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Comparison of Early vs Late Resumption of Enteral Feeding after Small Bowel Anastomosis

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ABSTRACT

Introduction: Small bowel anastomosis is commonly performed in general surgical practice. Traditionally, Patients are kept nil by mouth for 48 to 72 hours in the belief that it will help in the healing of the anastomosis. However, recently, there is increasing evidence that early initiation of enteral feeding is both safe and beneficial. Our study aimed to compare early and traditional practices of enteral feeding after small bowel anastomosis. **Materials and Methods:** This study was a single-blinded, randomised controlled trial. The sample size was calculated to be 204, 102 in each group. Participants were randomly allocated to the early enteral feeding group (Group A) or the late group (Group B). In the Early group, enteral feeding was commenced after full recovery from anaesthesia, usually within 24 hours of surgery. In the late group, feeding was started after 24 - 48 hours, usually after the return of bowel function. **Results:** Our study demonstrated a statistically significant difference in terms of time to passage of stool or flatus and mean hospital stay between early and delayed initiation of enteral feeding. The incidence of postoperative vomiting and anastomotic leak had no statistically significant difference. **Conclusion:** Early initiation of enteral feeding after small bowel anastomosis is safe and is associated with quicker return of bowel function and shorter hospital stay as compared to delayed initiation of enteral feeding.

INTRODUCTION

Small bowel anastomosis is commonly performed, with various indications, in both elective and emergency general surgical procedures. Traditionally, patients were kept nil by mouth (NBM) till the return of bowel movements. Delayed oral feeding following gut surgery is believed to reduce complications by decreasing gut contents, thus giving time for the gut to heal [1,2]. However, about 2.5 litres of fluid is produced daily in the small bowel, regardless of whether there is an early or late resumption of enteral feeding, and the fluid passes through the area of small bowel anastomosis [3]. Prolonged fasting is associated with damage to the epithelial lining of the intestines and translocation of bacteria to the bloodstream, with a resultant increase in the morbidity and mortality of patients. Delayed feeding has been shown to increase infectious complications, impair wound healing, and increase healthcare costs [4].

Recently, there has been increasing evidence in favour of the early resumption of enteral feeding as part of the enhanced recovery after surgery program [5]. It has been shown to reduce both morbidity and mortality in surgical patients.

In one previous study, hospital stay was also significantly shorter in the early feeding group (4 ± 0.64 days vs. 6.1 ± 0.84 days). Anastomosis leakage and abscess formation were not seen in the early feeding group. The patient's satisfaction (visual analog scale) in the early feeding group was higher than the delayed feeding group (8.56 ± 1.16 vs. 7.06 ± 1.59, P< 0.001) [6]. In another study, the mean hospital stay was 5.8 + 0.8 in early compared to 9.23 + 1.8 in the late feeding group. Stool passage on the 2nd postoperative day was 73.3% vs 56.7%, vomiting 10% vs 0%, between the early vs late feeding groups, respectively [7].

Recent evidence suggests that early feeding is associated with shorter length of stay, early return of bowel movements, less need for total parental nutrition (TPN), and fewer chances of anastomotic leak [8].

The aim of this study was to compare the outcomes between patients who had early resumption of enteral feeding with those who had a delayed resumption after small bowel anastomosis.

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MATERIAL AND METHODS

This study was single-blinded randomised control trial. After approval from the ethics and research board of Khyber Medical College Peshawar from 5 Dec 2022 to 5 June 2023, the study was registered in the clinical trials registry (clinicaltrials.gov , NCT 06906289). The sample size was calculated to be 204, 102 in each group, using Openepi , keeping the following assumptions;

Frequency of stool passage on 2nd postoperative day in early feeding group: 73.3% [7]

Frequency of stool passage on 2nd postoperative day in late feeding group: 56.7% [7]

Confidence level: 95%, Power of the test: 80%. After informed consent, participants were randomly allocated to either the early enteral feeding group (Group A) or the late group (Group B). In the Early group, enteral feeding was commenced after full recovery from anaesthesia, usually within 24 hours of surgery. In the late group, feeding was started after 24 - 48 hours, usually after returning of bowel function. The feeding regimen in both groups was the same and initially consisted of clear liquid fluid (water or green tea) and returned to a routine diet as tolerated by the patient. Outcome measures included time to passage of stool or flatus (in days), postoperative vomiting, length of hospital stay (in days), and anastomotic leak and mortality rate. The length of hospital stay was measured from the day of surgery till discharge from the hospital. Other parameters that were recorded were age, gender, indication for surgery, and co-morbidities. Patients between 15 and 65 years of age and both genders were included. Those patients who were using corticosteroids or other immunosuppressive drugs were excluded, as were patients in sepsis and hemodynamically unstable. The study duration was 1 year, and patients were followed till discharge or anastomotic leak or death. s

Statistical analysis was performed using IBM SPSS software version 26. Means and frequencies were calculated for age and gender, respectively. Chi-square and t-tests were performed to determine the significance of correlation between different variables. Data is represented in the form of table.

