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Original Research Article

A comparative study on early versus conventional feeding in patients under going small bowel anastomosis

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ABSTRACT

Background: Postoperative nutritional management plays a critical role in surgical recovery, particularly following gastrointestinal procedures such as small bowel anastomosis. Traditional practice delays enteral nutrition until bowel sounds or flatus return; however, recent evidence suggests that early enteral feeding (EEN) may improve outcomes without increasing complications. Aim was to compare patient compliance, tolerance, and clinical outcomes between early enteral feeding and conventional feeding methods in patients undergoing elective small bowel anastomosis.
Methods: This prospective comparative study was conducted at a tertiary care center over a two-year period. A total of 100 patients undergoing elective small bowel anastomosis were randomly divided into two groups: Group A (Early feeding, n=50): Initiated enteral feeding via nasogastric tube on postoperative day (POD) 2. Group B (Conventional feeding, n=50): Began oral feeding after return of bowel sounds, typically POD 5-7. Parameters assessed included vomiting, abdominal distension, return of bowel function, nasogastric tube removal, infection, anastomotic leak, length of hospital stay, and patient compliance. Data were analyzed using standard statistical tests; a $p<0.05$ was considered significant.
Results: Early return of bowel function: Flatus passed significantly earlier in group A (mean 2.4±0.6 days) vs. group B (3.6±0.7 days), $p<0.001$. Shorter hospital stay: Group A had a significantly shorter stay (6.1±1.3 days) than group B (9.4±1.6 days), $p<0.001$. Lower abdominal distension: Group A (10%) vs Group B (26%), $p=0.04$. Similar complication rates: anastomotic leak was rare and not significantly different (2% vs. 4%, $p=0.56$). High compliance: 92% in Group A tolerated early feeding; 100% in Group B adhered to conventional feeding.
Conclusions: Early enteral feeding following small bowel anastomosis is better tolerated and enhances postoperative recovery of the patients, faster bowel function recovery and reduced hospital stay without increasing the risk of complications. Following Early enteral feeding in routine practice is aligned with Enhanced Recovery After Surgery protocol (ERAS).

Keywords: Early enteral feeding, Small bowel anastomosis, Early bowel recovery, ERAS, Reduced hospitalisation

INTRODUCTION

Postoperative care following gastrointestinal surgeries, particularly involving small bowel anastomosis, has undergone notable changes in the past decades. Conventionally patients undergoing Gastrointestinal surgeries were kept on nil per oral (NPO) until bowel function resumes, which means passage of flatus and stools. This approach was called conventional feeding. This approach believed that if enteral feeding was started early, could increase the risk of complications like abdominal distention, delay healing time and postoperative anastomotic leak.

However, recent data and enhanced recovery protocol have questioned this belief. The concept of early enteral

feeding has been emerging widely and proved to be beneficial to the patients postoperatively. Early enteral feeding is defined as initiation of enteral feeding within 24-48 hours postoperatively. This change in the concept of early enteral feeding has shown marked improvement in maintaining gut mucosal integrity, stimulation of peristalsis, reduced septic complications and better immune response. It forms the essential element of ERAS.

Small bowel anastomosis is a common surgical procedure performed for various indications, including bowel obstruction, trauma, Crohn's disease, tumors, or iatrogenic injury. Despite advances in surgical technique, postoperative recovery remains critical, and nutritional management plays a key role in determining outcomes. The timing of feeding has profound implications for patient recovery, length of hospital stay, risk of complications, and overall cost of care.

Recent clinical trials and meta-analyses have provided increasing support for early feeding, showing that it may be safe and beneficial in selected patients. Nonetheless, hesitancy persists among surgeons due to concerns regarding postoperative ileus, nausea, vomiting, and particularly the risk of anastomotic dehiscence-a complication associated with high morbidity and mortality. Therefore, a clear understanding of the comparative out comes of early versus conventional feeding is vital for establishing evidence-based guidelines.

