

Outcomes of Emergency Resection and Primary Anastomosis of the Large Bowel in Unprepared Bowel during Acute Large Bowel Obstruction

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Abstract

Background: Acute large intestinal obstruction is a frequent surgical emergency with high morbidity and mortality. One-stage primary resection and anastomosis without intraoperative colonic lavage in unprepared bowel is a promising surgical option that avoids multistage procedures and colostomy. This study evaluates the clinical outcomes of this approach.

Aim: To evaluate that emergency resection and primary anastomosis in acute large intestinal obstruction in unprepared bowel appears to be a safe and effective procedure in selected patients.

Methods: This prospective study included **150** patients presenting with acute large bowel obstruction at Dinajpur Medical College Hospital from July 2022 to July 2024. Patients with generalized peritonitis or bowel perforation were excluded. Emergency resection and primary end-to-end anastomosis were performed using single-layer interrupted sutures without colonic lavage. Postoperative morbidity, mortality, and hospital stay were recorded.

Results: Of the 150 patients (88% male, mean age 55 years), sigmoid volvulus was the predominant cause (94%). Gangrenous bowel was present in 32%. Postoperative complications included wound infection in 14%, wound dehiscence in 4%, anastomotic leak in 2%, and mortality in 2%. Mean hospital stay was 12.5 days. Morbidity was higher in patients with gangrenous bowel.

Conclusion: Emergency resection and primary anastomosis without colonic lavage in selected patients with acute large bowel obstruction is a safe, effective procedure with acceptable morbidity and mortality, circumventing the need for staged surgery or colostomy.

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Introduction

Acute large bowel obstruction (LBO) represents a significant surgical emergency worldwide and poses substantial challenges in both diagnosis and management due to its associated morbidity and mortality. It is characterized by a mechanical or functional blockage that impedes the passage of intestinal contents through the colon and rectum, leading to progressive abdominal distension, pain, and severe electrolyte imbalances if untreated.¹ The etiology of LBO is diverse, with colorectal cancer being the leading cause globally, accounting for 50-70% of cases, particularly tumors distal to the splenic flexure.² Other benign causes include colonic volvulus—especially sigmoid volvulus—the second most frequent etiology in many geographic regions including South Asia and Africa, inflammatory strictures, adhesions, and fecal impaction.³

Patients with LBO are often elderly with multiple comorbidities and present acutely with signs of bowel obstruction such as progressive abdominal distension, colicky pain, obstipation, and vomiting. Immediate recognition and resuscitation are crucial to prevent complications such as bowel ischemia, perforation, and generalized peritonitis, which significantly worsen outcomes.⁴ The management of LBO varies according to the underlying cause, bowel viability, and patient condition, ranging from endoscopic decompression to emergency surgical intervention.

Traditionally, management of obstructed colon, especially in emergency settings, involved staged procedures such as Hartmann's procedure or temporary diverting colostomies to reduce the risk of anastomotic leak and mortality. However, these approaches necessitate further surgeries for stoma reversal and increase hospital stay, morbidity, and patient discomfort². Recent

surgical advances and accumulating evidence increasingly support one-stage resection with primary anastomosis even in unprepared bowels without mechanical cleansing or intraoperative colonic lavage, particularly in cases without gross contamination or sepsis.^{3,4}

⁴ This approach potentially reduces the number of surgeries, hospital costs, and improves quality of life by avoiding stoma formation. Despite concerns regarding anastomotic integrity in the absence of bowel preparation, multiple studies demonstrate comparable leakage rates with careful patient selection, surgical technique, and optimal perioperative care. However, the presence of gangrenous bowel or fecal contamination still requires cautious decision-making, and diversion or staged procedures may be necessary.⁵ Sigmoid volvulus, a condition marked by torsion of the sigmoid colon, remains a common cause of acute large bowel obstruction (LBO) in countries like Bangladesh, India, and parts of Africa, where dietary and socioeconomic factors contribute to its prevalence³. In these populations, emergency one-stage resection and primary anastomosis have shown favorable outcomes without increased morbidity.

This study aims to assess the safety and efficacy of emergency resection with primary anastomosis in an unprepared bowel without intraoperative colonic lavage among patients presenting with acute large bowel obstruction (LBO) at a tertiary hospital in Bangladesh. We explore postoperative complications, mortality, and hospital stay, contributing valuable data to optimize surgical management protocols in resource-limited settings.

