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Fast Track Surgery and Its Outcome in Colorectal Surgery in a Tertiary Care Hospital

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Abstract

Background: Fast track surgery is an evidence-based multidisciplinary approach. The underlying principle is to enable patients to recover from surgery and leave the hospital sooner by minimizing the stress responses on the body during surgery. Our aim was to compare the outcome of fast-track protocol and conventional methods in colorectal surgery. **Method:** It was an observational cross-sectional study carried out at the Department of Surgery in different tertiary level hospitals, Dhaka Bangladesh during the period January 2014 to December 2017. Among this population, 50 patients were placed in the fast-track program (Group A) from January 2014 to December 2015 and 50 patients were in the conventional method (Group B), from January 2016 to December 2017. The fast-track patients were selected after receiving ethical approval from the Bangladesh College of Physician & Surgeons. Data analysis was done using the statistical package for social science (SPSS) for windows version 20. **Results:** The average age of the patients was 45.24 ± 16.65 years (range: 11 - 70 years) in the fast track group (Group A) and 43.24 ± 17.76 years in the conventional method (Group B). The majority were female between two groups, with 56% in group A and 52% in group B. General and surgical complications occurred in 9 (18%) patients and 11 (22%) patients respectively in group A. On the other hand in group B general and surgical

complications occurred in 10 (20%) patients and 13 (26%) patients respectively. The average hospital stay was 9.24 ± 5.99 days in group A and the average hospital stay was 10.10 ± 6.04 days in group B. **Conclusion:** Making the decision to adopt fast-track surgery will challenge current traditional practice for all members of the multidisciplinary team across the whole local health community.

Keywords

Colorectal, Conventional, Fast Track, Outcome, Surgery

1. Introduction

Fast track surgery (FTS) program is a relatively new concept initiated by the Kehlet group in 2001. It is a multimodality approach that integrates surgery, anesthesia and nutrition in patient care enabling faster recovery without increasing morbidity [1] [2] [3]. The components of fast track surgery or enhance recovery after surgery (ERAS) program include following: 1) Preoperative assessment, planning and preparation before admission; 2) Reducing the physical stress of the operation; 3) An organized approach for optimum management in immediate post-operative and during (peri-operative) period, including pain relief; 4) Early mobilization. Enhanced recovery program empowers the patient to be a partner in their own care and have greater choice through shared and informed decision making. It is essential that the patient is in the best possible condition for surgery [3]. Fast track surgery protocol includes the intake of carbohydrate-rich drinks (4 × 200 mL) one day prior to surgery plus two further such drinks (2 × 200 mL) on the morning of surgery. Most clinical practices is a period of absolute fasting of between 6 - 12 hours, but recent studies show that intake of carbohydrate-rich drink before surgery may decrease the endocrine catabolic response and glycemic instability improving surgical outcome and fastening recovery [4]. The protocol also includes the administration of goal-directed fluids, temperature control to avoid hypothermia, and the non-routine use of mechanical bowel cleansing as well as nasogastric tube. Several trials suggest the latter may reduce pulmonary complications and mechanical bowel cleansing is of no benefit. Peritoneal drainage should be omitted in most patients whenever possible or limited to a short period, facilitating early mobilization, a measure by the ERAS followed. A number of studies on programmed colon surgery doubted the need for preoperative mechanical bowel cleansing and it is avoided in ERAS program. Although early resumption of oral diet is commonly limited in the postoperative period in conventional practice, a number of studies have shown that it is safe even after colon surgery involving anastomosis; it is therefore included in the ERAS [2]. In ERAS programme the patients also have the best possible management during and after operation regarding gut dysfunction, early mobilization, appropriate anesthetics and non-opioid analgesics to reduce pain

