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(RESEARCH ARTICLE)

The role of laparoscopy in bowel obstruction: A retrospective study at a tertiary care hospital

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Abstract

Bowel obstruction remains a common surgical emergency with a variety of underlying causes. Traditionally, open surgery has been the standard approach for managing this condition, but the introduction of laparoscopic techniques has provided a minimally invasive alternative with potential benefits, such as reduced postoperative pain, shorter hospital stays, and faster recovery. This study presents a retrospective analysis of 26 patients who underwent laparoscopic surgery for bowel obstruction between January 2022 and October 2023 at Nepal Mediciti Hospital. Patient demographics, operative details, clinical outcomes, and challenges encountered are discussed. A subset of cases required conversion to open surgery, and factors influencing the decision to proceed with laparoscopy are explored. The findings suggest that laparoscopy is a safe and effective option for managing bowel obstruction when appropriately indicated.

Keywords: Laparoscopy; Bowel obstruction; Adhesive obstruction; Hernia; Operative time; Conversion; Surgical outcomes

1. Introduction

Bowel obstruction is a common surgical emergency characterized by a blockage that prevents the normal passage of intestinal contents. Postoperative adhesions are the most common cause of acute small bowel obstruction, representing 75% of all cases. Around 50% will require surgical treatment.[1] Traditionally, the management of bowel obstruction has been through open laparotomy, which allows for direct visualization and intervention. However, laparoscopic approach has demonstrated benefits in other urgent and elective situations, offering lower morbidity, less postoperative pain and shorter hospital stay, even in adhesive bowel obstruction .[1,2] The main drawbacks related with the laparoscopic approach in bowel obstruction are: risk of intraoperative bowel injury, difficulty handling the bowel loops, difficulty obtaining a correct view of the cause of the obstruction and the presumably higher cost of the procedure.[3] However, in the guides of the World Society of Emergency Surgery Adhesive Small Bowel Obstruction working group [4,5], only factors related to pneumoperitoneum (hemodynamic instability or cardiopulmonary impairment) are considered absolute exclusion criteria for laparoscopic approach. Because of the scarcity of randomized controlled trials and the absence of a unified stance on the best surgical approach, laparoscopy is still viewed as a secondary option in the management of bowel obstruction.

In this study we review the role of laparoscopy in the management of bowel obstruction in a cohort of 26 patients and evaluate patient demographics, etiology, operative technique, clinical outcomes, and the challenges faced during laparoscopic procedures, including conversion to open surgery.

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2. Materials and Methods

A retrospective review of 26 patients who underwent laparoscopic surgery for bowel obstruction between January 2022 and October 2023 was conducted at Nepal Mediciti Hospital. Patient data was retrieved from medical records, which included demographic information, etiology of obstruction, surgical approach, operative time, length of hospital stay, time to resume oral intake, and postoperative complications.

Following the standard protocol, a nasogastric tube (NGT) was placed and kept open when bowel obstruction was suspected. The patient was kept nil per oral on intravenous fluid support and antibiotics. An intravenous contrast-enhanced computed tomography (CECT) of the abdomen was then performed in all patients. Laparoscopy was successfully employed in patients with the following characteristics:

- **Minimal Distention**: Patients with bowel distension of less than 4 cm on imaging were more likely to undergo successful laparoscopic surgery.
- **Previous Single Quadrant Surgery**: Patients who had undergone only single-quadrant surgeries in the past had fewer adhesions and less tissue distortion, making them suitable candidates for laparoscopy.
- **Proximal Obstruction**: Laparoscopy was particularly effective in managing proximal (small bowel) obstructions where access was easier, and visualization was more straightforward.

Preoperative CT scans were crucial in determining the suitability of laparoscopy, as they provided valuable information about the location and nature of the obstruction.

Our exclusion criteria for laparoscopic surgical interventions in bowel obstruction patients were as follows: (1) patients with complicated intestinal obstruction, i.e., septic shock; (2) patients with suspected malignancies; (3) patients with suspected bowel strangulation, ischemia, necrosis, or perforation; (4) patients with severe cardiovascular compromise, significant respiratory or hemostatic pathologies; and (5) patients in whom the medical records were incomplete.

Data were collected from the hospital records for age, sex, medical and surgical history, clinical presentation, radiological findings, surgical details (time, procedure, and result), the reason for the conversion - where applicable, time to initiation of diet (liquid or soft), perioperative complications, length of hospital stay, and mortality. Thus, ours is a retrospective study of prospectively collected and recorded data.

