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Left Colonic Anastomosis without Protective Stoma

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Abstract: ***Background:*** Protective stoma formation following resection and anastomosis of the colon is a common practice despite evidence of increased mortality and poor patient satisfaction. However, evidence regarding primary resection and anastomosis of lest colon without protective stoma formation is relative scarce. ***Methods:*** This cross-sectional study was conducted at the department of Surgery in Bangladesh Medical College & Hospital, Dhaka for six months of period. Patients requiring colonic resection specially in the left colon with colo-colic and colo-rectal anastomosis without any covering ileostomy or colostomy were included in this study. Before final selection, all participants were screened in according to the inclusion & exclusion criteria. Before interviewing and hospital record analysis, written informed consent was taken from each subject and ethical issues was ensured properly. Data was collected from a total 30 patients and recorded into a structured questionnaire. Collected data was analyzed by the SPSS 23. ***Results:*** total 30 patients were included and mean age of them were 52.83(±10.53) years. About 67% (n=20) were male and 33% (n=10) were female. Of all, 63.30% patients were finally diagnosed as a case of Neoplasm followed by Sigmoid Volvulus (26.7%), Diverticulitis (6.70%), and others 3.30%. most frequent post-operative events were infection which occurred in 16.7% (n=5) cases. Paralytic ileus had developed in 4(13.3%) patients and Anastomic leakage had occurred in 1(3.3%) patient. Mean duration of hospital stay was 08(±1.61) days. ***Conclusion:*** The common indication for left colonic resection and anastomosis was neoplasm and infection were the most common post-operative complication.

Keywords: Colon Resection, Primary Anastomosis, Large-Bowel Obstruction, Sigmoid Volvulus, Hartmann's Procedure, Emergency Colorectal Surgery, Anastomotic Dehiscence.

Original Research Article

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Article at a glance:

Study Purpose: *To assess the indications and outcomes of left colonic resection with primary anastomosis without a protective stoma.*
Key findings: *Neoplasm (63.3%) was the most common indication. Post-operative complications included wound infection (16.7%), paralytic ileus (13.3%), and anastomotic leakage (3.3%). The average hospital stay was 8 days.*
Newer findings: *Primary anastomosis without a protective stoma is a viable option in selected patients, potentially reducing morbidity associated with stoma formation.*
Abbreviations: *CRC – Colorectal Cancer, LCA – Left Colonic Anastomosis, ASA – American Society of Anesthesiologists (Score) .*

INTRODUCTION

The history showed that, the development of treatments of perforated, gangrenous, obstructed or malignant diseases of colon always reflects surgeon's fear of anastomotic dehiscence. The late 19th century, Ellis (1889) developed standardized

techniques for "two-layer" bowel anastomosis and at the same time non-anastomotic techniques for the acutely diseased colon the colostomy.[1] The Paul Mikuliez operation exteriorized the diseased colon as a double-barreled colostomy. Mayo in 1907 recommended temporary transverse colostomy for obstructing diverticulitis. In the 20th century treatment for perforated diverticulitis evolved towards the Hartmann procedure (proposed for colon cancer by Henri Hartmann in 1921) with resection of the perforated or diseased segment then closure of distal end and then proximal end colostomy. This procedure showed an improvement in outcome, reduced mortality and morbidity Parks, 1989.[2] After resection of diseased colon, primary anastomosis is one of the most important skills in general surgery. Untreated or improperly treated these conditions cause significant morbidity in terms of intraabdominal infection, fistulae, or death from generalized peritonitis. Some papers found that present series of left colon resection and primary anastomosis procedures from Torrevieja Hospital (Alicante, Spalti), performed without bowel irrigation or a diverting ileostomy. Seven patients developed some sort of complication (21.9%), all of which were managed conservatively.[3] An article of Pakistan journal of surgery "resection and primary anastomosis without dishowed amongst the 63 patients of sigmoid volvulus, there were 58 males and only five females with ages ranging from 38 to 62 years (mean 56.8 years). The time between onset of symptoms and presentation to the emergency department ranged from 14 to 72 hours (mean 18.2 hours). There was no mortality or anastomotic leakage, but 12(19%) cases developed wound infection and a single case of wound dehiscence.[4] BMCH is a place for this study. Moch study has not yet been carried out in our country regarding the efficacy of resection and primary anastomosis of colon. Large-bowel obstruction and perforation are still frequently occurring entities for the acute care surgeon. Patients presenting with acutely blocked left colon pose a critical dilemma with regards to the best form of management and are associated with a high mortality and morbidity.[5] The surgical management of left-sided large bowel emergency patients still remains controversial.[6] Different approaches are available and cach has advantages and disadvantages.[7, 8] When emergency surgery is undertaken at night or performed by a noncolorectal specialist, two-staged Hartmann resections are frequently performed. Approximately 60% of mechanical large-bowel obstructions are caused by malignancies, 20% by diverticular disease, and 5% are the result of colonic volvulus.[9] The incidence of CRC varies by geographic region: in Europe, the incidence is higher than in North America, followed by Oceanía, Latin America, Africa and Asia.[10] Sigmoid volvulus accounts for 4-8% of all cases of large-bowel obstruction in the United States and United Kingdom. It is relatively more common in Eastern Europe, India and Africa, accounting for 50% of all cases of intestinal obstruction.[11] The epidemiological pattern of sigmoid volvulus varies with different regions and races; a congenital mega-sigmoid is probably present with additional stimuli such as purgation, diet, active peristalsis or pregnancy. This study will enrich our knowledge about the surgical management of colon resection and anastomosis among the Bangladeshi population.

