

Original Article

Laparoscopic Management of Acute Small Bowel Obstruction

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BACKGROUND: Conventional surgical management of acute small bowel obstruction involves laparotomy. The laparoscopic approach has not been favoured due to the presumed increased risk of bowel injury.

METHODS: A retrospective review of our experience of laparoscopic management of acute small bowel obstruction was undertaken. Nine patients were identified from 1997 to 2003. The aetiology of obstruction was identified laparoscopically in all cases. Eight cases were caused by bands or local adhesions and one patient had a bezoar.

RESULTS: Laparoscopic treatment was successful in 78% of patients including one laparoscopy-assisted procedure. Conversion to laparotomy was performed in two patients, one due to difficult adhesiolysis and one due to iatrogenic bowel injury during adhesiolysis. The mean operating time was 74 minutes. There were no postoperative complications and the mean length of hospital stay was 4.3 days.

CONCLUSION: This small series demonstrates that laparoscopy can serve as a good diagnostic tool as well as treatment of acute small bowel obstruction. In an appropriately selected patient, laparoscopic management of small bowel obstruction is a feasible therapeutic approach and appears to convey the benefits of a short postoperative hospital stay, reduced postoperative complications and possibly reduced subsequent adhesion formation. [*Asian J Surg* 2005;28(3):185–8]

Key Words: abdominal adhesions, bowel obstruction, laparoscopy

Introduction

Small bowel obstruction (SBO) is a leading cause of acute hospital admission. In one review, intestinal obstruction accounted for 0.9% of all hospital admissions.¹ In another study, abdominal adhesiolysis with intestinal obstruction was responsible for 846,415 inpatient days at a cost of US\$1.3 billion.² Patient morbidity and the financial burden of SBO are compounded by the recurrent nature of this condition, illustrating the importance and scale of this clinical problem. Postoperative adhesion formation is the major cause of SBO.¹ Most patients with SBO have resolution with conservative therapy, but up to 30% of all admissions for SBO require surgical treatment.³ Treatment usually entails lysis of adhesions.

There has been a reluctance to advocate the use of laparoscopy in acute SBO because of technical difficulties associated with working on a distended bowel and in a reduced working space and, more importantly, the risk of iatrogenic bowel injury. Until recently, previous abdominal operations were viewed as a relative contraindication to laparoscopy. However, with advances in laparoscopic skills and experience, various studies have reported laparoscopic management of SBO.^{4–9}

In this study, we report our experience of the laparoscopic approach to acute SBO, focusing on its use as a diagnostic tool, complete laparoscopic treatment and conversion rates, intraoperative and postoperative complications and length of postoperative hospital stay.

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Patients and methods

Between August 1997 and August 2003, 87 patients had surgery for acute SBO and a laparoscopic approach was used in nine of these. The diagnosis of acute SBO was made on the basis of clinical history of abdominal pain, distension, nausea, vomiting and obstipation. The nine patients were identified as being suitable for laparoscopic management from a set of exclusion criteria: massive abdominal distension preventing safe initial port entry, clinical suspicion of peritonitis, American Society of Anesthesiologists score of 3 or more, and more than two previous abdominal operations.

All nine patients had radiographic confirmation of SBO. Patients with chronic symptoms and those who underwent laparoscopic adhesiolysis for abdominal pain without evidence of acute SBO were excluded (3 patients). The analysis included identifying the aetiology of the obstruction, length of surgery, conversion rates, postoperative morbidity and length of postoperative hospital stay.

Surgical technique

All patients had a nasogastric tube and urinary catheter *in situ* prior to surgery. In our experience, the key to successful laparoscopy for acute SBO is a meticulous focus on safe practice.