RESULTS

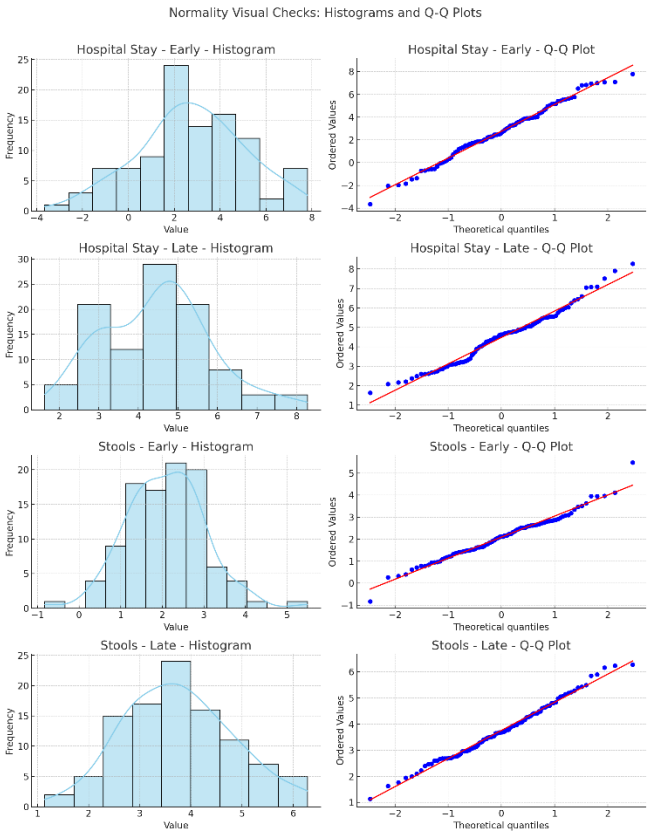
To assess the normality of the continuous variables, the Shapiro-Wilk test was performed on the distributions of hospital stay and time to passage of stools/flatus for both the Early and Late groups. The results indicated that all variables followed near normal distribution. Furthermore, visual inspection of the histograms and Q-Q plots confirmed the results of the Shapiro-Wilk test, showing approximately symmetric distributions and linear Q-Q plots for all groups.

Table 1

Shapiro-Wilk Test Results

Variable	W Statistic	p-value
Hospital Stay - Early	0.990	0.662
Hospital Stay - Late	0.981	0.137
Stools - Early	0.984	0.252
Stools - Late	0.991	0.702

Figure 1



The mean hospital stay was significantly different between the two groups. Patients in the Early group had a mean hospital stay of 3.06 ± 2.56 days, while those in the Late group had a mean stay of 4.38 ± 1.43 days. An independent samples t-test was conducted to compare the hospital stay between the two groups. Levene's test indicated a significant difference in variances ($F = 17.35$, $p < .001$); therefore, equal variances were not assumed. The results of the Welch's t-test showed a statistically significant difference in mean hospital stay between the Early and Late groups ($t(169) = -4.55$, $p < .001$), with a mean difference of -1.32 days (95% CI: -1.889 to -0.751).

Table 2

Group Statistics for Hospital Stay

Group	N	Mean	Std. Deviation	Std. Error Mean
Early Group	102	3.06	2.56	0.253
Late Group	102	4.38	1.43	0.141

Table 3

Independent Samples Test for Hospital Stay

Levene's Test F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
17.35	.000	-4.55	202	.000	-1.32	0.291	-1.893	-0.747
		-4.55	169	.000	-1.32	0.290	-1.889	-0.751

The mean time to passage of stools or flatus differed significantly between the two groups. Patients in the Early group had a mean time of 2.06 ± 0.89 days, while those in

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the Late group had a mean of 3.67 ± 1.19 days. An independent samples t-test was conducted to compare the means between groups. Levene's test indicated a significant difference in variances (F = 11.72, p = .001); therefore, the assumption of equal variances was not met, and Welch's t-test was applied. The results revealed a statistically significant difference in the mean time to passage of stools/flatus between the groups (t(174) = -10.62, p < .001), with a mean difference of -1.61 days (95% CI: -1.91 to -1.30).

Table 4

Group Statistics for Passage of Stool/Flatus

Group	N	Mean	Std. Deviation	Std. Error Mean
Early Group	102	2.06	0.89	0.088
Late Group	102	3.67	1.19	0.118

Table 5

Independent Samples Test for Passage of Stool/Flatus

Levene's Test F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lowe	95% CI Uppe
11.72	.001	-10.94	187	0.000	-1.61	0.147	-1.900	-1.320

Incidence of vomiting in group A was 2.9% (3 out of 102) and in group B was 4.9% (5 out of 102). The difference in vomiting between the groups was statistically not significant when chi square test was applied. Rate of anastomotic leak in both groups was same i.e 0.9%. The Mortality rate in group A was 0.98% (1 in 102) and in group B was 1.96% (2 in 102), with no statistical difference.

