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ORIGINAL ARTICLE

Comparative Analysis of Early versus Late Enteral Feeding after Gastrointestinal Surgeries

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ABSTRACT

Background: Despite of widespread belief, clinical studies and animal experiments have suggested that initiation of early feeding after surgery has many advantages. Present study was planned for comparing outcomes of early and late enteral feeding in patients who were undergoing gastrointestinal surgeries in our settings. This would help the surgeons to select better option for earlier recovery after surgery

Objective: To compare the outcome of early versus late enteral feeding in patients undergoing gastrointestinal surgeries.

Design: It was a randomized controlled trial.

Study Settings: The study was conducted at Department of General Surgery, PIMS Islamabad for a period of six months w.e.f 20-12-2017 to 19-06-2018.

Patients and Methods: A total of two hundred (n=200) patients of both gender between age 15-70 years, who had been scheduled for elective or emergency gastrointestinal surgery were enrolled in the study. Patients were randomized early (Group A, <24 hours after surgery) and late enteral feeding (Group B, <24 hours after surgery). Outcomes were estimated in terms of infection, anastomotic leak and duration of hospital stay in both groups.

Results: Mean age of the patients was 36.8±11.2. There were total 85 females and 115 males with female to male ratio of 1:1.35. Mean duration of hospital stay was 2.62 days ± 0.71 in group A and it was 6.55 days ± 0.71 2.93SD in groups B (P=0.001). Wound infection rate (8% vs 33%, P=0.001) and anastomotic leak rate (0% vs 10%, P=0.001) was also significantly lower in group A when compared with group B.

Conclusion: Initiation of early enteral feeding (within 24 hours post operatively) in patients undergoing gastrointestinal surgeries has an immediate advantage of caloric intake and results in faster recovery with fewer complications. Similar results are found in the literature. We recommend early initiation (within 24 hours after surgery) of enteral feeding in patients undergoing gastrointestinal surgeries.

Keywords: Anostomotic leak, early enteral nutrition (EEN), late enteral nutrition (LEN).

INTRODUCTION

Early enteral nutrition is defined as all oral intake and any kind of tube feeding (jejunal, gastric or duodenal) containing caloric contents within 24 h postoperatively. During metabolic and inflammatory phase, nutritional support is useful as it assists improvements in patient outcomes after surgery.[1] However, there is a strong association between poor nutritional status and longer hospital stay and delayed wound healing after surgery. Enteral feeding is believed to improve immunity and wound healing and reduce septic complications by diminishing stress responses after surgery. Enterocyte growth is stimulated which improves the mucosal barrier function and decreases bacterial translocation.[2,3] Traditionally, it is believed that the early feeding of patients can be dangerous for the patients who underwent gastrointestinal resection and the anastomosis site may leak owing to stress that is why the surgeons preferably not permit oral (NPO) to their patients for 4-5 days post-operation.[3,4]

Early feeding has no adverse effect as even in its absence, about two liters pancreatic and gastrointestinal secretions daily passes from small bowel and transits from anastomosis site, however, early feeding may help positive effect on reducing sepsis and quick wound healing. Mainly colon and stomach are affected by post-operative dysmotiltiy. However, within 4-8 hours of surgery small intestines recovers generally.[5,6] That is why, within first 24 hours of surgery, feeding is well tolerated. Early enteral feeding has been emphasized after resuscitation as soon as possible as its immunomodulatory effect may help recovery by reducing incidence of ileus and gastroparesis.[7] Other studies reported early enteral feeding reduces infectious complications, accelerates wound healing, improves nitrogen balance (NB) and improves immunity which result in turn reduces the length of hospital stay and health costs.[8], outcomes of early versus delayed oral feeding were evaluated by Jan et al.[9] in elective cases undergoing large or small intestinal anastomosis and reported post-operative hospital stay ranged between 4-5 days in early feeding group vs 7-15 days in delayed group. 4.8% in EEN group and 11.2% in LEN group had wound discharge. 3.2% in early feeding group and 13.3% in delayed feeding group had anastomotic leak in the post-operative period (p=0.04). Mortality was 3.2% in delayed feeding group versus no mortality in early feeding group (p=0.2479)7. Recently, Dorai et al.[10] showed mean length of stay at hospital as 9.3 days ± 3.7 SD vs 10.90 days ± 4.3 SD in early feeding group and late feeding group respectively (p-value=0.129).

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The purpose of this study was to compare outcomes of early and delayed enteral feeding in patients who were undergoing gastrointestinal surgeries in local population. This study would help the surgeons to devise better surgical plans for these patients, which eventually could promote enhanced recovery after surgery.