and minimally invasive techniques wherever appropriate as well as post-operative rehabilitation enabling early recovery and discharge from hospital [5]. Wind *et al.* [6] reported enhanced recovery program (ERP) in open colectomy has a shorter hospital stay with no increase in complication or readmission rate. Major colorectal surgery usually needs a hospital stay of more than 12 days. Suboptimal pain management, intestinal dysfunction, immobilization, wound infection are the main factors associated with delay in recovery and discharge. Laparoscopic colectomy with ERP has gained the preferred approach for colon resection [6] [7]. Many studies on fast-track colorectal cancer surgery published in the past ten years yield contrasting results mainly because of different populations and surgical approaches (laparoscopic/open surgery) [7]. Randomized controlled trials (RCTs) and meta-analyses have demonstrated that FTS is applicable and effective in colorectal surgery [8] [9]. The present study is here to compare postoperative outcomes between the fast track and conventional methods in colorectal surgery.

2. Methods

This observational cross-sectional study was conducted at the Department of Surgery of different tertiary level hospitals in Dhaka, Bangladesh from January 2014 to December 2017. Among this population, 50 patients were placed in the fast-track program (Group A) from January 2014 to December 2015 and 50 patients were placed in conventional method (Group B), from January 2016 to December 2017. Sampling method was purposive convenient sampling. Program was implicated by multidisciplinary teamwork. Patients with colorectal problems undergoing surgery [American Society of Anaesthesiology (ASA I & II)] were included. Patients who needed emergency surgery required synchronous second major procedure during the operation, which were anticipated to require intensive care unit (ICU) or high dependency unit (HDU) admission after the operation were excluded. The fast-track patients were selected after receiving ethical approval from Bangladesh College of Physician & Surgeon and informed written consent was obtained from each study participant prior to data collection. Plan for fast tract and conventional method in colorectal surgery was described (**Table 1**).

Table 1 shows preoperative, per-operative and postoperative protocols of fast-track surgery and conventional method followed in the study.

Complications were defined in terms of general and surgical complications. Reported general complications were cardiac, pulmonary and urinary tract infection. Surgical complication was wound infection, bowl obstruction and anastomotic leakage. Patients were discharged when there is no discomfort after postoperative regular diet, normal bowel evacuation, pain controlled by oral analgesic, no raise of temperature, walking comfortably and direct communication with the hospital as possible after the discharge. Patients were instructed to contact the hospital immediately if they experienced an evacuation disorder, stomachache, or fever after discharge. Thirteen variables were collected in pre-designed data collection sheet. Data analysis was done using statistical package for social

Table 1. Outline of fast-track surgery and conventional method of the study.

Characteristics	Fast tract surgery	Conventional
Preoperative		
Counseling	Gives great importance	Take no account
Fasting	Fasting for 6 h: water deprivation for 2 h	Fasting for 12 h; water deprivation for 4 h
Gut preparation	No routine	Oral laxatives, mechanical bowel preparation
Nasogastric tube	No routine or pill the gastric tube as soon as possible after surgery	Preoperative routine use of nasogastric tube
Intraoperative		
Transfusion and insulation	Intraoperative as small as possible	No such emphasis
Incision processing	as small as possible	No such emphasis
Postoperative		
Analgesia	Opioid sparing—Nonsteroidal anti-inflammatory drug intravenously after surgery or epidural	No such restriction or limitation
Urine tube	Unplugged within 48 h	Unplugged 3 - 5 days after surgery
Off-bed activity	One day after surgery	Do not require
Sips of water (SOW) start day	POD1 (Postoperative day)	POD2
Soft diet start day	POD2	POD3

science (SPSS) for windows version 20. Data were analyzed by chi-square test and "t" test and significant P-value were <0.05.

3. Results

The average age of the patients was 45.24 ± 16.65 years (range: 11 - 70 years) in the fast-track group (Group A) and 43.24 ± 17.76 years. The majority were female in both groups, with 56% in group A and 52% in group B. The majority of the patients of both groups were from the age range of 51 - 60 years, with 30% of group A and 26% of group B belonging to this group. The youngest age group (10 - 20 years) had the minimum number of patients in both group A (4%) and group B (8%). Mean ± SD age was 45.24 ± 16.65 in group A, and 43.24 ± 17.76 in group B. Female prevalence was higher in both groups, with 56% female in group A and 52% in group B (Table 2).

