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Original Research Article

Outcome of resection and primary anastomosis of colon upto the level of the rectosigmoid junction without diverting ileostomy or colostomy in Dhaka Medical College Hospital-a study of 50+ cases

Surajit Dutta[1]*, Salma Sultana[1], Sukla Nath[2], A. K. M. Al Masud[3], Aminul Haque[4], M. Fahimul Islam Mondal[1], Noor-E-Alam[1], Sakit Mahmud[5], Mohammed Aynul Hoque[6], Abdullah Al Mamun[7], M. Shahid Hossain[1]

[1]Department of Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[2]Department of Obstetrics & Gynaecology, Dhaka Medical College Hospital, Dhaka, Bangladesh
[3]Department of Surgery, Faridpur Medical College Hospital, Faridpur, Bangladesh
[4]Department of Cardiology, Directorate General of Health Services, Dhaka, Bangladesh
[5]Department of Medicine, Directorate General of Health Services, Dhaka, Bangladesh
[6]Department of Neurology, Dhaka Medical College Hospital, Dhaka, Bangladesh
[7]Department of Surgery, Shaheed Ahsanullah Master General Hospital, Gazipur, Dhaka, Bangladesh

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***Correspondence:**
Dr. Surajit Dutta,
E-mail: dr.surajitdutta22@gmail.com

ABSTRACT

Background: Colon resection is frequently performed in surgical practice for various indications. A key decision is whether to perform primary anastomosis with or without proximal diversion. Although diversion adds safety, it also introduces additional complications. In Bangladesh, outcomes of primary anastomosis without diversion have not been systematically studied. To evaluate the outcomes and safety of colon resection with primary anastomosis, without diverting ileostomy or colostomy, in both emergency and elective surgical cases.
Methods: This descriptive cross-sectional study included 52 patients who underwent colon resection up to the rectosigmoid junction with primary anastomosis, without diversion, in the Department of Surgery, Dhaka Medical College Hospital, from January 2013 to September 2013. Patients over 12 years of age, regardless of sex, meeting specific inclusion and exclusion criteria were enrolled. Data on demographic profile, surgical indication, intraoperative findings, postoperative outcomes and complications were collected and analyzed using SPSS.
Results: Among the 52 patients (age range: 19–75 years), the majority were male (75%) and over 50 years of age. The most common indication for surgery was sigmoid volvulus. Emergency colectomy was performed in 53.85% of cases. In 86.54% of cases, the resected bowel was viable and single-layer anastomosis was the preferred technique. Postoperative blood transfusion was frequently required. Early oral intake was resumed in 55.77% of patients. There was no mortality and 82.69% of patients experienced no postoperative complications. Most patients were discharged within 13–14 days.
Conclusions: This study demonstrates that resection with primary anastomosis of the colon up to the rectosigmoid junction without a diverting ileostomy or colostomy is a safe and effective option in both elective and emergency surgical settings when proper patient selection and operative techniques are employed.

Keywords: Bowel viability, Colonic obstruction, Diversion avoidance, Primary anastomosis, Sigmoid volvulus

INTRODUCTION

The history of colon surgery spans nearly three centuries and is marked by continual innovation aimed at overcoming the challenges of operating on a heavily contaminated organ within the peritoneal cavity. Early surgical efforts were bold, with one of the first documented milestones being the successful creation of a colostomy in an infant with imperforate anus in 1710, which set a precedent for future advances.[1] Significant progress followed with Reybard's pioneering resection of the sigmoid colon in 1823, laying the foundation for resection techniques that would evolve through the 19th and early 20th centuries under the influence of surgeons such as Mikulicz, Paul, Murphy, Miles and Hartmann.[2]

A critical concern throughout this evolution has been anastomotic leakage, a feared complication associated with morbidity and mortality. In response, Ellis introduced a standardized two-layer bowel anastomosis technique in 1889, while also advocating for colostomy as a safer alternative in critically ill patients.[2] Hartmann's procedure, introduced in 1921, became a cornerstone for managing left-sided colonic emergencies by resecting the diseased segment, closing the distal bowel and forming a proximal colostomy. This approach gained popularity due to its lower mortality and complication rates compared to primary anastomosis, especially in the emergency setting.[3]

