

Outcome of Early Oral Feeding after Primary Repair of Traumatic Intestinal Injury: Prospective Observation in a Tertiary Hospital in Bangladesh

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Abstract

Introduction: A period of starvation is common practice after intestinal anastomosis. Starved patient became malnourished and underwent catabolic state, impairing the host immune response and thus increasing the risk of postoperative infections thereby long hospital stay.

Objective: To observe the outcome of early oral feeding in patients having primary repair of traumatic intestinal injury and to assess its beneficial effect.

Methods: This prospective observational study was conducted on 80 patients who underwent urgent intestinal resection with or without covering stoma in the Department of Casualty Surgery at Dhaka Medical College Hospital.

Results: Early oral feeding is safe in the recently performed anastomosis even in emergency situations as there were no cases of clinical anastomotic dehiscence and no increase in morbidity. Among 80 patients 58(72.5%) patients had no complaints; rest 22(27.5%) patients had complication. Wound infection seen in 14(17.5%) patients among them 8(10%) patients had burst abdomen and 1(1.25%) patient had intra-abdominal abscess. 14(17.5%) patients had chest infection. 10(12.5%) patients complained nausea and among them 8(10%) patients suffered from few episodes of vomiting. 1(1.25%) patient had diarrhoea. Abdominal distension was seen in 9(11.25%) patients. Hospital stay was significantly shorter in with a mean length of stay (9 ± 1) days. No hospital readmission rate was recorded.

Conclusion: Early postoperative feeding is timely, safe and tolerable after emergency intestinal resection anastomosis without raised morbidity and mortality and has a considerable reduction in hospital stay with its physical, psychological and fiscal benefits.

Key-words: Early Oral Feeding, Traumatic Intestinal Injury, Intestinal anastomosis, Postoperative infections.

Introduction

For proper wound healing and postoperative recovery, nutritional support plays an important role. It is evident that delayed wound healing and longer hospital stays after surgery is strongly associated with poor nutritional status of the patients. It has been revealed that after any emergency gastrointestinal (GI) surgery, there is always an impaired nutritional status and elevation of basal expenditure. As a result, proper nutritional support is of considerable importance. As the immunomodulatory effect of early enteral nutrition (EEN) assist in recovery after surgery, so it is recommended that EEN should be started as soon as possible. Furthermore, enhanced recovery after surgery has been shown to improve postoperative recovery after elective GI surgery as well. However, several post-operative complications like edematous or ischemic bowel, ileus, obstruction and anastomotic failure are very frequent among the patients undergone emergency GI surgery for which the majority of surgeons are wary of early feeding after emergency GI surgery.

In comparison to the total parenteral nutrition (TPN), EEN is preferable whenever possible^{1,2} as because it is more physiological and prevent morphologic and functional trauma-related alterations of the gut. It adjusts the immune and inflammatory responses to injury and is less expensive than TPN.

However, surgeons often prefer postoperative TPN because of concerns about possible adverse effects of the early jejunal infusion of nutrients, such as bloating, diarrhoea, increased risk of anastomotic leak or complications related to the feeding tube^{3,4}. This may be the reason behind patients needing TPN despite a functioning gut. In an Italian survey half of the patients receiving TPN were deemed to have a functioning gut by the same physician ordering TPN⁵.

Adequate nutrition has always been a major goal of postoperative care. However, because of paralytic ileus, early

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oral feeding after abdominal surgery usually is avoided and routine nasogastric decompression has been used. But this approach has no clear beneficial effect. Malnutrition is a well-known risk factor significantly influencing the occurrence of post-operative infectious complications. There is consensus that dietary support is an vital component of the multidisciplinary treatment of surgical patients. It can be carried out with different modalities, depending on the underlying injury and on the patient's general condition. Several studies have shown that the early administration of oral nutrition promotes the restoration of gastrointestinal mucosa integrity; whereas with total parenteral nutrition such beneficial effect is not observed. The timing of feeding also influences the clinical outcome. With advent of modern suture materials, surgical skill and pre-procedure steps, chance of anastomotic leak is very unlikely to be caused by early oral feeding. On the other hand it is a cost effective way to maintain post-operative nutrition and hydration.

Surgical interventions release local inflammatory cytokines and systemic counter-regulatory hormones. In overwhelming inflammatory response local wounding process blends with MOSF. Hypercatabolism caused by cytokines and systemic hormones is characterized by protein breakdown within skeletal muscle, breakdown of branched-chain amino acids and increased release of glutamine and alanine. Glutamine is critical source of energy for enterocytes, immune cells and rapidly growing tissues⁶. Extent of the SIRS is determined by the degree of the injury and its immunologic and dietary context.