OBJECTIVES

To evaluate the efficacy of primary anastomosis of colon without diverting ileostomy or **colostomy** among the patients, who require colonic resection in the tertiary level hospital.

MATERIALS AND METHODS

Study Design: Longitudinal study.

Place of Study: Department of Surgery, Bangladesh Medical College Hospital, Dhaka.

Study Period: Six months after approval of protocol.

Study population: Patients with colon resection and primary anastomosis up to the upper one third of rectum without diverting ileostomy or colostomy were included in this study.

Sampling Method: Purposive and convenient sampling.

Sample size: Thirty cases were included.

Inclusion criteria

Patients included in the study were those who underwent colon resection with primary

anastomosis up to the upper one-third of the rectum, without a diverting ileostomy or colostomy. Both routine and emergency colo-colic anastomosis cases were considered, excluding traumatic cases. Participants included both male and female patients above 16 years of age. Additionally, inclusion required that the patient or their legal guardian was willing to provide informed consent.

Exclusion criteria

Patients were excluded from the study if they underwent primary anastomosis of the colon with a diverting ileostomy or colostomy, or if they had an ileo-colic anastomosis. Traumatic cases were not considered. Additional exclusion criteria included the presence of local sepsis, poor nutritional status, immunosuppression, history of radiation exposure, gross fecal contamination, or patients in a septicemic condition.

Study procedure

Before the commencement of the study, formal ethical approval was obtained from the Ethical Review Committee (ERC) of BMC. Patients were selected according to the inclusion and exclusion criteria. Informed written consent was obtained from the patients and/or their legal guardians. Face-to-face interviews were conducted using a semi-structured questionnaire, which included socio-demographic parameters and clinical presentations. Following the interview, the patients were examined by the researcher for specific clinical signs, which were recorded in a checklist. Diagnosis, clinical signs, and investigation profiles were collected from patient registry files. A total of 30 patients were interviewed, investigated, and followed up. All patients underwent surgery performed by a single surgeon, with strict adherence to aseptic precautions. The researcher personally conducted the interviews and recorded the collected data. After verifying the data and addressing any inconsistencies, the data were transferred into a spreadsheet for statistical analysis. The final analysis was performed using SPSS version 23.

Ethical issues

Ethical considerations were strictly maintained throughout the study. Patients and their key relatives were clearly informed about the scope and limitations of the study. Informed written consent was obtained from all participants before their inclusion. Additionally, the confidentiality of patients' personal information was strictly upheld to ensure privacy and data protection.

Data Processing and Analysis

Data will be statistically analyzed using SPSS (statistical package for social science) program version 23 for windows. Before starting the analysis, the normality test was performed to check whether the data are distributed normally or not. For normally distributed quantitative variables were expressed by measure mean and standard deviation and categorical variables were expressed by frequency and percentage. For all the analysis a p value < 0.05 was considered statistically significant. Data were shown as mean, range or value and 95% confidence interval (95% CI) and frequency and percent.