Advancements in surgical techniques and perioperative care over the last few decades have made primary anastomosis increasingly feasible and safe, even in emergency situations. Studies have demonstrated that left colon resection with primary anastomosis without protective diverting ileostomy can be performed with low mortality and manageable complication rates.[4] For example, Jimenez and Costa reported zero mortality and only 21.9% minor complications in patients undergoing emergency left-sided colon resection without bowel irrigation or diverting stoma.[4] In regions such as Asia and Africa, emergency indications for colon surgery differ somewhat from Western countries, with gangrenous sigmoid volvulus, iatrogenic injuries during gynecological procedures and advanced colon malignancies being common.[5]

In these settings, the choice between Hartmann's procedure and primary anastomosis is influenced by patient stability, disease severity and available resources. Notably, studies from Pakistan indicate that primary anastomosis in acute sigmoid volvulus is a safe option with no reported anastomotic leaks or mortality.[5] Large bowel obstruction and perforation remain frequent emergencies worldwide and while Hartmann's procedure has been the traditional approach, increasing evidence supports the safety and benefits of primary anastomosis in selected patients.[6] These benefits include faster recovery, reduced need for subsequent surgeries and improved quality of life. The current trend among experienced colorectal surgeons favors primary anastomosis whenever feasible, challenging the longstanding preference for staged procedures.[7,8]

Objectives

General objective

To evaluate the efficacy of primary anastomosis after resection of the part of colon without diverting ileostomy or colostomy, among the patients in the Department of Surgery, Dhaka Medical College Hospital.

Specific objectives

To find out the indications requiring colonic resection among the patient in the Department of Surgery, Dhaka Medical College Hospital. To find out the rate of mortality and morbidity related to surgery. To find out the length of hospital stay among the patients with primary anastomosis of colon without diverting ileostomy or colostomy.

METHODS

Study design

This was a descriptive cross-sectional type of observational study conducted in the Department of Surgery, Dhaka Medical College Hospital (DMCH), Dhaka. The study period extended from January 2013 to September 2013. The study population included patients who underwent resection and primary anastomosis of the colon up to the level of the rectosigmoid junction without the creation of a diverting ileostomy or colostomy during the specified 9-months period at DMCH. Selection of the study group was based on specific inclusion and exclusion criteria. A biased purposive sampling method was employed and a total of 52 cases were included in the study.

Inclusion criteria

This study included patients who underwent colon resection with primary anastomosis up to the level of the rectosigmoid junction without the formation of a diverting ileostomy or colostomy. It covered both routine and emergency cases involving colo-colic anastomosis and excluded traumatic cases. Participants were of both sexes, aged above 12 years and only those who provided informed consent, either personally or through a legal guardian, were enrolled.

Exclusion criteria

Patients were excluded if they underwent primary anastomosis of the colon with a diverting ileostomy or colostomy or if they had ileo-colic anastomosis. Exclusion criteria also included those with local sepsis, poor nutritional status, immunosuppression, prior

radiation exposure, gross fecal contamination or septicemia.

Study procedure

All patients were evaluated preoperatively through clinical examination and necessary investigations, including routine blood tests, abdominal imaging and pre-anesthetic checkups. Bowel preparation was done for elective cases. Intraoperatively, resection of the diseased colon segment was performed and a primary colo-colic anastomosis was created, either as a single or double-layered anastomosis depending on surgeon preference and intraoperative findings.

No proximal diversion (ileostomy or colostomy) was fashioned. The viability of bowel ends, absence of tension and good perfusion were ensured prior to anastomosis. Postoperative care included routine monitoring, intravenous fluids, antibiotics and analgesia. Oral intake was resumed once bowel sounds returned and patients tolerated clear liquids. Patients were observed for any signs of anastomotic leak, wound infection or other complications. Follow-up data were collected until discharge.

Data analysis

After collecting information, data was checked, verified for consistency and edited for finalized result. After editing and coding, the coded data was analyzed by computer with the help of SPSS/PC software. Data cleaning validation and analysis is performed using the SPSS/PC software and graph and chart by MS Excel. The result is presented in tables in mean, standard deviation (sd) and percentage.

Ethical implication

Participation in the study was entirely voluntary and informed consent was obtained from all respondents after explaining the study details in Bangla. Participants were assured of their right to refuse or withdraw at any point and all responses were kept confidential. Interviews were conducted privately, at a time and place convenient for the participants. Additionally, surgeons were free in their operative decision-making without any external influence or pressure regarding the type of surgery performed.

RESULTS

Table 1 shows the ages of the patients in the study ranged from 19 to 75 years. Most of the patients belong to age group>50 years, comprising 53.85% (n=28) and 46.15% (n=24) patients were <50 years of age. The lowest incidence 7.69% (n=4) was in the age group of <30 years. 75% (n=39) patients were male. Male to female ratio was 3:1. BMI of most of the patients were within range of 19-24 (normal limit), 78.85% (n=41).