PATIENTS AND METHODS

Sample size of 200 patients was calculated by using WHO calculator (7.4) for two population means at 5% level of significance, 80% power of test, population standard deviation 4.00[10], 9.3[10], and anticipated population mean 10.9[10] through, non-probability consecutive sampling technique and the patients were distributed into two random groups of 100 each. Patients of both the genders who were aged between 15-70 years and were scheduled for elective or emergency gastrointestinal surgery were included in this study. However, patients already undergone cholecystectomy, appendectomy, or adhesiolysis without bowel resection and/or anastomosis and who were suffering from sustained bowel ischaemia and/or short bowel syndromes were excluded from the study. An informed written consent was taken from all the patients. Gastrointestinal surgery was done as per surgeon's technique. Data regarding all the variables was recorded on a single proforma. Antibiotics were used pre-operatively and post operatively according to the condition of the patient. Group A subjects were started with enteral feeding within 24 hours after the surgery and in group B enteral feeding was commenced after 24 hours of surgery. Eternal feeding in both groups was started with liquids followed by semisolid and solid components. In early feeding group, eternal feeding was started as early as within 4 hours in some patients. Outcomes were estimated in terms of infection, anastomotic leak and duration of hospital stay in both groups. All the collected data and demographic details of the patient was recorded in the standard proforma.

SPSS version 17 was used for data analyis. Quantitative variables like age, duration of hospital stay were measured as Means and Standard Deviation while Qualitative variables like gender, presence of anastomotic leak, presence of wound infection was presented as frequencies and percentages. T-test was applied on numerical variables while Chi square test was applied on categorical variables. were a

Students t-test was used to compare the numerical variables (duration of hospital stay) in both groups and Chi-square test was used for comparing categorical variables (wound infection and anastomosis leak) hospital stay) in both groups. P value of ≤0.05 was considered as statistically significant. Data was stratified for effect modifiers and post stratification chi-square was applied.

RESULTS

Mean age of the patients was 36.8±11.2. There were total 85 females and 115 males with female to male ratio of 1:1.35. Mean duration of hospital stay was 2.62 days ± 0.71SD in group A and it was 6.55 days ± 0.71 2.93SD in group B as given in Table 1. The difference was statistically significant and duration of hospital stay was shorter in group A in comparison with group B (p-value=0.001) as given in Table 2. Wound infection rate was low significantly in group A when compared with group B (8% vs 33%, P-value chi-square = 0.001, table 5). Similarly, anastomotic leak rate was low significantly in group A when compared with group B (0% vs 10%, P-chi-square = 0.001) as well as given in Table 3. Similar trends (shorter duration of hospital stay, lower infection and anastomosis leak rate in group A compared to group B) were noted when data were stratified for gender, age and type of surgery that all were significant across all the groups.

Table 1: Baseline Characteristics of Study Sample

Characteristics	Participants (n=200)
Gender	
• Male	115 (57.5%)
• Female	85 (42.5%)
Mean age in both the groups	36.8±11.2
• Early	36.2±10.8
• Delayed	37.1±11.6
Age groups – years	
• 15-40	142 (71.0%)
• 41-70	58 (29.0%

Table 2: Mean duration of hospital stay in both groups

Groups	Mean Duration of Hospital Stay	p-value
• Early	2.62±0.71	0.001
• Delayed	6.55±2.93	

Table 3: Rate of wound infection & anastomotic leak infection in both groups

Description	Groups	Total	p-value	
	Early	Delayed		
Wound Infection				
Present	8 (8.0%)	33 (33.0%)	41 (20.5%	0.001
Absent	92 (92.0%)	67 (67.0%)	159 (79.5%)	
Anastomotic Leak				
Present	0 (0.0%)	10 (10.0%)	10 (5.0%)	0.001
Absent	100 (100.0%)	90 (90.0%)	190 (95.0%)	

Table 1: Duration of hospital stay in both the groups

Age Groups	Groups	Mean duration of Hospital Stay (Days)	Total	p-value
15-40 years	Early	2.69	0.77	0.001
	Delayed	6.661	3.10	
41-70 years	Early	10 (10.0%)	10 (5.0%)	
	Delayed	90 (90.0%)	190 (95.0%)	

DISCUSSION

After gastrointestinal surgery, there is controversy regarding role of early postoperative enteral nutrition. The norm is to give rest to the gut for 3 to 5 days. Surgeons are apprehensive due to many reasons such as anesthetic agents and personal beliefs.[7] Present study was planned to compare the outcomes of early and delayed enteral feeding in patients who undergoing gastrointestinal surgeries at PIMS. A total of two hundred (n=200) patients of both gender between age 15-70 years were nerolled in this study, who were scheduled for elective or emergency gastrointestinal surgery. Patients were randomized early (Group A, <24 hours after surgery) and late enteral feeding (Group B, <24 hours after surgery). Outcomes were estimated in terms of infection, anastomotic leak and duration stay at hospital in both groups.