Cytokine release in trauma patients complicates the primary injury. Intestinal stasis and gut flora alteration permeates intestinal bacteria and hepatic endotoxin transfer across gut wall. It in turn amplifies the cytokine response, endorse sepsis or multiorgan failure and hyper catabolism.

Similar study review showed strong relationships between EN and enteral immunity. Fasting results in a variable degree of mucosal atrophy, with some increase in gut permeability. However, ongoing nutrition support with TPN causes significant changes in the lymphocyte and cytokine profile, and subsequent secretory IgA production within the bowel. This leads to an increased susceptibility to lung and likely intestinal infection. Enteral administration of a complex diet may change this situation and have the ability to modify the inflammatory response to trauma and surgical illness.

Traditionally, oral diet and fluid has been reintroduced cautiously and gradually after bowel surgery, often rendering the patients

nil by mouth or on oral sips only for many days in the post-operative period. This, it was thought, was necessary for adequate healing of bowel anastomoses. However, recently, early introduction of diet and fluids (within 24 hours post-operatively) has been shown to be safe^{5,7}. In addition, there is some evidence that early feeding may be beneficial in reducing the risks of anastomotic dehiscence, infections and reducing the length of stay⁸. In our view, tolerance to early feeding provides a more objective evaluation of gut function than assessment on the basis of bowel sounds of passage of wind. Despite the bowel oedema and intra-abdominal hypertension related to the abdominal compartmental syndrome, early enteral feeding is feasible after definitive abdominal closure 20. Early oral feeding in the open abdomen was associated with (1) earlier primary closure; (2) reduced fistula rate and (3) lower hospital stay. There is a significantly lower incidence of septic morbidity in patients fed orally after blunt and penetrating trauma, with most of the significant changes occurring in the more severely injured patients. The following protocol (Figure-1) was adopted by the unit during the study period. The protocol was prepared by reviewing Enhanced recovery guidelines. Furthermore, relatively few reports have been issued on the safety of early feeding after emergency GI surgery. Thus, this study was undertaken to assess the feasibility of early feeding in patients after emergency GI surgery.

Materials and Methods

This prospective observational study was conducted among purposively selected 80 patients who underwent emergency operation with intestinal resection at the Department of Casualty of Dhaka Medical College Hospital (DMCH) over a period of six (06) months (i.e., 1st July 2016 to 31st December 2016). Data were collected from the patients through pretested structured questionnaire. The procedure for data collection from the patients is shown in figure 1. The data were collected through face-to-face interview and follow up of the patient daily. The questionnaire includes the sociodemographic information along with disease and outcome of early feeding related information. Data processing and analysis were done by SPSS version 23. All the patients were monitored for the main outcome variables such as anastomotic leak, wound infection, pneumonia, gastrointestinal upset (nausea, vomiting, and diarrhoea), intra-abdominal abscess, length of hospital stay, morbidity, mortality etc.