RESULT

Total 30 patients were included in our study. The mean age of patients was 52.83(±10.53) years. Minimum age of the patients was 17 years and maximum age of the patients was 64 years. Maximum (76.7%) patients were from >45 years age group

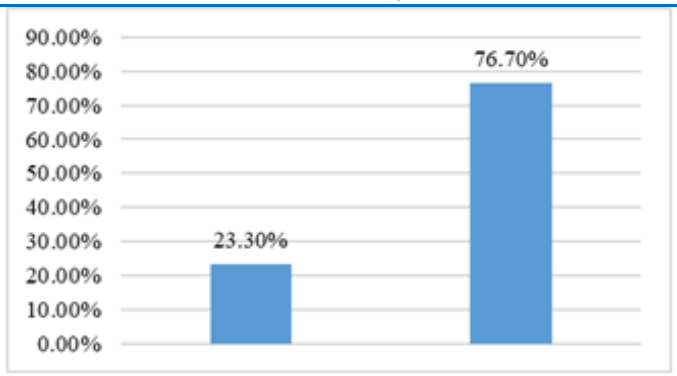

Figure 1: Distribution of patients according to their age (n=30)

Among 30 patients 20(67%) were male and 10(33%) were female.

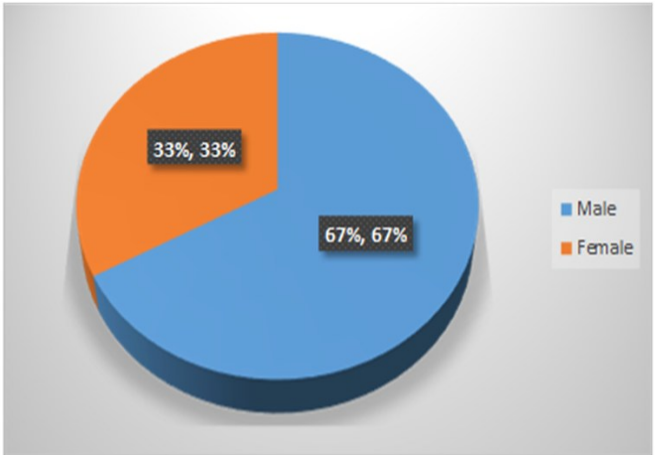

Figure 2: Sex of the patients (n=30)

Among 30 cases maximum were from low socioeconomic status. Fifteen (50%) were from low socioeconomic status. **Ten** (33%) patients were from middle and 5 (17%) patients were from high class families.

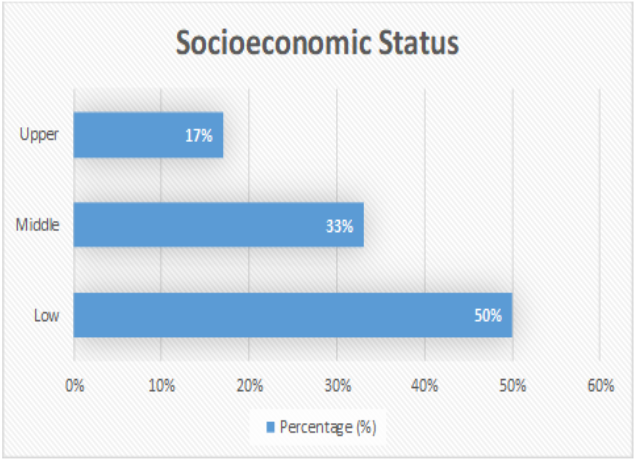

Figure-3: Socioeconomic status of the patients(n=30).

All of the study patients had abdominal pain. Other's symptoms are shown in the below tables.

Table 1: Distribution of symptoms of patients (n=30)

Symptoms	Number of patients	Percentage (%)
Abdominal pain	30	100
Abdominal mass	19	63.3
Weight loss	17	56.7
Ascites	05	16.7

Regarding co-morbidities,8 patients had history of co-morbidities. The types and number of patients presented with co-morbidities are shown below.

Table 2: Co-morbidities of the patients (n=30)

Name of the co-morbidities	Number of the patients	Percentage (%)
HIN	06	20
DM	06	20
IHD	02	6.66

About 63.30 % patients were finally diagnosed as a case of Neoplasm. Rests 26.7%, 6.70%, 3.30% were Sigmoid Volvulus, Diverticulitis and others respectively.