48% of group A and 46% of group B patients had laparoscopic operations, while 52% of group A and 54% of group B had other forms of operation (Table 3).

Pre- and post-operative hemoglobin and albumin levels have no significant difference between the two groups (Table 4).

Complications were more common among the group B participants, but the difference between both groups was not statistically significant. General and surgical complications occurred in 9 (18%) patients and 11 (22%) patients respectively in group A. On the other hand in group B, general and surgical complications occurred in 10 (20%) patients and 13 (26%) patients respectively (Table 5).

The average hospital stay was 9.24 ± 5.99 days in group A and the average hospital stay was 10.10 ± 6.04 days in group B (Table 6).

Table 2. Demographic characteristics of study subjects (n = 100).

Characteristics	Group A (n = 50)		Group B (n = 50)		P value
	No.	%	No.	%	
Age in years					
10 - 20	2	4	4	8	0.593
21 - 30	11	22	12	24	
31 - 40	7	14	9	18	
41 - 50	6	12	5	10	
51 - 60	15	30	13	26	
61 - 70	9	18	7	14	
Mean ± SD	45.24 ± 16.65		43.24 ± 17.76		
Sex					
Male	22	44	24	48	0.688
Female	28	56	26	52	

Table 3. Type of the operation between two groups (n = 100).

Name of the operation	Group A (n = 50)		Group B (n = 50)		P value
	No.	%	No.	%	
Laparoscopic	**24**	**48**	**23**	**46**	0.841
Abdomino-Perineal Excision of Rectum	12	24	11	22	0.899
Anterior Resection	2	4	3	6	0.646
Left Hemicolectomy	8	16	7	14	0.898
Right Hemicolectomy	2	4	2	4	1.000
Other	**26**	**52**	**27**	**54**	0.841
Sigmoid Colectomy	1	2	2	4	0.557
Abdomino-Perineal Excision of Rectum	10	20	11	22	0.806
Anterior Resection	7	14	6	12	0.761
Abdominal Rectopexy	5	10	4	8	0.726
Mucosal Sleeve Resection (Delorme)	3	6	4	8	0.695

Table 4. Laboratory investigation of the patients (n = 100).

Laboratory investigation	Group A (n = 50)	Group B (n = 50)	P value
Hemoglobulin			
Preoperative	12.43 ± 1.22	12.64 ± 1.63	0.470
Postoperative	11.90 ± 1.33	11.43 ± 1.73	0.128
Albumin			
Preoperative	41.43 ± 3.26	41.18 ± 3.23	0.692
Postoperative	30.77 ± 3.34	29.83 ± 3.97	0.208

Table 5. Complication between two groups (n = 100).

Complication	Group A (n = 50)		Group B (n = 50)		P value
	No.	%	No.	%	
General complications	**9**	**18**	**10**	**20**	0.603
Cardiac	2	4	2	4	1.000
Pulmonary	3	6	3	6	1.000
Urinary tract	4	8	5	10	0.739
Surgical complication	**11**	**22**	**13**	**26**	0.640
Wound infection	8	16	9	18	0.798
Bowel obstruction	3	6	4	8	0.705
Anastomotic leakage	3	6	4	8	0.705

Total will not correspond to 100% because of individual patients having multiple complications.

Table 6. Outcome of surgery between two groups (n = 100).

Outcome	Group A (n = 50)		Group B (n = 50)		P value
	No.	%	No.	%	
Passage of flatus					
Day 1	46	92	44	88	0.505
Day 2	4	8	6	12	
Pain score (VAS)					
1st POD	2.19 ± 0.85		2.87 ± 0.61		0.192
2nd POD	0.98 ± 0.57		1.16 ± 0.84		0.086
Walk on day					
Day 1	43	86	41	82	0.439
Day 2	6	12	5	10	
Day 3	1	2	4	8	

Continued

Hospital stay					
0 - 10 days	36	72	33	66	
11 - 20 days	11	22	13	26	0.428
21 - 30 days	3	4	4	8	
Mean ± SD	9.24 ± 5.99		10.10 ± 6.04		0.477
Bowel movement					
Gas out (hours)	56.16 ± 16.98		74.56 ± 19.69		0.001
Defecation (hours)	58.37 ± 18.87		78.81 ± 21.97		0.001
Soft diet (hours)	46.65 ± 8.83		69.23 ± 10.96		0.001
Re-admission	0	00	1	2	-

POD = Postoperative day, VAS = Visual analog scale, SD = Standard deviation.