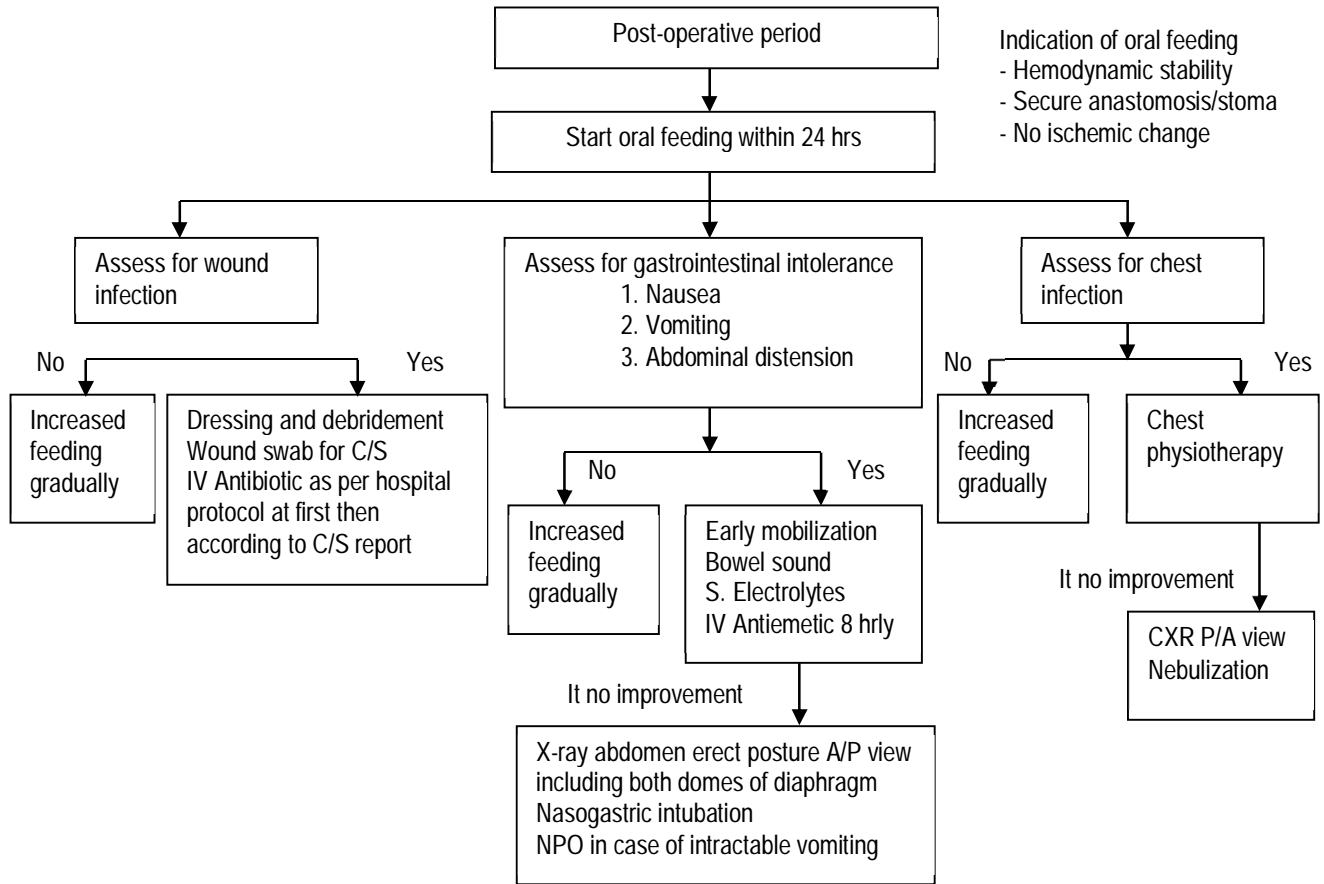


Figure-1: Protocol for early oral feeding in repair of traumatic intestinal injury (Adopted from Ref)

Results

Table-I: Distribution of patients according to the site of injury (n=80)

Site of injury	Frequency (%)
Proximal jejunum	7 (8.8%)
Distal jejunum	13(16.3%)
Proximal ileum	18(22.5%)
Distal ileum	11(13.8%)
Cecum	4(5.0%)
Ascending colon	5(6.3%)
Transverse colon	9(11.3%)
Descending colon	7(8.8%)
Sigmoid colon	6(7.5%)

As per the type of surgery, majority (53.8%) underwent repair of the injury which was followed by resection and end to end anastomosis (43.8%) (Table-II).

Table-II: Distribution of patients according to the type of surgery (n=80)

Types of surgery	Frequency (%)
Repair of injury	43(53.8%)
Resection and end to end Anastomosis	35(43.8%)
Resection and end to end anastomosis	02(2.5%)

In regards to the type of post-operative complications, almost two-third (72.5%) had no complications. Highest (17.5%) had wound

infection and chest infection which was followed by nausea (12.5%), abdominal distension (11.3%), burst abdomen (10%) (Table-III).

Table-III: Distribution of Post-operative complication among the patients (n=80)

Name of complication	Frequency (%)
Anastomotic dehiscence	2(2.5%)
Wound infection	14(17.5%)
Burst abdomen	8(10%)
Intra-abdominal abscess	1(1.3%)
Chest infection	14(17.5%)
Nausea	10(12.5%)
Vomiting	8(10%)
Diarrhea	1(1.3%)
Abdominal distension	9(11.3%)
No complication	58(72.5%)

In regards to the length of hospital stays, more than half (53.8%) of the patients stayed for 9 days which was followed by 10 days (13.8%), 8 and 11 days equally (11.3%)(Table-IV).

Table-IV: Length of hospital stay

Length of hospital stay in days	Number of patients
6	1(1.3%)
7	3(3.8%)
8	9(11.3%)
9	43(53.8%)
10	11(13.8%)
11	9(11.3%)
12	4(5.0%)

Discussion

Out of 80 patients 58 were male and 22 were female. Male to female ratio was 2.6:1. Age of the patients ranged from 18- 60 years. Malhotra A et al found similar results regarding sex, though the sex and distribution has got no direct impact on the results in terms of outcomes⁹.