Methods

This prospective observational study was conducted in the Department of Surgery at Dinajpur Medical College Hospital, Bangladesh, over a one-year period from July

2023 to July 2024. A total of 150 patients presenting with acute large bowel obstruction (LBO) were enrolled consecutively based on predefined inclusion and exclusion criteria. Eligible patients were aged between 31 and 80 years, were hemodynamically stable at presentation, and had resectable colonic carcinoma. Patients younger than 30 years or older than 80 years, those with hemodynamic instability, unresectable colonic malignancy, diabetes mellitus, or generalized peritonitis were excluded from the study. All patients underwent comprehensive preoperative evaluation upon admission. A detailed clinical history was obtained with particular emphasis on symptom onset, duration, bowel habits, and any previous abdominal surgery. Physical examination focused on abdominal distension, tenderness, visible peristalsis, and digital rectal examination findings. Baseline laboratory investigations included complete blood count, serum electrolytes, blood urea, serum creatinine, and blood glucose levels. Hemoglobin values ranged from 8 to 15 g/dL, reflecting varying degrees of anemia among the patients. Total leukocyte counts ranged between 5,500 and 20,000/cu mm, with higher counts commonly observed in patients presenting late or with bowel gangrene. Serum biochemical analysis, performed in selected patients, revealed elevated urea and creatinine levels primarily in cases associated with gangrenous bowel. Hypokalemia was frequently observed in these patients, while other electrolyte parameters were generally within normal limits. Radiological evaluation included erect abdominal radiographs for all patients to confirm the presence, level, and nature of bowel obstruction. Abdominal ultrasonography and colonoscopy were performed selectively in patients where malignancy or complex pathology was suspected, to further delineate the diagnosis and plan surgical management. Initial

management focused on adequate resuscitation, including intravenous fluid administration, correction of electrolyte imbalances, nasogastric decompression, and administration of broad-spectrum antibiotics according to institutional protocol. Surgical intervention was undertaken only after ensuring adequate hemodynamic stabilization. Emergency laparotomy was performed under general anesthesia through a midline vertical incision. Intraoperatively, the site of obstruction and bowel viability were assessed. The obstructed segment, along with any gangrenous or non-viable bowel, was resected. Primary end-to-end anastomosis was performed manually using a single-layer interrupted extramucosal technique with 3-0 vicryl sutures. Intraoperative colonic lavage was not employed; instead, manual decompression was performed when required to reduce bowel distension. Abdominal closure was completed using a standard mass closure technique with No. 1 prolene. Post-operatively, patients were closely monitored for vital parameters, wound condition, return of bowel function, and complications such as anastomotic leakage, wound infection, or respiratory events. Oral feeding was initiated following the return of bowel activity, and early ambulation was encouraged. The duration of hospital stay was recorded for each patient. Follow-up evaluations were conducted in the outpatient department at two and four weeks post-discharge to assess recovery and identify any late post-operative complications. The study protocol was reviewed and approved by the Institutional Ethical Committee of Dinajpur Medical College Hospital. Written informed consent was obtained from all participants prior to enrollment, and the study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Results

A total of 150 patients diagnosed with acute large bowel obstruction (LBO) were included in the study.

Table I: Demographic characteristics of the study subjects

Demographic characteristics	Number	Percentage
Age in years		
31 – 40	6	4.0
41 – 50	36	24.0
51 – 60	72	48.0
61 – 70	24	16.0
71 – 80	12	8.0
Sex		
Male	132	88.0
Female	18	12.00
Socio-economic Status		
Poor (Up to 60,000Tk. per year)	139	92.67
Average (Up to 1,20,000 Tk. Per year)	8	5.33
Rich (Above 1,20,000Tk. per year)	3	2.00

The study included predominantly middle-aged and elderly patients. Nearly half of the subjects (48%) were aged 51–60 years, followed by 24% in the 41–50 year age group. Patients aged 61–70 years constituted 16%, while smaller proportions were seen in the 31–40 years (4%) and 71–80 years (8%) age groups. The study population was largely male (88%), with females accounting for 12%. Most participants belonged to a low socio-economic background, with 92.67% classified as poor, while only 5.33% were from an average socio-economic group and 2% from a higher socio-economic status (Table-1).