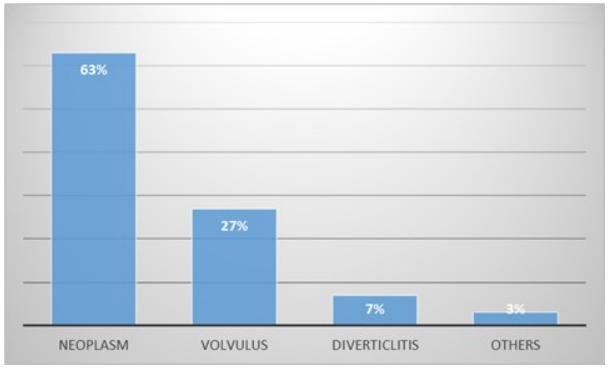

Figure 4: Final diagnosis of the patients (n=30)

The most significant post operative event that occurred in our patients was wond infection. Five (16.7%) patients had suffered from wound infection. Paralytic ileuv hand developed in 4(13.3%) patients. Anastomic leakage had occurred in 10.3%) patients. The rest post-operative events are given in table 3.

Table 3: Post-operative events of patients (n=30)

Post-operative events (%)	Number of the patients	Percentage
Anastomic leakage	01	3.3
Wound infection	05	16.7
Paralytic ileus	04	13.3
Wound dehiscence	01	3.3
Abdominal rigidity	03	10
Abdominal tenderness	08	26.7
Intestinal obstruction	00	00
Fever	05	16.7
Abdominal distention	01	3.3
Referred to ICU	00	00
Mortality	00	00

The mean post-operative hospital stay of the patients was & days. Maximum stay was 11 days and minimum stay was 5 days.

Table 4: Duration of hospital stay of the patients (n=30)

Hospital Stays	Days
Mean	08(+1.61)
Maximum	11
Minimum	05

DISCUSSION

After colonic anastomosis protective stoma formation is a common practice. But patient's satisfaction about this stoma is very poor. Therefore, protective stoma for prevention of wound dehiscence is not universally accepted.[12, 13] The general objective of this study is to evaluate the efficacy of primary anastomosis of colon without diverting ileostomy or colostomy among the patients, who require colonic resection. This study was a hospital based cross sectional descriptive study. The study was conducted at in patient Department of Surgery, Bangladesh Medical College Hospital. Total 30 patients were included in this study, who were admitted at the inpatient department of Surgery, Bangladesh Medical College Hospital. The mean age of the patients was 52.83(±10.53) years. Minimum age of the patients was 17 years and maximum age of the patients was 64 years. Maximum (76.7%) patients were from >45 years age group. Only 23.3% were from 16-45 years age group. The mean age of their patients was 56.8 years. All of their patients were above 38 years and maximum age of the patients was 62 years of age. Among the patients 20(67%) were male and 10(33%) were female. So incidence of colonic resection is significantly higher in male patients. Acute intestinal obstruction mostly affects males than females.[14] conducted a meta-analysis regarding the pre- operative risk factors for colorectal anastomotic leakage and found that male gender was a significant risk factor for CAL.[15] They studied 148 patients who required colonic resection. Among them 89(60.14%) were male. Rest 59 patients were female (39.86%). Diverticulitis, specifically colonic diverticulitis, is a gastrointestinal disease characterized by inflammation of abnormal pouches (diverticula) which can develop in the wall of the large intestine. Diverticulitis, specifically colonic diverticulitis, is a gastrointestinal disease characterized by inflammation of abnormal pouches (diverticula) which can develop in the wall of the large intestine.[16] Acute left colonic diverticulitis is a common problem encountered by surgeons in the emergency setting. It encompasses a variety of conditions, ranging from localized diverticular inflammation to perforation and fecal peritonitis.[17] A number of studies used the Hinchey classification system to grade the severity of diverticulitis, and this is as follows: Class I disease is a localized pericolic inflammation, Class II is a localized pericolic abscess, Class III is diffuse purulent peritonitis and Class IV is diffuse feculent peritonitis.[18] Advantage of primary anastomosis with protective stoma compared to HP is the significant difference in the stoma reversal operation. conducted a study and found that ileostomies were not only reversed more frequently than Hartmann's procedure, but earlier and with fewer and less severe complications.[19- 21] Some surgeons use a protective stoma after low anterior resection to prevent the occurrence of anastomotic leak because it is believed that by diverting the fecal stream and keeping the anastomosis free of material, leakage will be less likely.[22] Stoma itself can cause prolapse, stenosis, bleeding, necrosis, retraction of stoma, skin crosions etc.[23] Regarding occupation of the patients we found that 8(26.60%) patients were day laborer, 8(26.60%) patients were businessman, 6 (20%) were service holder, 4(13.30%) were housewife, 3(10%) were retired employee and 1(3.30%) were unemployed. The exact data regarding occupation of the patients was not found. In our study we found that incidence of colonic resection is lowest in patients who came from upper class families. Among 30 patients only 5 (17%) patients were from upper class families. Rest 15 (50%) were from low socioeconomic status and10 (33%) patients were from middle class families.[24] also tried to identify the socioeconomic