In 19 patients (23.8% of traumatic intestinal injury), injury occurred due to blunt trauma abdomen, 30 patients (37.5%) had penetrating abdominal trauma, gunshot wound was the cause of traumatic intestinal injury in 13 patients (16.3%). Rest 18 patients (22.5%) suffered traumatic intestinal injury due to road traffic accident. Penetrating abdominal trauma is the most common aetiological factor causing single site intestinal injury (from 15 cm distal to Dudenno-jejunal junction to sigmoid colon). Lee et al found similar result though cause of injury has no direct impact on the results on terms of outcome¹⁰.

Site of injury caused by blunt trauma mostly were in proximal jejunum and ascending colon as it is more fixed part was also agreed by Moore et al¹¹. Proximal ileum and distal ileum were mostly injured by penetrating trauma and motor vehicle accident being mobile and superficial. Gunshot wound mostly injured proximal ileum for the alike reason. This observation was also supported by Braga et al¹.

Among the 80 patients, 43(53.8%) were repaired of the traumatic intestinal injury, 02(2.5%) patients undergone resection and end to side anastomosis. Rest 35 (43.8%) patients had resection and end to end anastomosis. Type of surgery has no effect on outcomes of study. Among 80 patients, five groups made by random selection and five types of enteral feeding (Plain water, Saline, Clear soup, Dal & Milk) given in equal amount. 1(1.3%) patient taking plain water had complication, 2(2.5%) patients taking saline had complication, 3(3.8%) patients taking clear soup had complication, 2(2.5%) patients taking dal had complication. 5(6.3%) patients had complication after taking milk. Patients taking milk had more complication than the others. Kudsk et al found no difference in their study¹².

Among 80 patients 58(72.5%) patients had no complaints; rest 22(27.5%) patients had complication. No patient had anastomotic

dehiscence. Wound infection seen in 14(17.5%) patients among them 8(10%) patients had burst abdomen and 1(1.3%) patient had intra-abdominal abscess. Fourteen (17.5%) patients had chest infection. Ten (12.5%) patients complained nausea and among them 8(10%) patients suffered from few episodes of vomiting. One (1.3%) patient had diarrhoea. Abdominal distension was seen in 9(11.3%) patients.

In this study, complications associated with early feeding, such as abdominal pain, diarrhoea and postoperative nausea and vomiting were investigated. Although complications developed in 22 patients in the early feeding group, all recovered fully under conservative management except one patient with intra-abdominal abscess. Most common of complications were wound problems and pulmonary complications. Lee HS et al found 22 of 44 patient having complication and all were treated conservatively¹⁰.

Intra-abdominal abscess occurs frequently as a consequence of anastomotic leak, proximal perforation due to obstruction, stump blowout or inadequate peritoneal toileting. Only 1 patient (2.5%) had intra-abdominal abscess, which was due to proximal perforation due to anastomotic obstruction and was treated by re-exploration and resection of ileal perforation and previous anastomosis with ileoileal anastomosis. Sheth et al found similar results regarding intra-abdominal abscess¹³.

Among 80 patients, in 11(13.8%) patients bowel sound appeared within 24 hours of surgery, in 65(81.3%) patients it appeared within 48 hours of surgery. In rest 4(5%) patients it was audible within 72 hours after surgery. Two (2.5%) patients defecated within 24 hours after surgery. 19(23.8%) patients moved their bowel within 48 hours. Rest 59(73.8%) defecated within 72 hours after surgery. Post-operative early oral feeding increased the motility and helped post-operative bowel movement.

Visual analogue score was six in most of the patients on first post-operative day. VAS was mostly 5 in 2nd & 3rd, respectively. 4th POD assessment shows VAS score 4 in most of the patient and on 5th post-operative day, VAS was 3. Two (2) was the VAS score in most of the patients on 6th post-operative day. VAS was 0 on 7th post-operative day. It was comparable with the result of study done by Sheth et al¹³.

In this study of eighty patients, most of the patients, 43(53.8%) discharged on 9th post op day. Nine (11.3%) patients discharged on 8th and 11th POD. 3(3.8%) and 4(5.0%) patients were discharged on 7th and 12th POD respectively. Eleven (13.8%) patients were discharged on 10th POD. Only one (1.3%) patient was discharged on 6th POD. Mean length of hospital stay is 9±1 days. In the study done by Sheth et al, most of the patients (93.3%) were discharged on the seventh POD which is less than the present study¹³. But Martin KE had alike results regarding length of stay¹⁴.

Conclusion

There is no obvious advantage in keeping patients fasted following emergency gastrointestinal surgery, and this study support early commencement. Especially due to pronounced changes in surgical techniques which is much less stressful and effective to the patients. Early oral feeding in postoperative is safe and tolerable after emergency intestinal resection anastomosis without raised morbidity and mortality and has a demonstrable reduction in hospital stay with its physical, psychological and economic benefits.

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