The initial 10/12-mm port was placed via an open technique either infra-umbilically or at a chosen site away from any abdominal scars. Pneumoperitoneum was established to a maximum pressure of 12 mmHg. After initial diagnostic laparoscopy, additional working ports (usually two 5-mm ports) were placed under direct vision. The entire abdominal cavity was inspected carefully, with attention directed towards the collapsed distal bowel to identify the cause of obstruction. Care was taken to avoid handling the distended bowel where possible, and atraumatic bowel graspers were used to minimize the risk of bowel injury. The view was enhanced by tilting the patient in several directions during surgery to maximize exposure. Once the cause of the obstruction was identified, adhesiolysis was performed by dividing the single band or local adhesions with laparoscopic scissors and minimizing use of electrocautery adjacent to the bowel.

One patient had a bezoar and required a laparoscopy-assisted procedure that involved a small 3-cm incision over his right iliac fossa where the loop of the terminal ileum was delivered to facilitate open enterotomy and extraction of the bezoar, which could not be crushed and milked along the bowel. In all cases, the entire length of the small bowel was

examined from the caecum to the ligament of Treitz to ensure that the obstruction did not involve multiple levels of the small bowel.

Results

Laparoscopic treatment was undertaken in nine patients (5 men and 4 women) with a mean age of 46.5 years (range, 29–88 years). Four patients had had no previous operations and five had had one previous operation (appendectomy in 3, myomectomy in 1, laparotomy for trauma in 1). The aetiology of obstruction was a single band or local adhesions in eight patients (88.8%) (Table; Figures 1 and 2). The remaining patient had obstruction secondary to a bezoar.

The aetiology of the obstruction was correctly identified in all patients and the obstruction was relieved completely by laparoscopy in six patients (66.6%). The patient with the bezoar underwent a laparoscopy-assisted procedure.

Two cases required conversion to laparotomy. In one case, this was due to iatrogenic perforation during adhesiolysis and, in the other, conversion to mini-laparotomy was due to difficulty in performing the adhesiolysis and safe reduction of internal herniation secondary to band adhesion. There were two intraoperative complications of iatrogenic bowel injury; one required conversion to laparotomy followed by small bowel resection and anastomosis, and in the other case, the bowel injury was managed laparoscopically.

The mean operating time was 74 minutes (range, 47–135 minutes). There were no postoperative complications. The length of postoperative hospital stay ranged from 3 to 6 days (mean, 4.3 days).

Discussion

More than half of episodes of acute SBO are incomplete obstruction and usually resolve spontaneously.¹⁰ Patients who present with complete SBO with the classic signs of bowel ischaemia will need emergency surgery, but most patients with incomplete SBO may need adjunct diagnostic tools to assist in evaluation and subsequent management. Several studies have shown the benefits of oral water-soluble contrast in selecting patients in whom the obstruction is unlikely to settle conservatively. It has even been shown to serve a therapeutic role in some patients, reducing the need for surgery.^{11–13} Computed tomography is also useful in confirming the diagnosis of SBO and can predict the aetiology of the obstruction and influence clinical decisions on operative intervention.^{14,15}

Table. Small bowel obstruction (SBO) and surgical characteristics

Cause of SBO	Previous operation	Outcome (laparoscopic)	Intraoperative complications	Operating time (min)	Postoperative hospital stay (d)
Single band	Nil	Band division	Nil	50	3
Single band	Appendectomy	Band division	Nil	70	4
Local adhesions	Appendectomy	Adhesiolysis, laparoscopic repair of perforation	4-mm caecal perforation	60	4
Single band	Nil	Band division	Nil	50	6
Single band	Appendectomy	Band division (and adhesiolysis of extensive adhesions not directly causing SBO)	Nil	135	6
Local adhesions	Trauma laparotomy	Adhesiolysis then converted to laparotomy and SB resection	Iatrogenic perforation during adhesiolysis	100	4
Single band with internal hernia	Nil	Conversion to laparotomy	Nil	47	4
Single band	Myomectomy	Band division	Nil	60	3
Bezoar	Nil	Laparoscopy-assisted procedure with enterotomy and removal of FB	Nil	95	5

SB = small bowel; FB = foreign body.