Table 2 illustrates the distribution of 52 patients who underwent colostomy based on their clinical indications. Sigmoid volvulus was the most frequent cause, accounting for 19 cases.

This was followed by left-sided colon cancers in 15 patients. Iatrogenic injuries sustained during gynecological procedures, such as those for pelvic endometriosis or ovarian cancer, were responsible for 6 cases. Additionally, colostomy-related complications like prolapse or stenosis of the proximal loop were found in 4 patients.

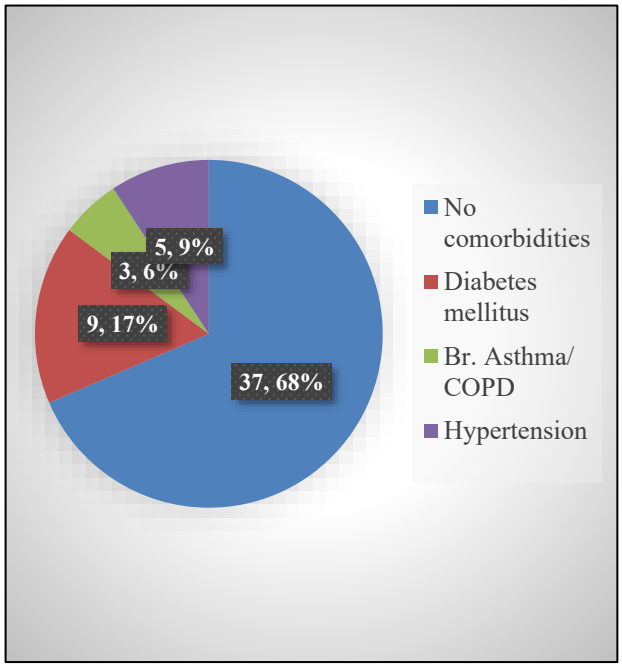

Figure 1: Patients associated with comorbidities.

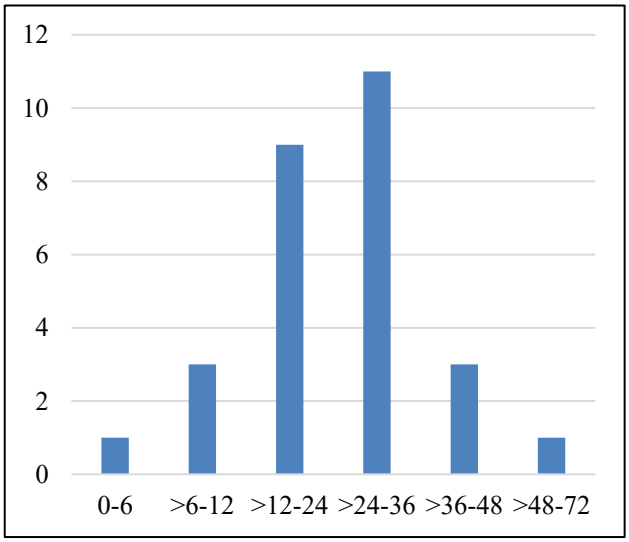

Figure 2: How much time have passed from onset of disease to surgical intervention in emergency cases.

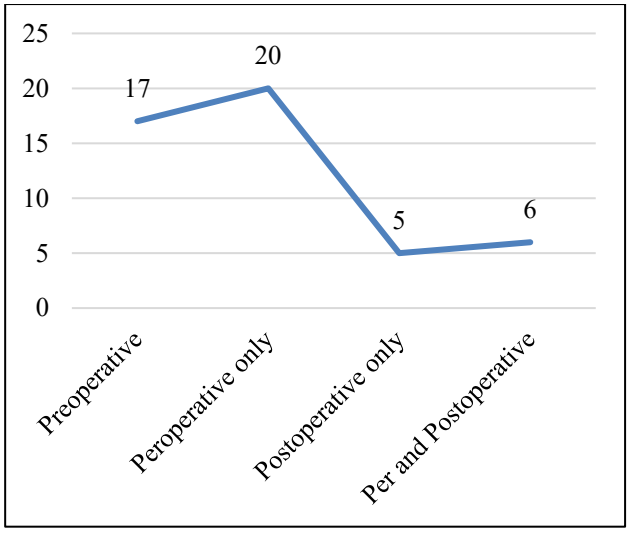

Figure 3: Time of blood transfusion.