2.1. Preoperative Preparation

Preoperative preparation was in the form of adequate intravenous fluid replenishment, maintaining normal electrolyte balance, judicial use of antibiotics, and appropriate antithrombotic prophylaxis. Nasogastric decompression was carried out in each patient. This facilitated decompression above the level of the obstruction, thereby minimizing the risk of aspiration during anesthesia and deflating the proximal distended bowel, which enabled relatively easier handling of the dilated bowel during surgery. Written, informed consent was obtained from every patient, prior to surgery.

2.2. Patient Position and the Surgical Technique

The patients were given a supine position with legs straight and split up. They were firmly strapped, fixed to the table at the lower chest level to enable steep Trendelenburg, reverse Trendelenburg, and right and left lateral positions. The pressure points and contact areas were adequately padded. In patients who did not have scars of previous surgery on the abdomen, our preferred point of entry was the umbilical area (supra- or infraumbilical, depending on the adequacy of the umbilicus to pubis distance). If the bowel loops were massively distended and the abdomen was too tense, then we preferred to do a direct 10-mm blunt trocar insertion by the open technique in the umbilical area (either infra- or supraumbilical). In other situations, where the NGT had aspirated copious amounts and the abdomen was relatively soft, we preferred to institute pneumoperitoneum through the chosen site by the conventional Veress needle technique. In patients with scars of previous abdominal surgery, we preferred to institute pneumoperitoneum through the Veress needle at Palmer's point (a relatively safe point for entry, on the left midclavicular line two finger breadths below the costal margin). Then, a 5-mm trocar was inserted at the same point, and a peripheral bird's eye view of the abdomen was obtained through a 5-mm telescope that was inserted through this trocar. Central trocars were then inserted, carefully dodging any adhesions (if present), under the vision provided by this 5-mm telescope. Dense adhesions, if present, were first lysed through additional peripheral trocars inserted in "safe areas" before insertion of the central trocars.

Once the central 10-mm trocar was inserted, we switched over to a 10-mm telescope and inserted the left subcostal 10-mm trocar, which then became our primary optic trocar. A systematic "bowel walk" was initiated, starting from the ileocecal junction to the duodenojejunal flexure. While dealing with concurrent complicated adhesions and significant small bowel distension, we believe that one should not hesitate to insert one or two extra trocars at optimum places in order to insert extra instruments like the fan retractor for better atraumatic retraction of dilated bowel and safer surgery. Ligasure was our preferred energy source for these surgeries, and we found it invaluable, especially while working in restricted spaces. Any free fluid was aspirated and sent for routine microscopy, gram stain, amylase level, and cytology.

A pair of "cold" scissors were used to divide the adhesions or bands. We usually avoided the use of energy sources nearby to the bowel. Extreme care was taken to minimize direct handling of distended bowels. Where needed, atraumatic "soft" bowel graspers were used. In case of iatrogenic bowel injury or evidence of ischemic/necrotic bowel, conversion to laparotomy was carried out.

In cases requiring bowel resection, laparoscopic anastomosis was performed in an assisted manner. This technique allowed for less manipulation and faster recovery compared to traditional open surgery.

3. Results

A total of 26 patients were enrolled in the a study with age range of 18 to 85 years(mean age= 45.7 years). 15 cases were males and 11 patients were female.

The primary causes of bowel obstruction were as follows:

Table 1 The primary causes of bowel obstruction

Cause of bowel obstruction	Frequency	Percentage
Adhesive bowel obstruction	16	61.5%
External hernia	3	11.5%
Malignancy	4	15.4%
Crohn’s disease	2	7.7%
Others (e.g. volvulus, stricture)	1	3.8%

In 7 cases (26.9%), the laparoscopic approach was converted to open surgery. The conversion was driven by: Severe adhesions or distorted anatomy made laparoscopic manipulation difficult in 6 cases and perforation necessitated conversion to open surgery in one case.

Conversion was performed when it was deemed necessary for patient safety and to ensure complete resolution of the obstruction.

The operative time ranged from 15 to 210 minutes, depending on the complexity of the case, the degree of adhesions, and any comorbid conditions. The mean hospital stay was 6.7 days, ranging from 3 to 15 days. Uncomplicated cases were discharged sooner, while patients with more extensive resections or complications had longer stays. The mean time to resume oral intake was 1.5 days, reflecting the quick recovery observed with laparoscopic techniques.