Laparotomy has always been the gold standard treatment for managing SBO when surgical intervention is necessary. However, laparotomies predispose to future intra-abdominal adhesions.^{1,16} Miller et al found that 43% of patients presented with SBO after one previous laparotomy, and 28% obstructed after two laparotomies.³ On the contrary, there is evidence to suggest that laparoscopic surgical techniques lead to fewer

intra-abdominal adhesions by reducing tissue trauma, which in turn reduces circulating inflammatory mediators.¹⁷ The advent of advanced laparoscopic techniques has expanded the domain of laparoscopy to cover many more surgical conditions, both in elective and emergency settings. With the suggested evidence that laparoscopic surgical techniques lead to fewer intra-abdominal adhesions,¹⁷ many authors have been en-



Figure 1. Band adhesion.

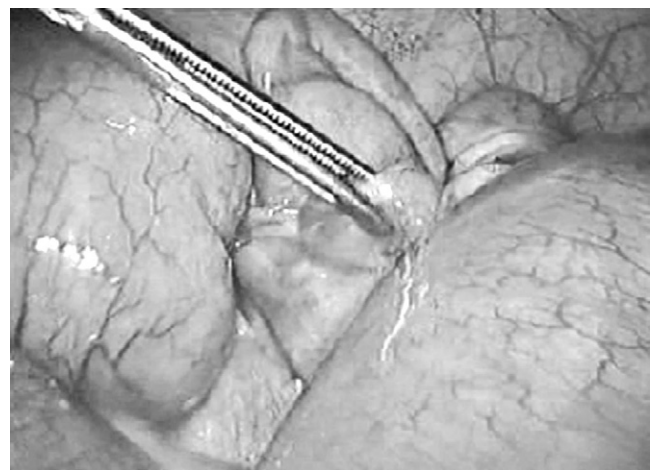


Figure 2. Adhesion and bowel dilatation.

couraged to consider the laparoscopic approach as an alternative to conventional laparotomy, even in the presence of acute SBO.⁴⁻⁹

Suter et al attempted to identify predictors of success or failure in laparoscopic treatment of SBO.¹⁸ Duration of surgery exceeding 120 minutes ($p < 0.001$) and bowel diameter exceeding 4 cm ($p = 0.02$) were predictors of conversion to laparotomy. Accidental bowel perforation ($p = 0.008$) and the need for conversion ($p = 0.009$) were the only independent factors associated with an increased risk of postoperative complications.

In our series, the aetiology was diagnosed in all cases (100%). In published series, this varies between 66% and 92%.^{6,8,18}

Wullstein and Gross found that intraoperative perforation during laparoscopy was more common in patients who had undergone more than one previous laparotomy ($p = 0.066$).⁹ Perforation rates range from 9% to 17.3%.^{6,9,18} Conversion rates to laparotomy range from 17.4% to 51.9%.^{7,8,18} Two of the patients in this series had iatrogenic perforations (22.2%) and two underwent conversion to laparotomy.

Wullstein and Gross also showed that postoperative complications were less frequent in the laparoscopy group (19.2%) compared with the laparotomy group (40.4%; $p = 0.032$).⁹ Reported postoperative complication rates following laparoscopy are 31.3%,¹⁸ 11%,⁶ and 42.5%.⁷ In this series, there were no postoperative complications.

The mean length of postoperative stay in this series was 4.3 days. This is comparable to that reported by Bailey et al.⁵ Their patients underwent complete laparoscopic treatment and stayed a median of 4 days compared with a median of 8 days in those having full laparotomy ($p < 0.05$). Another series showed a mean length of stay of 3.6 days for the complete laparoscopic group versus 10.5 days for the group that required conversion to laparotomy.⁷

In conclusion, laparoscopy serves as a good diagnostic tool in identifying the aetiology of acute SBO, and laparoscopic treatment can be achieved in most patients. Those who were successfully treated using the method in this series had no postoperative complications and had a short postoperative hospital stay. Laparoscopy appears to be a reasonable option for the treatment of acute SBO when performed by a well-trained and experienced laparoscopic surgeon in an appropri-

ate patient. This valuable alternative to laparotomy could reduce the formation of adhesions and, hence, potentially decrease future episodes of SBO.

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