Figure 1 present most of the patients were free from any comorbid condition, 71.15% (n=37). The common comorbid condition was DM, 17.31% (n=9%). In most emergency cases about 24 to 36 hours required between onset of disease to surgical intervention, 39.29% (n=11). Early surgical intervention was less frequent, only 3.57% (n=1) within 6 hours.

Table 3 shows most of the anastomotic margins found healthy non-oedematous, 94.23% (n=49). Remaining found mild oedematous, only 5.77% (n=3). The majority of the surgeons preferred single layer extra mucosal interrupted anastomosis technique, 63.83% (n=30).

Table 4 shows 92.31% (n=48) patients required blood transfusion to maintain baseline Hb level 10 gm/dl at postoperative period.

Figure 3 shows majority of patients required blood transfusion preoperatively 54.17% (n=26), basically admitted as emergency case. Preoperative transfusion could be given in routine cases.

Table 5 revealed early oral resumption was established in 55.77% (n=29) cases, just after appearing of bowel sound. Prolonged NPO found only in 9.61% (n=5) cases.

Table 6 shows most of the patient 82.69% (n=43) leaved hospital without any complication. No anastomotic leakage found and no death was recorded. Only in 17.31% (n=9) cases there were post-operative pyrexia and in 9.62% (n=5) cases suffered from wound infection.

Table 7 illustrates the distribution of total hospital stay among the 52 patients in the study. The majority of patients (23 cases, 44.23%) stayed for 13–14 days, followed by 16 patients (30.77%) who stayed for 11–12 days. A smaller group of 11 patients (21.15%) had a shorter stay of 8–10 days, while only 2 patients (3.85%) required a longer hospitalization of 15–21 days.

Table 1: Demographical data distribution of the patients.

Age (in years)	No. of patients (n=52)	%
>12-20	01	1.92
21-30	03	5.77
31-40	09	17.31
41-50	11	21.15
51-60	15	28.85
>60	13	25.0
Sex		
Male	39	75
Female	13	25
Body mass index (BMI)		
<19	08	15.38
19-24	41	78.85
>24	03	5.77

Table 2: Pattern of indications of resection and primary anastomosis (RPA) of colo indications.

Sigmoid volvulus	No. of patients (n=52)
Colon cancers (left colon)	15
Iatrogenic injury (during gynecological operation such as pelvic endometriosis, ovarian cancers)	06
Colostomy complications (prolapsed of the proximal loop, stenosis)	04
Most of the cases were sigmoid volvulus, then ca-colon involving left colon	19

Table 3: Condition of anastomotic margin and shows anastomosis procedure.

Anastomotic margin	No. of patients (n=52)	%
Non-oedematous	49	94.23
Oedematous	03	5.77
Anastomosis procedure		
Single layer extra mucosal interrupted	30	63.83
Classical two layered anastomosis	17	36.17

Table 4: Requirements of blood/ packed cell transfusion.

No. of unit/bag	No. of patients (n=52)	%
0 unit	04	7.69
1 unit	21	40.38
2 units	16	30.77
3 or more units	11	21.15

Table 5: Shows time of oral resumption from (POD).

Oral resumption	No. of patients (n=52)	%
Just after appearing bowel sound	29	55.77
At 3rd POD with good bowel sound	18	34.62
At 4,h-5th POD with good bowel sound	05	9.61

Table 6: Shows percentage of post-operative complications.

Complications	No. of cases (n=52)	%
Post-operative pyrexia	09	17.31
Features of generalized peritonitis	0	0
Localized abdominal rigidity or rebound tenderness	0	0
Fecal matter in the drain tube	0	0
USG reveals intra-abdominal collection	0	0
Wound infection	05	9.62
Burst abdomen	0	0

Table 7: Shows total hospital stay of patient.

