Enhanced recovery after surgery (ERAS) protocol in stoma reversals
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Abstract
Objective: To compare the length of hospital stay and return of bowel movement using the conventional management versus 'enhanced recovery after surgery' protocol.
Methods: This study was conducted at the Civil Hospital, Karachi, from June 2014 to May 2015, and comprised patients undergoing stoma reversal. Patients were randomly allocated in two equal groups, i.e. A (treated with conventional peri-operative management) and B (with 'enhanced recovery after surgery' protocol). Prolonged ileus, wound infection and length of hospital stay between the two groups were compared. SPSS 20 was used for statistical analysis.
Results: There were 60 participants who were divided into two groups of 30(50%) each. Overall, 39(65%) patients were males and 21(35%) were females. The mean age was 27.80±9.99 years in group A and 23.87±4.56 years in group B. Besides, 25(83%) patients in group A had prolonged ileus compared to 3(10.7%) in group B (p=0.00). Moreover, 14(46.7%) patients in group A and 8(26.7%) patients in group B had wound infection (p=0.10). The mean duration of hospital stay was also less in group B compared to group A (p<0.05).
Conclusion: The application of 'enhanced recovery after surgery' protocol was found to be safe.
Keywords: ERAS, Ileostomy, Ileus. (JPMA 67: 1674 2017)
of bowel movement using the conventional management versus ERAS protocol in patients undergoing two-end ileostomy reversals.

**Patients and Methods**

This study was conducted at surgical unit II of the Civil Hospital, Karachi, from June 2014 to May 2015. Approval of the institutional review board (IRB) of Dow University of Health Sciences was obtained. Ileus was defined as transient cessation of coordinated bowel motility after surgical intervention which prevents the effective transit of intestinal contents or tolerance of oral intake.

The sample size was estimated using openepi.com, version 2, open source calculator taking mean length of hospital stay at 10.4±3.1 days and the return of bowel movement at 3.1±1.0 days in the traditional group and at 7.0±1.3 days and 1.3±0.8 days in the fast-track group. Patients of either gender, aged at least 15 years, and undergoing two-end ileostomy reversal were included. Causes of stoma formation in all the patients were tuberculous, enteric and traumatic perforations with contamination of peritoneal cavity. None of the patients had stoma formation due to malignancy or as protective stoma in anterior resection. Patients with neurological and/or renal disorders, cardiac disease, bed-ridden patients, with diabetes mellitus, those who were on steroids and patients who were unable to understand verbal and written commands were excluded. Informed consent was taken from each patient about surgery and this study. Patients were randomly allocated in two groups, i.e. A (treated with conventional peri-operative management) and B (with ERAS protocol), by a computer-generated list to minimise sampling bias.

All stoma reversals were performed by senior surgeons. Pre-operatively, all patients in group B were counselled about modified ERAS protocol (Figure), fasting of less than 6 hours, fluid and carbohydrate loading with Glaxose-D (glucose juice) 6 hours before surgery and antibiotic prophylaxis. Intra-operatively, short acting anaesthetic agents like sevoflurane/atracurium were used and placement of urinary catheter and nasogastric tube was done if required. Anastomotic technique was the same as done in group B. Post-operatively, fluid overload was avoided, paracetamol was used for pain management, patients were asked to mobilise after 24 hours of surgery and start of oral feed after 24 hours with sips of clear fluid (15ml/hour) and then to free clear liquids and then continued to semi-solid and solid diet. The time duration of passage of first flatus and passage of faeces (in hours) and total length of hospital stay was assessed by senior registrar or senior resident (postgraduate trainee 3-4 years) in both groups.

Patient’s demographics (age and gender), hospital registration number, group of patients (group A and B), time of passage of flatus and faeces and length of hospital stay were recorded. Confounding variables were controlled by excluding patients with neurological and/or renal disorders, bed-ridden patients, diabetics and those on steroids. Bias was minimised by the assessment of passage of first flatus, presence of wound infection by senior registrar or senior resident (postgraduate trainee 3-4 years), common post-operative regime to patients of both groups and data being entered by postgraduate resident not participating in this study.