Table 6 shows different post operative outcomes of both groups. The difference between outcomes of two groups in terms of passage of flatus, pain score, walking ability following operation, hospital stay and re-admission were not statistically significant but earlier resumption bowel activity was observed in group A.

4. Discussion

Fast track (FTS) programs in colorectal surgery have been familiarized more than a decade ago with promising results. Many studies have been done regarding the efficacy of fast-track programs in various fields of surgery. The present study results have been discussed with previously published relevant study findings.

This study shows that the average age of the patients in the fast track surgery group (Group A) in 45.24 ± 16.65 years was higher than that of the conventional group (Group B) in 43.24 ± 17.76 years (Table 2). Female predominates over male in both groups, 56% in group A and 52% in group B (Table 2). The findings of the study are well in agreement with the findings of the other research works [10] [11] [12]. Regarding the type of operation, 48% were laparoscopic in group A and 46% were laparoscopic in group B (Table 3). Hemoglobin and albumin level reflects the nutritional status of the patients [13]. In the present study, preoperative hemoglobulin (Hb%) was 12.43 ± 1.22 g/dL and postoperative Hb% was 11.90 ± 1.33 g/dL in group A. On the other hand in group B, preoperative Hb% was 12.64 ± 1.63 and postoperative (Hb%) was 11.43 ± 1.73. Preoperative albumin was 41.43 ± 3.26 g/dL and postoperative albumin was 30.77 ± 3.34 in group A. On the other hand, preoperative albumin was 41.18 ± 3.23 and postoperative albumin was 29.83 ± 3.97 in group B (Table 4). Analysis revealed that Hb% and albumin differences pre- and postoperatively were statistically not significant between the two groups ($P > 0.05$). In contrast, Ripollés-Melchor *et al.* [14] found significantly lower Hb% and albumin levels in fast track surgery ($P < 0.05$).

In the current study, postoperative general complications were few (Table 5).

It was observed that general complications were more in the conventional method (Group B) than fast track surgery (Group A) which was 20% vs 18% respectively but not statistically significant (P > 0.05). These findings are similar to the study done by Ripollés-Melchor *et al.* [14] They found complications were more in the no ERAS group than ERAS group which was 44.62% and 40.72% respectively (P > 0.05). In this study among the postoperative surgical complications wound infection occurred in 11 (22%) in the FTS group and 13 (26%) in the conventional method group (**Table 5**). After regular dressing and systemic antibiotics, the infection was controlled. Gouvas *et al.* [9] reported no statistically significant differences in terms of immediate postoperative morbidity in the two groups. Anastomotic leakage is the most feared complication in colorectal surgery. In this study, anastomotic leakage was 3 (6%) in FTS and 4 (8%) in the conventional method and there was no statistically significant difference between the two groups (P > 0.05). Ripollés-Melchor *et al.* [14] found anastomotic leakage 5.98% in the ERAS group and 7.42% in the no ERAS group (P > 0.05).

Postoperative pain has a significant effect on a patient's recovery. Inadequate pain management results in a clinical and psychological impact on patients which increases morbidity hampers the quality of life and increases treatment cost. Most commonly postoperative analgesia is managed by opioids in conventional practice, where in fast-track surgery choice of analgesics is opioid-sparing. [2] This study did pain assessment by visual analog scale (VAS) and found VAS score was lower in Group A than the Group B which was 2.19 ± 0.85 vs 2.87 ± 0.61 in 1st POD (P > 0.05). Lower pain score was also observed in 2nd POD in fast track surgery (Group A) than the conventional method (Group B) which was 0.98 ± 0.57 vs 1.16 ± 0.84 (P > 0.05) (**Table 6**). Similar study Boyoul *et al.* [15] reported the pain score (VAS) was 4.31 ± 0.79 in the conventional group and 4.19 ± 0.58 in fast track surgery with P > 0.05.