One patient had enterotomy during evaluation of ischemic bowel. No major complications, such as anastomotic leaks or infections, were reported in the laparoscopic cohort. The conversion rate to open surgery was 26.9%. Factors contributing to conversion included extensive adhesions, inadequate port access, and the presence of bowel ischemia or perforation.

4. Discussion

Laparoscopy has become an increasingly popular method for managing bowel obstruction, providing several benefits over traditional open surgery. These include smaller incisions, reduced postoperative pain, shorter hospital stays, and

faster recovery times. In our cohort, laparoscopic surgery was successfully performed in 19 out of 26 cases (73.1%), with a conversion rate of 26.9%.

The results of our study show that the laparoscopic approach in the management of bowel obstruction is associated with better postoperative outcomes, lower morbidity, an earlier onset of oral intake and a shorter length of hospital stay, especially for selected patients with simple adhesions. The number and type of previous operations and peritoneal damage have been considered an important risk factors involved in the pathogenesis of adherences [6]. Some studies have also associated the size of the laparotomy with the formation of new adhesions [7], and have quantified the prevalence of postoperative adherences as high as 93% [8]. A study comparing two groups of 205 patients undergoing either laparoscopic and open colorectal surgery, did not find differences in admissions for intestinal obstruction (9% vs 13%) but reported a higher indication for surgery in the open approach when present (2% vs 8%; $p = 0{,}006$) [9]. Similarly, in a review by Burns et al. of 187,148 patients who underwent colorectal surgery, 3.5% required adhesiolysis within three years of surgery. In that study the patients who underwent laparoscopic approach, had a lower percentage of readmissions and less need for reoperation for adhesions (OR = 0.8; $p < 0.001$) [10]; in agreement with other studies [11,12]. Therefore, laparotomy in the management of adhesive bowel obstruction is in itself, a factor for the development of new episodes of adhesive bowel obstruction and does not seem theoretically the best option.

Since Bastug reported the first laparoscopic adhesiolysis in 1991 [13], laparoscopic approach has demonstrated its feasibility and safety.

One of the drawbacks of the laparoscopic approach is the possibility of intraoperative intestinal tearing during handling, especially in severe adhesions and multiple previous operations [14]. In a review of 19 studies including 1061 cases of adhesive bowel obstruction operated by laparoscopy, rates of recognized intraoperative enterotomy and missed perforation were 6.5 and 0.8% respectively [15]. Unlike most published studies, our study found a lower rate of perforation in laparoscopy, possibly due to the low threshold for open conversion recommended by the guidelines [14]. Our results suggest that laparoscopy is a safe technique that does not increase the intraoperative risk of enterotomy.

A previous review of over 2000 cases reported a conversion rate as high as 36, and 6.7% of cases were considered laparoscopic assisted [16]. A Swiss registry also reported a conversion rate of 32.4% in 537 patients, including elective surgeries [17], and Ming-Zhe et al. published rates ranging from 26 to 51.9% [18].

Since most conversions are due to technical difficulties and the inability to identify the cause of the obstruction, it is logical to think that patients with single adhesions without need for resection will be the ideal candidates for laparoscopy. Our study has a selection bias already present in other similar retrospective studies [19], since patients in the laparoscopic group are younger, with a lower ASA score and fewer previous operations. This bias may alter postoperative outcomes compared to the open approach, and so prospective randomized studies are needed to validate the results obtained in this study.

Despite these limitations, we think that the results obtained are robust enough to confirm the benefits of the laparoscopic approach in adhesive bowel obstruction, especially in selected patients with simple adhesions and when performed by surgeons skilled in advanced laparoscopic surgery.

5. Conclusion

Laparoscopy is a safe and effective approach for managing bowel obstruction, particularly in patients with minimal bowel distention, proximal obstructions, and a history of previous single-quadrant surgery. Successful laparoscopic management requires careful preoperative planning, proper patient selection, and skilled surgical techniques. Despite a relatively low conversion rate, conversion to open surgery remains a necessary option for complex or challenging cases. Further studies with larger sample sizes and longer follow-up periods are needed to better define the role of laparoscopy in the management of bowel obstruction and optimize patient outcomes.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Mancini GJ, Petroski GF, Lin WC, Sporn E, Miedema BW, Thaler K. Nationwide impact of laparoscopic lysis of adhesions in the management of intestinal obstruction in the US. Journal of the American College of Surgeons. 2008 Oct 1;207(4):520-6.