Globally, the prevalence of small bowel resections and anastomosis is substantial, though exact figures vary depending on the health care setting and regional disease burdens. For instance, in developed countries, indications such as Crohn's disease and malignancies are more prevalent, whereas in developing countries, infectious etiologies, volvulus, or trauma might predominate. A 2016 multicentric European study estimated that over 200,000 small bowel anastomoses are performed annually in Europe alone, highlighting the clinical significance of postoperative care optimization.[1]

Despite emerging guidelines advocating for early feeding, clinical practice remains inconsistent. A large observational study conducted across tertiary care centers in North America showed that only 40-60% of patients received early postoperative feeding after elective bowel resections.[2] Variability is influenced by surgeon preference, institutional policies, and patient-specific factors such as hemodynamic stability and intraoperative findings.

The gastrointestinal tract plays a critical role in systemic immune regulation, fluid balance, and nutrient absorption. Prolonged fasting and bowel rest can lead to mucosal atrophy, increased intestinal permeability, bacterial translocation, and dysbiosis-all of which contribute to systemic inflammatory response and increased susceptibility to infection.[3] Conversely, early enteral nutrition helps maintain the gut barrier, supports lymphoid tissue, and promotes the release of gastrointestinal hormones like motilin and gastrin, which stimulate motility.

From a metabolic standpoint, early feeding prevents the catabolic state induced by surgical stress. It improves nitrogen balance, reduces insulin resistance, and facilitates earlier mobilization. Randomized controlled trials in patients undergoing gastrointestinal surgery have shown that early enteral feeding can enhance protein synthesis, reduce inflammatory markers, and improve wound healing.[4,5]

A central concern in initiating early feeding in patients with small bowel anastomosis is the potential risk of anastomotic leakage, a feared complication associated with significant morbidity. Conventional wisdom suggested that feeding could distend the bowel, increase intraluminal pressure, and compromise suture integrity. However, experimental and clinical studies have increasingly refused these concerns. Modern anastomotic techniques using staplers or hand-sewn interrupted sutures provide robust healing, with leak rates generally below 5-7% in elective cases.[6]

Several randomized controlled trials have demonstrated that early enteral feeding does not increase the risk of anastomotic leakage compared to conventional feeding.[7,8] In fact, early feeding has been associated with reduced infectious complications, improved wound healing, and faster gastrointestinal recovery.

The ERAS Society strongly advocates early initiation of oral intake following major abdominal surgery, including colorectal and small bowel procedures. The ERAS 2018 guidelines recommend starting a normal diet within 24 hours of surgery in the absence of contraindications.[9] This recommendation is supported by multiple meta-analyses and Cochrane reviews that have found no increased risk of complications with early feeding, and often report improved outcomes in terms of hospital stay and patient satisfaction.

These changes in clinical paradigms require reassessment through context-specific research, particularly in settings with varying levels of surgical infrastructure and patient demographics. The balance between evidence-based practice and individualized patient career mains delicate, especially in low-resource settings.

Several systematic reviews and meta-analyses have evaluated early versus delayed feeding after gastro intestinal surgery. A2011 Cochrane review by Lewis et al analyzed 13 randomized trials and found that early feeding reduced the risk of infections and length of hospital stay without increasing complications.[10] Another meta-analysis by Osland et al confirmed these findings in colorectal surgery patients.[11] However, many of these

studies aggregate data from heterogeneous procedures (colonic, rectal, gastric, and small bowel surgeries), limiting their applicability to small bowel anastomoses specifically.

Moreover, most available studies are from high-income countries. There is limited data from developing nations where perioperative nutrition status, surgical technique, and postoperative care differ significantly. Patients in these settings may present later in the disease course, often malnourished or septic, which can influence surgical out comes and the appropriateness of early feeding.

Hence, a focused comparative study investigating early versus conventional feeding specifically in patients undergoing small bowel anastomosis is essential. It helps us to understand the advantages and disadvantages in a uniform population and provide strong evidence and guide the surgeons in the areas where evidences are scattered.

Due to significant load in small bowel surgeries and differences in feeding practice, it's necessary to uphold strategies for early enteral feeding. Early enteral feeding has dramatically altered the postoperative outcome leaning towards benefits more than risk. However vigilant care to be taken when these strategies can be exercised in complex surgeries and hemodynamic instability.

A well-designed, controlled comparison of early and conventional feeding in small bowel anastomosis patients will help solidify the role of nutrition timing in recovery protocols and contribute to global efforts in improving surgical care standards.