Data was analysed using SPSS 20. Mean and standard deviation were computed for numerical variables like age and final outcome, whereas frequency and percentages were employed to assess the categorical variable like gender and wound infection. Unpaired t-test was used to compare the mean time of passage of first flatus, faeces, length of hospital stay, while wound infection between two groups was compared using chi-square test. Statistical significance was taken at p<0.05. Stratification was done with regard to age and gender to control the effect modifier.

**Results**

There were 60 participants in the study divided into two groups of 30(50%) each. Overall, 39(65%) patients were males and 21(35%) were females. The mean age was 27.80±9.99 years in group A and 23.87±4.56 years in group B. The number of patients aged 30 years or below was 20(66.7%) in group A and 28(93.3%) in group B (p=0.01). Besides, 25(83%) patients in group A had prolonged ileus compared to 3(10.7%) in group B (p<0.05). Also, 14(46.7%) patients in group A and
8(26.7%) patients in group B had wound infection (p=0.10) (Table-1).

The mean time of passing first flatus and faeces was lower in group B patients (31.63±9.63 and 55.17±7.37 days) compared to group A (51.77±7.37 and 82.77±10.71 days) (p< 0.05). The mean duration of hospital stay was 4.13±1.04 days in group B and 7.23±1.16 days in group A (p<0.05) (Table-2).

Of all, 48(80%) patients were aged 30 years or below while 12(20%) were aged above 30 years. Of the former, 20(41.7%) had prolonged ileus and 15(31.2%) had wound infection compared to 8(66.7%) and 7(58.3%) patients in
Pre-operative oral high carbohydrate drinks is associated with less muscle loss, better whole-body protein balance, and shorter hospital stay after major abdominal surgery.\textsuperscript{12,13} Bowel cleansing by the means of mechanical bowel preparation has not been demonstrated to reduce post-operative complication rates in RCTs.\textsuperscript{14} Mechanical bowel preparation either demonstrates no benefit or harmful effects of mechanical bowel cleansing.

The fashioning of a temporary stoma brings with itself the fact of the inevitable reversal. Just like any other procedure it carries its own risks.\textsuperscript{14-16} The healthcare system of Pakistan is underfunded and overstretched and these additional cases inevitably put additional burden on the already limited hospital beds and resources. Traditionally the care offered post-anastomosis/reversal of stoma resulted in the inevitable stay of the patient in hospital for around 5-6 days.

Peacock et al.\textsuperscript{17} conducted a study on closure of loop ileostomy as day care procedure; the variables included in the study were cost, complications, hospital stay and readmissions. They observed ileus in 8% of patients, while wound complications were seen in 7.3% cases. Hospital stay was 23 hours which was standardised as part of day care procedure, while readmission was seen in only 6% of cases.

Similar to our observation, Aditya J. et al.\textsuperscript{18} reported 5(16.7%) vs 4(13.3%) overall complications in their comparative study between conventional and fast-track surgery groups, respectively. Prolonged ileus was seen in 10% vs 01% while mean hospital stay was 7.27±1.36 in the conventional group vs 4.73±1.34 in group treated with fast-track surgery (p<0.05).

The results demonstrate that implementing the locally developed fast-track programme in a seemingly routine and uncomplicated cases can lead to significant improvement in the patient outcome, even in the absence of sophisticated tools. This translates into lower days of hospital bed occupancy, hence reduces cost to the government and the load on the public hospitals.

**Conclusion**

The application of ERAS protocol in the appropriate setting was found to be safe and it decreased peri-operative complications in terms of hospital stay, resolution of ileus and wound infections. Such protocol is easy to apply in small bowel surgeries and results in better outcome.

**Disclaimer:** None.

**Conflict of Interest:** None.

**Source of Funding:** None.

**References**


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