Hospital stay mean duration as per findings of our study was 2.62 days ± 0.71SD in group A and it was 6.55 days ± 0.71 2.93SD in groups B (P=0.001). Our results are similar with Shang et al.[11] who reported EEN group had hospital stay of 7.3±1.7 days versus 9.1±1.5 days in the LEN group (P=.069). Lee et al.[12] in their study also demonstrated that patients receiving EEN had shorter duration of hospital stay (median: 14.0, interquartile range: 8.0-24.0 vs median: 17.0, interquartile range: 11.0-26.0, P=0.048). Significantly shorter stay at hospital was demonstrated by Nematihonar et al.[13] in EEN group (4 ± 0.59 days vs. 6.1 ± 0.79 days). Shu et al.[14] in meta-analysis identified that EEN was associated with shortened length of stay at hospital besides helping to recover functioning of digestive system. EEN was exhibited more efficacious in increasing prealbumin and serum albumin by Yang et al.[15] and its significant role to promote gastrointestinal functions recovery and decreased stay at hospital particularly for colon cancer. In the present study, we did not take serum albumin and prealbumin as outcome variables. On clinical outcomes and immune responses after esophageal cancer operations effect of EEN was evaluated by Zhu et al.[16] and they showed that EEN group had significantly shorter stay at hospital in comparison with total parenteral nutrition (9.3±1.3 days, 7.8±1.1 days; P<0.01). It was held by all above authors that early recovery of gastrointestinal functions can be promoted by EEN and that is why leads faster postoperative recovery in esophageal cancer patients. In another study on esophageal cancer patients, Wang et al. [17] reported that patients in EEN group had lower thoracic drainage volume, early first fecal passage, and the lowest LOH and hospitalization expenses of the three groups.

Present study revealed that wound infection rate (8% vs 33%, P=0.001) and anastomotic leak rate (0% vs 10%, P=0.001) was also significantly lower in group A when compared with group B. Similar findings were reported by Shang Q et al.[11] where no difference was observed in occurrence of complications associated with enteral feeding versus the control group (2.9±1.7 days vs 3.6±1.1 days, risk ratio [RR] 0.59; 95% confidence interval [CI] 0.39-1.06, P=.039). complications including infections were observed between EEN versus LEN patients as (116 [45.8%] vs 136 [53.9%]; OR, 0.69, 95% CI 0.49-1.02, P=.047) by Wu et al.[9] Lower rate pulmonary complications were reported by Lee et al.[12] (LEN 19.4% vs. EEN 4.5%; P-value=0.007) than those receiving LEN. We, however, in the present study did not estimate these variables. Nematihonar et al. [13] exhibited tolerance to early feeding by majority of the subjects (93%). In early feeding group no abscess formation or anastomosis leakage was observed. In digestive tract surgery patients, EEN was found more effective by Shu et al. 14 for decreasing incidence of infections (RR=0.69, 95% CI: 0.42, 1.19; P<0.04). In late feeding group, frequency of pneumonia was found highest by Wang et al.[17] (p = 0.019) besides observing significantly worst post operational outcomes. Andersen et al.[18] in their systematic review analysis evaluated whether complications associated with commencement of postoperative enteral nutrition at earliest or traditionally gastrointestinal surgery patients by involving 1173 patients under 13 randomized controlled trials. There was no statistical significance between individual clinical symptoms, however, it was indicated by the direction of effects that risks of post-surgical complications are reduced by early feeding. Shen et al.[19] in their meta-analysis, aimed evaluation of efficacy and safety of EEN for patients after pancreatoduodenectomy. They included four RCTs published in 2000 or later in which 246 patients underwent EEN and 238 patients and reported that EEN appears safe and tolerated for patients after pancreatoduodenectomy.

A limitation to current study was non-inclusion of variables like defecation, pulmonary complications and ICU-free days. That is why, such a study is strongly recommended in future.

CONCLUSION

Initiation of early enteral feeding (within 24 hours post operatively) in patients undergoing gastrointestinal surgeries has an immediate advantage of caloric intake and results in faster recovery with fewer complications. Similar results are found in the literature. We recommend early initiation (within 24 hours after surgery) of enteral feeding in patients undergoing gastrointestinal surgeries.

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