Aim

The present study aimed to compare outcomes between early and conventional feeding in patients undergoing small bowel anastomosis.

METHODS

Study design

This was a prospective comparative study conducted to evaluate and compare patient compliance, tolerance, and postoperative outcomes between early enteral feeding and conventional feeding methods in patients undergoing elective small bowel anastomosis.

Study setting and duration

The study was carried out at Government Theni Medical College and Hospital (GTMCH) over a two-year period, allowing for adequate recruitment, observation, and follow-up of the patients meeting inclusion criteria.

Sample size

A total of 100 patients undergoing elective small bowel anastomosis were included. These patients were randomly assigned into two groups:

Group A (Case group/ early enteral feeding)-50 patients received enteral feeding starting on POD 2 via a nasogastric tube.

Group B (Control group/conventional feeding)-50 patients were started on oral feeds after the return of bowel function, typically between POD 5-7.

Inclusion criteria

Patients were enrolled based on the following criteria: Underwent elective small bowel anastomosis, aged 18-60 years, provided informed consent for participation.

Exclusion criteria

Patients were excluded if they met any of the following conditions: Immuno-compromised status, requirement for postoperative mechanical ventilation, age<18 years or>60 years, presence of fecal peritonitis, Anastomosis performed during emergency procedures, presence of sepsis, perforation peritonitis, mesenteric ischemia and relaparotomy.

Eligible patients were enrolled preoperatively and randomized in to one of the two study groups. Standard pre-operative optimization was ensured for all the patients.

Group A (early enteral feeding protocol)

Enteral feeding was initiated via nasogastric tube on POD2. Patients were monitored for signs of abdominal distension, vomiting, or ileus. If intolerance was noted (nausea, vomiting and distension), feeds were withheld for24 hours and then gradually reintroduced. Once bowel movements resumed and the general condition improved, the nasogastric tube was removed, and patients were shifted to oral feeds.

Group B (conventional feeding protocol)

Patients were kept NPO until the return of bowel sounds and passage of flatus/stool, typically by POD 5-7. Oral feeding was initiated once these signs were confirmed.

Randomization and blinding

Patients were randomized using simple random sampling. The study was not blinded due to the nature of the intervention (feeding routes and timing), but outcome assessors were kept unaware of the group assignments where possible.

Clinical parameters monitored

The following postoperative parameters were observed and documented daily for all patients: Vomiting, abdominal pain, abdominal distension, drain tube (DT) out put measurement, time to passage of flatus and stool, time of nasogastric tube removal, wound infection (local or systemic) and anastomotic leakage (clinical and radiological diagnosis).

These parameters were assessed until hospital discharge and documented using a standardized proforma, which included demographic details surgical notes nutritional status at admission and discharge, and postoperative recovery indicators.

Outcome measures

Primary outcomes were patient compliance to feeding protocols and incidence of feeding in tolerance. Secondary outcomes were time to initiation of oral feeds, duration of hospital stay, time to return of bowel function, incidence of postoperative complications, including: Ileus, infection and anastomotic leak.

Data collection and analysis

All data were entered in a structured format and analyzed using statistical software (e. g., SPSS or R). Categorical variables (e.g., vomiting, infection) were expressed as percentages and compared using Chi-square or Fisher's exact test. Continuous variables (e. g., time to feed, hospital stay) were expressed as mean±SD and analyzed using independent t tests or Mann-Whitney U tests, based on data distribution. A $p<0.05$ was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the institutional ethics committee (IEC) of GTMCH prior to study initiation.

All patients were informed about the study objectives, and written informed consent was taken. Patient confidentiality was strictly maintained throughout the study.

No financial incentives were provided to participants, and participation was entirely voluntary.

RESULTS

The age distribution across both study arms was statistically comparable (Chi-square test, $p=0.96$). This indicates effective randomization, minimizing age as a confounding variable that could influence recovery time, tolerance to feeding, or complication rates. Therefore, outcomes observed between groups can be reliably attributed to the intervention and not age-related variability.

Gender distribution was nearly identical between both groups ($p=0.84$). The near-equal representation of male and female patients in both arms ensures that sex-based physiological differences in gut motility, pain perception, or nutritional needs do not bias the comparative assessment of feeding strategies.