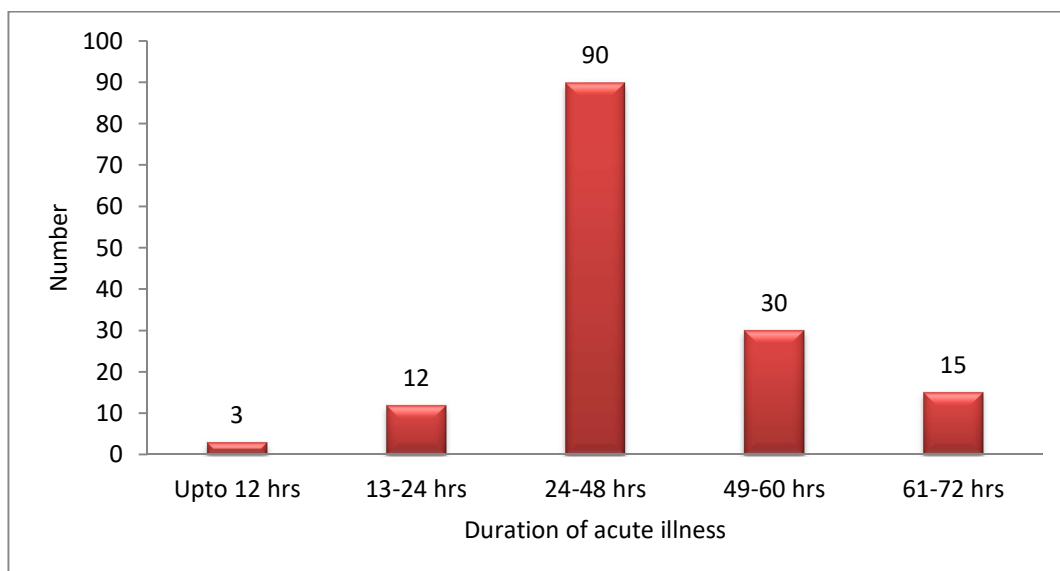


Figure 1. Duration of acute illness

Figure 1 shows that the majority of patients had an acute illness lasting **24–48 hours 90(60%)**, followed by **49–60 hours 30(20%)** and **61–72 hours 15(10%)**, while only **10%** had illness duration under 24 hours.

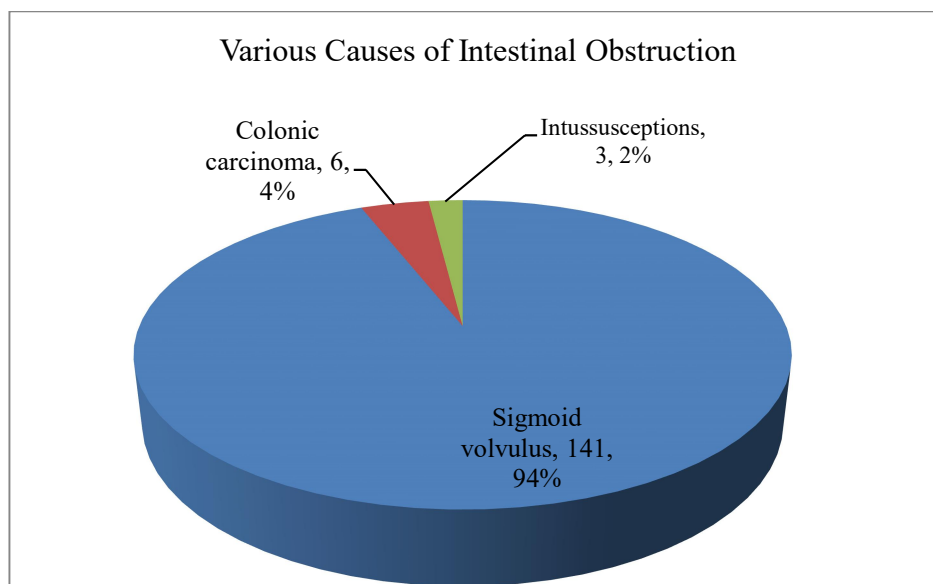


Figure 2. Various Causes of Intestinal Obstruction

Sigmoid volvulus was the most common cause of intestinal obstruction (94%), while **colonic carcinoma** (4%) and intussusception (2%) were rare.

Table II: Condition of colon during laparotomy (n=150)

Condition	Number of patients	Percentage (%)
Gangrenous	48	32.0
Non-gangrenous	102	64.0
Total	150	100.0

During laparotomy, gangrenous changes of the colon were observed in 48 patients (32.0%), while the majority, 102 patients (64.0%), had non-gangrenous colon. Overall, non-gangrenous involvement was more common among the studied patients.

Table III: Operative procedures among patients undergoing emergency resection and primary anastomosis

Operative procedures	Number	Percentage
Sigmoid volvulus: sigmoid colectomy with primary end-to-end anastomosis	141	94.0
Colonic carcinoma	--	
Right hemicolectomy	3	2.0
Left hemicolectomy	3	2.0
Intussusception (Ileocaecal) – Right hemicolectomy	3	2.0

In this study, all patients underwent **emergency resection with primary anastomosis**. The **majority (94.0%)** were treated for **sigmoid volvulus with sigmoid colectomy and primary end-to-end anastomosis**. **Right and left hemicolectomy** were each performed in **2.0%** of patients, including cases of **colonic carcinoma** and **ileocaecal intussusception**, reflecting the less frequent need for these procedures.