status of their patients. They found only two percent patients were from high class families. Maximum of the patients were from middle class families (56%) and 42% of the patients were from Low class families. The common symptom of our patients was abdominal pain. Hundred percent of the patients complained of abdominal pain. Seventeen patients complained of weight loss. Sixteen patients complained of abdominal mass, 5 patients had ascites and 3 patients had jaundice. But their findings were quite different from us. Among their 32 patients 24 (75%) had history of HTN and 14 (43.75%) had history of DM. This is quite higher than our findings. This dissimilarity is may be due to ethnical dissimilarity. They found no IHD patients in their study. About 19 (63.30%) patients were finally diagnosed as a case of Neoplasm in our study. Rests 8 (26.7%), 2 (6.70%) and 1(3.30%) were sigmoid volvulus, diverticulitis and others respectively. This is similar to the findings.13 Among their 9 patients of large bowel obstruction, 4(44.44%) were finally diagnosed as a case of neoplasm, 3 (33.33%) were diagnosed as volvulus and 2(22.22%) were diagnosed as others. Among their 63 patients 12 (19%) had developed wound infection. Paralytic ileus was developed in 4 (13.3%) patients. This finding is similar to the findings. Among their 75 patients 9 (12%) patients had developed paralytic ileus. Anastomic leakage occurs in 01(3.33%) patients. This is similar to the finding.19 Among their 2800 patients anastomie leakage occurs in 67 (2.4%) patients. The mean post operative hospital stay of the patients was 8 days. Minimum stay was 5 days and maximum stay was 11 days. The mean hospital stay of their cases was 7.8 days. Minimum stay was 4 days and maximum stay was 10 days. Mengual-Ballester Met al.[25] found a 45.9% incidence of ileostomy-related complications, including intestinal obstruction, diarrfien, surgical wound infection, enterocutaneous fistula, disuse stricture of distal anastomosis, rectorrhagia and anastomotic leakage.[26] Intraoperative blood loss, duration of surgery, and total duration of stay were increased significantly for stoma patients.[27] Patients are subjected to additional operations and may develop small bowel obstructions related to the diverting ostomy, acute kidney injury due to a high stoma output, a parastomal hernia, or complications at the time of ostomy reversal.[28] A loop/end ileostomy has an adverse effect on the quality of life.[21, 22] A defunctioning gastrointestinal stoma may appear to be a simple procedure for the surgeons. The physical, physiological and psychological impacts onto the patients are, however, immense.[29, 30] The mean post-operative hospital stay of the patients was 8 days. Minimum stay was 5 days and maximum stay was 11 days. This is also similar to the findings of Fuertes *et al*.[3] The mean hospital stay of their cases was 7.8 days. Minimum stay was 4 days and maximum stay was 10 days.

Limitations of the study

The study had several limitations. It was longitudinal in nature, which may have influenced the findings over time. Surgeries were performed by multiple surgeons, leading to potential variability in surgical techniques and outcomes. Additionally, the study was conducted in a single center, limiting the generalizability of the results. Furthermore, the sample size was relatively small and not representative of the broader population, which may affect the applicability of the study findings.

CONCLUSION

In this study, it was found that neoplasm and sigmoid volvulus were the two most common indications for left colonic anastomosis without protective stoma in out settings. And overall hospital duration was eight days and most commonly observed complication are infection. However, further larger randomized trial study is needed to finalize the findings.

Recommendation

Further large-scale, multicenter randomized controlled trials are recommended to validate the findings of this study. Future research should focus on evaluating long-term outcomes and identifying factors that influence postoperative complications. Standardization of surgical techniques across different surgeons may help improve result consistency. Additionally, studies involving diverse populations can enhance the generalizability of the findings.

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