[2] Wiggins T, Markar SR, Harris A. Laparoscopic adhesiolysis for acute small bowel obstruction: systematic review and pooled analysis. Surgical endoscopy. 2015 Dec; 29:3432-42.

[3] Suter M, Zermatten P, Halkic N, Martinet O, Bettschart V. Laparoscopic management of mechanical small bowel obstruction: are there predictors of success or failure?. Surgical endoscopy. 2000 May; 14:478-83.

[4] Di Saverio S, Coccolini F, Galati M, Smerieri N, Biffl WL, Ansaloni L, Tugnoli G, Velmahos GC, Sartelli M, Bendinelli C, Fraga GP. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2013 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. World journal of emergency surgery. 2013 Dec; 8:1-4.

[5] Catena F, Di Saverio S, Kelly MD, Biffl WL, Ansaloni L, Mandalà V, Velmahos GC, Sartelli M, Tugnoli G, Lupo M, Mandalà S. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2010 evidence-based guidelines of the World Society of Emergency Surgery. World Journal of Emergency Surgery. 2011 Dec; 6:1-24.

[6] Duepree HJ, Senagore AJ, Delaney CP, Fazio VW. Does means of access affect the incidence of small bowel obstruction and ventral hernia after bowel resection?: Laparoscopy versus laparotomy. Journal of the American College of Surgeons. 2003 Aug 1;197(2):177-81.

[7] Beck DE, Opelka FG, Bailey RH, Rauh SM, Pashos CL. Incidence of small-bowel obstruction and adhesiolysis after open colorectal and general surgery. Diseases of the colon & rectum. 1999 Feb 1;42(2):241-8.

[8] Menzies D, Ellis H. Intestinal obstruction from adhesions--how big is the problem? Ann R Coll Surg Engl. 1990; 72:60–3.

[9] Reshef A, Hull TL, Kiran RP. Risk of adhesive obstruction after colorectal surgery: the benefits of the minimally invasive approach may extend well beyond the perioperative period. Surgical endoscopy. 2013 May; 27:1717-20.

[10] Burns EM, Currie A, Bottle A, Aylin P, Darzi A, Faiz O. Minimal-access colorectal surgery is associated with fewer adhesion-related admissions than open surgery. Br J Surg. 2013; 100:152–9.

[11] Aquina CT, Probst CP, Becerra AZ, Iannuzzi JC, Hensley BJ, Noyes K, Monson JR, Fleming FJ. Missed opportunity: laparoscopic colorectal resection is associated with lower incidence of small bowel obstruction compared to an open approach. Annals of surgery. 2016 Jul 1;264(1):127-34.

[12] Bartels SAL, Vlug MS, Hollmann MW, Dijkgraaf MGW, Ubbink DT, Cense HA, van Wagensveld BA, Engel AF, Gerhards MF, Bemelman WA, Collaborative LAFA study group. Small bowel obstruction, incisional hernia and survival after laparoscopic and open colonic resection (LAFA study). Br J Surg. 2014; 101:1153–9.

[13] Ghosheh B, Salameh JR. Laparoscopic approach to acute small bowel obstruction: review of 1061 cases. Surgical endoscopy. 2007 Nov; 21:1945-9.

[14] O'Connor DB, Winter DC. The role of laparoscopy in the management of acute small-bowel obstruction: a review of over 2,000 cases. Surgical endoscopy. 2012 Jan; 26:12-7.

[15] Dindo D, Schafer M, Muller MK, Clavien PA, Hahnloser D. Laparoscopy for small bowel obstruction: the reason for conversion matters. Surgical endoscopy. 2010 Apr; 24:792-7.

[16] Li MZ, Lian L, Xiao LB, Wu WH, He YL, Song XM. Laparoscopic versus open adhesiolysis in patients with adhesive small bowel obstruction: a systematic review and meta-analysis. The American journal of surgery. 2012 Nov 1;204(5):779-86.

[17] Lombardo S, Baum K, DeAmorim Filho J, Nirula R. Should adhesive small bowel obstruction be managed laparoscopically? A National Surgical Quality Improvement Program propensity score analysis. Journal of Trauma and Acute Care Surgery. 2014 Mar 1;76(3):696-703.