Table 6

Shows Demographic Features of the Patients in Group A and Group B

Demographics		Group A	Group B
Mean age		40.44 ± 17.07	41.6± 18.02
Mean BMI		23.44 ± 3.32	24.44 ± 2.74
Mean Hospital stay		3.06 ± 2.56 days	4.38 ± 1.43 days.
Mean time to passage of stool/flatus		2.06 ± 0.89 days	3.67 ± 1.19 days
Postoperative vomiting		2.9%	4.9%
Gender	Male	67	72
	Female	35	30
Comorbidities	Diabetic	20	14
	Hypertensive	16	18
	Chronic Kidney disease	1	0

DISCUSSION

Resumption of enteral feeding after bowel anastomosis is a long-standing debate in surgical practice. Late enteral feeding was thought to reduce the incidence of vomiting and anastomotic leak by giving rest to the bowel and promoting healing. However, there is a growing body of evidence to suggest that early resumption of enteral feeding is both safe and associated with potential advantages, including early return of bowel function, shorter hospital stays, and reduced dependence on enteral feeding. Our study aims to compare outcomes between early and late resumption of enteral feeding after small bowel anastomosis.

The hospital stay in our study in group A was 3.06 ± 2.56 days, and that of group B was 4.38 ± 1.43 days. The difference was statistically significant. Early resumption leads to early return of bowel function in terms of passage of stools or flatus and mobility out of bed. This leads to early discharge from the hospital. In one previous study, hospital stay was also significantly shorter in the early feeding group (4 ± 0.64 days vs. 6.1 ± 0.84 days). Anastomosis leakage and abscess formation were not seen in the early feeding group. The patient's satisfaction (visual analog scale) in the early feeding group was higher than the delayed feeding group (8.56 ± 1.16 vs. 7.06 ± 1.59, P< 0.001) [6]. In another study, the mean hospital stay was 5.8 + 0.8 in early compared to 9.23 + 1.8 in the late feeding group. Stool passage on 2nd post operative day was 73.3% vs 56.7%, vomiting 10% vs 0%, between early vs late feeding groups respectively [8]

Emma Osland et al conducted a meta-analysis on early and traditional resumption of enteral feeding after resectional surgery. The meta-analysis had fifteen studies that included a total of 1240 patients. A statistically significant reduction (45%) in the relative odds of total postoperative complications was seen in patients receiving early postoperative feeding. No effect of early feeding was seen with relation to anastomotic dehiscence (OR 0.75; CI, 0.39–1.4, P = .39), mortality (OR 0.71; CI, 0.32–1.56, P = .39), days to passage of flatus (weighted mean difference [WMD] −0.42; CI, −1.12 to 0.28, P = .23), first bowel motion (WMD −0.28; CI, −1.20 to 0.64, P = .55), or reduced length of stay (WMD −1.28; CI, −2.94 to 0.38, P = .13) [9]. Our study showed similar results in terms of complications, i.e, vomiting and anastomotic leak.

Marek Sierzega et al performed a study that included 353 patients who underwent total gastrectomy for gastric cancer between 2006 and 2012. The study was a retrospective study. The study results showed no increase in the risk of anastomotic dehiscence when early feeding was instituted [9]. Similar was the case in our study, where no increased incidence of anastomotic leak was identified in the early feeding group.

Yuxin Tian et al conducted a systematic review that included patients in whom early feeding was instituted after intestinal anastomosis. Although the study included paediatric age patients, it nonetheless showed similar results to our study in terms of hospital stay, return of bowel function, risk of anastomotic leak, and vomiting. The postoperative anastomotic leak rate between the early and delayed feeding groups was 0% (OR = 0.86; 95% CI 0.17-4.46; p = 0.86). The early group had a shorter length of hospital stay (MD = - 3.38; 95% CI - 4.29 to - 2.48; p < 0.00001), earlier time to bowel movement return (MD = - 0.57; 95% CI - 0.79 to - 0.35; p < 0.00001) [10]

Alwin Issac performed a systematic review on children undergoing gastrointestinal surgery and bowel anastomosis. Similar to our findings, the study concluded that early initiation of enteral feeding is associated with a shorter hospital stay, earlier bowel movements, and no increased risk of anastomotic leakage or other complications. [11] Although the study includes patients of pediatric age, it shows the benefits and safety of early

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initiation of enteral feeding as compared to delayed resumption of oral feeding after gastrointestinal surgery. Our study provides a valuable insight into the surgical practices related to enteral feeding after intestinal anastomosis. Early feeding is associated with early return to bowel function and shorter hospital stay. Early feeding does not increase the chances of anastomotic leak and vomiting. Although the sample size was adequate for statistical analysis, a multi-centre study is recommended to further evaluate the benefits of early feeding. One other limitation of our study is that we only included those patients who were operated on in an elective situation. Those patients who underwent surgery in an emergency setting were excluded from the study. Further study will be required to assess the outcomes of early feeding in such patients.

CONCLUSION

Early Resumption of enteral feeding after small bowel anastomosis is associated with quicker return of bowel function and shorter hospital stay. There is no difference in the incidence of vomiting, anastomotic leaks and overall mortality rate between early resumption and late resumption of enteral feeding after small bowel anastomosis.

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