Hospital stays (in days)	No. of patients (n=52)
8-10	11
11-12	16
13-14	23
15-21	02

DISCUSSION

In our study, the majority of patients (53.85%) were older than 50 years, with a notable proportion being above 60 years of age. This aligns with the findings of Kuzu et al, who demonstrated that intestinal emergencies, particularly volvulus and malignancies, are more prevalent in the elderly population.[9] Such patients often have age-related bowel motility disorders and predisposing anatomical factors.[10] Male predominance was observed in our cohort, with a male-to-female ratio of 3:1. This is consistent with the study by Ballantyne et al, who also found a significant male preponderance in cases of sigmoid volvulus.[11] Hormonal and anatomical differences, as well as higher prevalence of predisposing conditions in males, could explain this trend.[12] In our findings, BMI ranged mostly within normal limits (19–24) in 78.85% of patients. This is consistent with results from the research of Farid et al, who found that a normal BMI did not significantly influence the risk or outcome of emergency colectomy procedures.[13] Regarding clinical indication, sigmoid volvulus was the most frequent cause of surgery (36.5%), followed by left-sided colon cancer. Similar findings were reported by Halabi et al, who showed sigmoid volvulus to be one of the leading causes of acute large bowel obstruction requiring emergency surgery.[14] A significant number of our patients (53.85%) were emergency cases and 39.29% underwent surgical

intervention within 24–36 hours of symptom onset. A study by Biondo et al, found that early intervention within 24–48 hours reduced postoperative complications in emergency colorectal surgeries.[15] Only 3.57% of cases had surgery within 6 hours, similar to the pattern reported by Teixeira et al, who observed delays due to diagnostic and referral challenges.[16] Most of the patients (71.15%) had no significant comorbidities. Diabetes mellitus DM was the most frequent comorbidity (17.31%), which is comparable with findings by Kruschewski et al, who also reported DM as the most common comorbidity among emergency surgical patients.[17]

During intraoperative evaluation, 86.54% of gut segments were found viable, with only 13.46% showing partial strangulation or necrosis. These results are in agreement with Atamanalp et al, who documented similar percentages in their series of sigmoid volvulus cases.[18] Peritoneal toileting was performed in 13.46% of cases, which aligns with recommendations by Wexner et al, advocating lavage in the presence of contamination or strangulation.[19] In terms of anastomosis, 63.83% of cases used single-layer extra-mucosal interrupted techniques, which mirrors findings by Goligher et al, who emphasized the safety and reliability of this technique in emergency settings.[20]

Perioperative blood transfusion was required in 54.17% of cases, primarily in emergencies, consistent with conclusions drawn by Nelson et al, who reported increased transfusion rates in emergency colectomy cases due to anemia and blood loss.[21] Early oral feeding was resumed in 55.77% of patients upon return of bowel sounds. This finding is comparable to results from the study by Reissman et al, who demonstrated safety and enhanced recovery with early enteral nutrition post-abdominal surgery.[22] Postoperative complications were minimal in our study, with 17.31% experiencing only pyrexia and 9.62% developing wound infections. No anastomotic leakage or mortality was observed.

This favorable outcome reflects the findings by Alves et al, who also reported low morbidity and mortality with timely surgical intervention in large bowel emergencies.[23] Hospital stay ranged from 8 to 21 days, with a majority (44.23%) staying for 13–14 days. This is similar to the pattern observed by Horgan et al, who noted that the length of hospital stay in emergency colectomy typically spans 10–14 days, influenced by postoperative recovery and complications.[24]

This study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to other settings. The relatively small sample size (52 patients) may not capture the full spectrum of potential complications and outcomes. The short duration of follow-up restricted assessment of long-term anastomotic integrity and late complications such as stricture or recurrence. Additionally, selection bias cannot be excluded, as only patients deemed suitable for primary anastomosis without diversion were included, potentially underestimating the complication rate in broader clinical practice.

CONCLUSION

Previously colon resection means two stage (primary anastomosis with covering ileostomy or colostomy & then stoma closure) or three stage (Hartmann's procedure then Hartmann closure with covering ileostomy or colostomy then stoma closure) surgery. Now that trend is changing. Dudley first studied the one stage procedure. But still resection and primary anastomosis of colon without proximal diversion, is not uniformly accepted and has received some criticism. It is important to emphasize the importance of single stage operation. This study has established that resection and primary anastomosis of colon without diverting ileostomy or colostomy can be performed safely in both routine and emergency cases.

Recommendations

Resection and primary anastomosis of colon without diverting ileostomy or colostomy is a safe option for both routine and emergency cases, with or without mechanical bowel preparation. It has the merit of being a single stage procedure, simple to perform, cost effective and shorter hospital stay without increasing morbidity or mortality. Here patient can also avoid fear of colostomy, difficulties of maintenance of stoma, social disruption, joblessness and specially second or third stage surgery related morbidity and mortality. This study recommended that careful and skilled surgical technique with properly fit general condition of the patient, carry the chance of anastomotic leakage almost nil, thus we can prevent the hazards of ileostomy or colostomy.

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