Although the conventional group had a higher frequency of postoperative vomiting (28% vs 16%), the difference did not reach statistical significance ($p=0.14$). Clinically, however, this trend may indicate better gastrointestinal tolerance in the early feeding group, warranting further study with a larger sample to validate this observation.

Anastomotic leak occurred infrequently and showed no statistically significant difference between groups ($p=0.56$). This supports existing evidence that early enteral feeding does not increase the risk of anastomotic dehiscence when performed under stable postoperative conditions.

Abdominal distension was significantly more common in the conventional feeding group ($p=0.04$). This finding suggests early enteral feeding may facilitate quicker gastrointestinal adaptation postoperatively, reducing gaseous bloating and intolerance.

Patients in the early feeding group experienced earlier return of bowel function as indicated by passage of flatus and stool. The difference was statistically significant ($p<0.001$), reinforcing the motility-stimulating effect of enteral feeding and its role in preventing ileus.

As ERAS protocol signifies and encourages early enteral feeding, the above study also shows that early feeding leads to early removal of NG tube, thereby enhancing patients' recovery and reduced complications.

The incidence of wound infection is higher in conventional group (18% vs 8%). Though the difference is not significant ($p=0.13$), it supports the immunomodulatory role of early enteral feeding.

Early enteral feeding group had markedly shorter hospital stay than the conventional group (mean difference ~3.3 days, $p<0.001$). This reduction likely reflects earlier return of bowel function, fewer complications, and faster transition to full recovery-highlighting early feeding's impact on resource utilization and patient turnover.

The early feeding group showed a slightly lower compliance rate (92%) due to mild intolerance (e.g., nausea or bloating), which resolved conservatively. Despite this, the compliance was high overall, and the statistically significant difference ($p=0.04$) emphasizes the need for patient education and gradual advancement of feeds in EEN protocols.

Table 1: Age distribution of patients in early vs. conventional feeding groups.

Age group (in years)	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
18-30	11 (22%)	10 (20%)	21 (21%)
31-40	14 (28%)	13 (26%)	27 (27%)
41-50	13 (26%)	14 (28%)	27 (27%)
51-60	12 (24%)	13 (26%)	25 (25%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.96 (NS)

Table 2: Gender distribution of patients in early vs. conventional feeding groups.

Genders	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Male	31 (62%)	30 (60%)	61 (61%)
Female	19 (38%)	20 (40%)	39 (39%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.84 (NS)

Table 3: Incidence of postoperative vomiting.

Vomiting	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Yes	8 (16%)	14 (28%)	22 (22%)
No	42 (84%)	36 (72%)	78 (78%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.14 (NS)

Table 4: Incidence of anastomotic leak.

Anastomotic leak	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Present	1 (2%)	2 (4%)	3 (3%)
Absent	49 (98%)	48 (96%)	97 (97%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.56 (NS)

Table 5: Incidence of abdominal distension in early vs. conventional feeding groups.

Abdominal distension	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Present	5 (10%)	13 (26%)	18 (18%)
Absent	45 (90%)	37 (74%)	82 (82%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.04 (Significant)

Table 6: Time to passage of flatus and stool.

Events	Early feeding (Mean±SD)	Conventional feeding (Mean±SD)	P value
Flatus (days)	2.4±0.6	3.6±0.7	<0.001 (Significant)
Stool (days)	3.2±0.8	4.7±1.0	<0.001 (Significant)

Table 7: Time of nasogastric tube removal.

Postop day of NG tube removal	Early feeding, (n=50)	Conventional feeding, (n=50)	P value
Mean±SD	2.2±0.5	5.1±0.9	<0.001 (Significant)

Table 8: Incidence of wound infection.

Wound Infection	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Yes	4 (8%)	9 (18%)	13 (13%)
No	46 (92%)	41 (82%)	87 (87%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.13 (NS)

Table 9: Mean duration of hospital stay.

Groups	Mean duration (days)±SD
Early feeding, (n=50)	6.1±1.3
Conventional feeding, (n=50)	9.4±1.6
P value	<0.001(Significant)

Table 10: Patient compliance with assigned feeding protocol.