Recovery of bowel function is one of the important markers in colorectal surgery. Approximate 25% of patients develop paralytic ileus in the postoperative period following colorectal surgery. Disturbances in normal bowel function increase patient noncompliance, dissatisfaction, length of stay in the hospital, and health care costs. ERAS program that is use of opioid-sparing analgesics, avoidance of prolonged fasting and mechanical bowel cleansing, early postoperative feeding contribute a role in facilitating bowel care and early bowel movement. [16] This study shows a significant difference in bowel function recovery in fast track surgery (group A) and conventional method group (Group B). It was observed that gas out time was lower in group A than group B which was 56.16 ± 16.98 hours vs 74.56 ± 19.69 hours respectively (P < 0.05). Also, defection time was lower in group A than group B which was 58.37 ± 18.87 hours vs 78.81 ± 21.97 hours respectively (P < 0.05). Soft diet feeding time was lower in group A than group B which was 46.65 ± 8.83 hours vs 69.23 ± 10.96 respectively (**Table 6**). These findings of the study correlated with the findings of the other research works. [9] [15] [17] Gatt [18] stated a significantly shorter time to oral feeding

for ERAS patients (48 vs 90 h, p0.042). Anderson also reported an earlier return of gut function for ERAS patients (48 [33 - 55] h vs 76 [70 - 110) h, respectively). [19] Another study by Serclova *et al.* [20] showed bowel movement or passing stool time was earlier in ERAS patients (1.3 ± 0.8 vs 3.1 ± 1.0 days) comparing to the conventional method (2.1 ± 1.1 vs 3.9 ± 1.1 days). This study shows the average stay time in the hospital was 9.24 ± 5.99 days in the FTS group and 10.10 ± 6.04 days in the conventional method while only 1 patient was readmitted in the conventional method and not had any readmission in the FTS group ($P > 0.05$) (**Table 6**). These findings were consistent with the study done by Wind *et al.* where the median hospital stay time was shorter in fast tract surgery [6]. They reported a maximum reduction in hospital stay is a combination of fast-track programs and laparoscopic surgery.

This study result shows that the use of FTS helps in regaining bowel function earlier compared to traditional practices without increasing the risk of anastomotic leakage which is important in colorectal surgery. Though not statistically significant, this study found shorter hospital stays, fewer complications, and less pain scores in the FTS group. To successfully apply this program multidisciplinary teamwork, collaboration between the operating room and wards is necessary, along with continuous evaluation of the program.

5. Limitations of the Study

The sample size of the study was small but with long duration and there are limited variables. So, the findings may not reflect the scenarios of the whole country.

6. Conclusion

It is clear that fast-track programs enhance recovery and thereby reduce hospital stay. Shortening hospital stay and reduction of morbidity are attractive, since both increase the availability of beds and might reduce the overall cost of hospital stay. The findings of the present study may open new perspectives for the patients undergoing colorectal surgery.

7. Recommendations

Further work may prove the significance of this study which should include larger sample size and long-term follow-up.

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Disclosure

Approval of the Research Protocol

The study protocol was approved by Bangladesh College of Physicians (BCPS),

Dhaka Bangladesh and it conforms to the provisions of the Declaration of Helsinki.

Informed written consent: Informed written consent was obtained from all study participants before recruitment in the study.

Registry and the Registration

CPS-712/2012, PSN-1002.

Authors' Contributions

Authors 1 & 2 help in planning, methodology, data collection. Authors 3, 4 & 5 help in data curation and drafting article. Authors 6 & 7 help in visualization and investigation, software and validation. Authors 8 & 9 help in supervision, writing, reviewing and editing. All authors have read and approved the final article.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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