Table IV: Incidence of post-Operative complications

Post-operative complications	Number	Percentage
Wound infection	21	14
Wound dehiscence	6	4
Respiratory complications	3	2
Anastomotic leakage	3	2
Endotoxic shock	6	4
Post-operative anuria	3	2
Death	3	2
Total	45	30
Duration of Hospital stay	12.74 (± 3.8)	8-29 days

Post-operative complications were observed in 45 patients (30%). The most common complication was wound infection (14%), followed by wound dehiscence (4%) and endotoxic shock (4%). Less frequent complications included respiratory complications, anastomotic leakage, post-operative anuria, and death, each occurring in 2% of patients. The mean duration of hospital stay was 12.74 ± 3.8 days, (range of 8 to 29 days), indicating moderate variability in postoperative recovery.

Table V: Outcome of emergency resection and primary anastomosis (n=150)

Condition of bowel at operation	Recovered without complication No of (%)	any Recovered with some complication No of (%)	Death No of (%)
Gangrenous (n=48)	21 (43.75)	24 (50)	3 (6.25%)
Non gangrenous (n=102)	84 (82.36)	18 (17.64)	--

Outcomes differed markedly according to bowel condition at operation. Among patients with gangrenous bowel (n = 48), 21 (43.75%) recovered without complications, 24 (50.0%) developed postoperative complications, and 3 (6.25%) died. In contrast, among patients with non-gangrenous bowel (n = 102), the majority 84 (82.36%) recovered without any complication, while 18 (17.64%) experienced some complications, and no mortality was recorded. Overall, non-gangrenous bowel was associated with significantly better postoperative outcomes following emergency resection and primary anastomosis.

Discussion

Acute large bowel obstruction (LBO) remains a significant surgical emergency in developing countries, posing challenges in early diagnosis, timely referral, and optimal management.⁶ The present study, comprising **150 patients**, represents one of the largest single-center series from this region and confirms the continued predominance of **sigmoid volvulus (94%)** as the leading cause

of acute large bowel obstruction, consistent with previously reported South Asian and Bangladeshi studies.⁷

The demographic profile showed a marked male predominance (88%), with most patients belonging to the middle-aged and elderly groups and originating from a low socioeconomic background. Similar demographic trends have been widely reported, reflecting dietary habits, chronic constipation, delayed health-seeking behavior, and limited access to healthcare facilities in resource-constrained settings.⁸

Delayed presentation was a notable finding, with the majority of patients presenting **24–48 hours after symptom onset**, and a median duration exceeding 37 hours. Such delays were strongly associated with an increased incidence of **gangrenous bowel (32%)** and metabolic derangements, including anemia, leukocytosis, and electrolyte imbalance. These observations emphasize the critical role of early diagnosis, community awareness, and

improved referral systems in reducing morbidity and mortality.^{8,9}

Plain abdominal radiography remained the primary diagnostic tool in this study, demonstrating classical features such as the coffee-bean sign and air–fluid levels in most patients, in line with existing literature.¹⁰ All patients underwent emergency resection with primary anastomosis, predominantly sigmoid colectomy without intraoperative colonic lavage. This single-stage approach has gained acceptance due to reduced hospital stay, avoidance of stoma-related morbidity, and elimination of the need for a second operation for stoma reversal.¹¹

The overall postoperative complication rate was **30%**, with wound infection being the most frequent complication (14%), followed by wound dehiscence and endotoxic shock (4% each). Serious complications such as anastomotic leakage and mortality occurred in only 2% of cases, which compares favorably with published regional and international data.¹² The mean hospital stay of 12.74 ± 3.8 days further supports the feasibility of primary anastomosis in emergency settings.

Outcome analysis revealed a clear association between bowel viability and postoperative results. Patients with non-gangrenous bowel had significantly better outcomes, with 82.36% recovering without complications and no mortality, whereas those with gangrenous bowel experienced higher complication rates and all recorded deaths. These findings are consistent with international experience identifying **bowel gangrene and delayed presentation** as major predictors of adverse outcomes.^{12–13}

Despite its strengths, this study is limited by its **single-center design**. Nevertheless, it provides valuable local evidence supporting the **safety and effectiveness of emergency**

primary resection and anastomosis in selected patients with acute large bowel obstruction (LBO). Further multicenter prospective studies and improved emergency referral pathways are warranted to optimize patient selection and surgical outcomes.¹³

Conclusion

This prospective study demonstrates that emergency primary resection and anastomosis in an unprepared large bowel, without intraoperative colonic lavage, is a safe and effective treatment for acute large bowel obstruction (LBO), particularly in cases of sigmoid volvulus. Favorable outcomes, including low mortality and minimal anastomotic complications, were achieved, especially among patients with viable bowel and early presentation. The approach reduced hospital stay and largely avoided the need for stoma formation. Timely diagnosis, adequate resuscitation, and careful intraoperative assessment were key determinants of success. These findings support single-stage emergency surgery as a practical and effective strategy in resource-limited settings, while emphasizing the need for improved community awareness and early referral to further enhance outcomes.

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