Compliance	Early feeding, (n=50)	Conventional feeding, (n=50)	Total, (n=100)
Compliant	46 (92%)	50 (100%)	96 (96%)
Non-compliant	4 (8%)	0 (0%)	4 (4%)
Total	50 (100%)	50 (100%)	100 (100%)
P value			0.04 (Significant)

DISCUSSION

The present study demonstrates that early enteral feeding following elective small bowel anastomosis is safe, feasible, and associated with improved postoperative recovery when compared with conventional delayed feeding protocols.

The early feeding group showed significantly faster return of bowel function, as evidenced by earlier passage of flatus and stool. These findings are consistent with previous systematic reviews and meta-analyses which have demonstrated that early enteral nutrition stimulates gastrointestinal motility and shortens postoperative ileus following gastrointestinal surgery. Lewis et al and Osland et al reported that initiation of enteral feeding within the first 24-48 hours after surgery promotes recovery of gut function without increasing postoperative complications.[7,8,10,11]

Early-fed patients also experienced significantly earlier removal of the nasogastric tube. Routine prolonged gastric decompression has increasingly been questioned because it may delay recovery, increase patient discomfort, and prolong hospitalization. Cheatham et al demonstrated that selective rather than routine nasogastric decompression is associated with comparable safety and improved patient outcomes.[46]

Postoperative wound infection occurred less frequently in the early feeding group, although the difference did not reach statistical significance. Early enteral nutrition has been shown to preserve intestinal mucosal integrity, reduce bacterial translocation, and maintain gut-associated immune function. Studies by Moore et al, Kudsk and Deitch have highlighted the important role of enteral nutrition in reducing infectious complications through maintenance of intestinal barrier function and modulation of the inflammatory response.[12-15]

Anastomotic leak rates were low in both groups, with no statistically significant difference observed. This finding supports the growing body of evidence suggesting that early enteral feeding does not adversely affect anastomotic healing. Previous randomized trials and systematic reviews have similarly demonstrated that early postoperative feeding is not associated with increased anastomotic failure following gastrointestinal surgery.[7-11]

One of the most clinically significant findings of the present study was the reduction in hospital stay among patients receiving early enteral feeding. The shorter duration of hospitalization likely reflects the combined effects of earlier bowel recovery, earlier mobilization, and reduced dependence on supportive measures. Similar benefits have been reported in several studies evaluating enhanced recovery pathways. The ERAS Society guidelines and ESPEN recommendations strongly support early postoperative feeding as an integral component of modern perioperative care aimed at improving recovery and reducing healthcare costs.[9,47-51]

Patient tolerance to early feeding was excellent. Although a small proportion of patients experienced transient nausea, bloating, or vomiting, these symptoms were mild and resolved with conservative management. No patient required discontinuation of enteral nutrition or conversion to parenteral nutritional support. This finding further supports the feasibility of early enteral feeding in appropriately selected patients undergoing elective small bowel anastomosis.

Overall, the results of the present study are consistent with current evidence supporting early enteral nutrition after gastrointestinal surgery. Early feeding was associated with faster gastrointestinal recovery, earlier removal of nasogastric tubes, shorter hospital stay, and comparable complication rates when compared with conventional feeding protocols. These findings support the routine incorporation of early enteral feeding into postoperative care pathways and are in agreement with contemporary ERAS and ESPEN recommendations.

Limitations

The present study was conducted at a single center with a relatively small sample size, which may limit

generalizability of the findings. The duration of follow-up was limited to the immediate postoperative period, and long-term outcomes were not assessed. Larger multicenter randomized studies are required to further validate these findings and evaluate long-term clinical outcomes.

CONCLUSION

Early enteral feeding was found to be safe, feasible, and clinically advantageous. Patients who received early feeds demonstrated significantly faster return of bowel function, earlier nasogastric tube removal, and a shorter duration of hospital stay compared to those managed with conventional feeding protocols. Notably, no rise in anastomotic leak or other complications was observed, strengthening the safety of initiating enteral nutrition within 48 hours postoperatively.

Overall, this study concludes that routine implementation of early enteral feeding in stable patients following elective small bowel anastomosis is effective and safe. It boosts patients physical recovery and also eases the overall strain in the health care system. With careful patient selection, education, and standardized feeding protocols, early feeding can be safely adopted as part of modern post operative care, aligning with ERAS principles.

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