⁾ who stated that early enteral feeding is associated with less wound infection.

Intra abdominal collection: 1 patient(5.88%) had intraabdominal collection in late enteral feeding group out of 17 patients whereas no patients of early enteral feeding group developed intraabdominal collection. In Reissman et al study⁽¹¹⁾ all intraabdominal abscess were due to anastomotic dehiscence and no statistical significant difference found between both the groups which correlated with our study.

Anastomotic Dehiscence: In our study 1 patient (5.88%) had anastomotic dehiscence in late enteral feeding group whereas no patient had anastomotic dehiscence in early enteral feeding group. That correlated with Reissman et al⁽¹¹⁾ study who stated that there is no statistical significant difference between two groups. Reporting on factors that could have modified the effect of early feeding - a) experience of surgeon b) length of operative time c) resection from large or small intestine d) use of antibiotics e) post operative pain control.

Pneumonia: Incidence of postoperative respiratory infection was found to be elevated in advance age group, pre existing poor chest condition, immunocompromised patients or as a consequences of anastomosis dehiscence. No patients had pneumonia in early enteral feeding group and 4 patients (23.5%) had pneumonia in late enteral feeding group which is a significant difference that correlated with Ayman El Nakeeb et al study⁽⁹⁾.

Length of Hospital Stay: In our study Average Post Operative Hospital stay in early enteral feed is 8.6 days whereas in late enteral feed it is 13days. Which correlated with Ayman El. Nakeeb ⁽⁹⁾ who stated that early enteral feeding is safe, well tolerated ,may improve postoperative gastro intestinal motility and plays an important role in enhanced recovery and outcome.

Conclusion

Early enteral feeding significantly reduces- incidence of wound infection , the incidence of paralytic ileus , pain in post operative patients , length of Hospital stay in post operative patients of resection and anastomosis or perforation primary repair.

Nutritional support plays important roles in wound healing and postoperative recovery. A poor nutritional status is strongly associated with delayed wound healing and longer hospital stays after surgery.

Early enteral feeding should be started as soon as possible after resuscitation because the immunomodulatory effect of enteral feeding could assist recovery.

Post operative early enteral feeding is well tolerated in presence of comorbid conditions and also may be beneficial.

Early enteral feeding significantly reduces chances of pneumonia and DVT in post operative patients of resection and anastomosis or perforation primary repair.

No significant difference in anastomotic dehiscence in post operative patients of resection and anastomosis or perforation primary repair in both the groups.

Early Ryle's tube removal, drain removal induces early mobilization of patient thus decreasing complications like DVT and pneumonia; patients remain motivated to resume his work as soon as possible depending upon surgery.

So, early enteral feeding is safe, effective, feasible and cost effective in post operative patients of resection and anastomosis or perforation primary repair.

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