

Laparoscopic Lysis of Adhesions

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The surgical treatment of small bowel obstruction is evolving. Laparoscopic exploration and adhesiolysis is increasingly being utilized. We conducted a retrospective chart review of all patients who were operated on and discharged with the diagnosis of adhesiolysis for small bowel obstruction (SBO) from July 1999 to October 2000 at Cedars-Sinai Medical Center. There were a total of 75 patients. Patients were grouped based on the type of operation: laparoscopic (lap), open, and converted. Thirty-four patients were attempted laparoscopically, 11 of those requiring conversion to open. Fifty-two patients were treated with a laparotomy. Complications contributing to morbidity were significantly lower in the lap group ($P < 0.01$). There was no difference in morbidity between the converted and open groups. There were fewer pneumonias and wound infections in the lap group when compared to the open group, although it did not reach statistical difference. The reduction of post-op ileus in the lap group was statistically significant ($P < 0.01$). Statistically significant differences between the lap and open groups were also found in estimated blood loss (EBL) ($P < 0.004$), length of stay (LOS) ($P < 0.01$), bowel resection ($P < 0.01$) and op-time ($P < 0.003$). Laparoscopic release of adhesions is a viable option in the surgical management of small bowel obstruction. A prospective randomized trial comparing both surgical techniques is needed to further validate the laparoscopic approach to small bowel obstruction.

S MALL BOWEL OBSTRUCTION (SBO) is a common clinical problem. It often results in lengthy hospital stays for patients and can result in significant morbidity. Mortality rates can be as high as 30 per cent if strangulation is present.¹ Multiple studies have reported the cost-associated complications from adhesions. Ray et al.² revealed that 948,000 cumulative hospital days were required for the treatment of the sequelae of adhesions in 1988. This translated into a total estimated cost of 1.18 billion dollars in the United States.

Adhesions are the most common cause of acute SBO in adults. Ninety per cent of all adhesion formation is caused by surgery.³ Despite the large amount of research performed in this area, the ability to prevent adhesions has been slow to advance. In fact it has been shown that between 36 per cent and 60 per cent of all patients who present with adhesive intestinal obstruction require surgery.³

The surgical management for small bowel obstruction has evolved since the 1990s and the increasing familiarity of general surgeons with laparoscopy. Lap-

aroscopic adhesiolysis for SBO is increasingly being performed with the hope of decreasing morbidity and shortening hospital stays. We present our institutional experience with the surgical management of SBO. Specifically, we compare the laparoscopic (lap) and the open techniques for the treatment of this common entity.

Patients and Methods

Patients undergoing operative management of acute small bowel obstruction at Cedars-Sinai Medical Center between July 1999 and October 2000 were identified from a hospital discharge database. The initial search of data encompassed all operations done for small bowel obstructions. Only patients that underwent surgery for adhesive small bowel obstruction were included in the study. All cases with tumor obstruction, hernias, volvulus, anastomotic stenoses, and so forth were excluded. The operative procedure note was reviewed for type of surgery, intraoperative findings, need for bowel resection, estimated blood loss, and duration of operation. Age, gender, and type of previous abdominal surgery were also recorded. Length of postoperative stay was recorded based on date of discharge or date of transfer to a rehabilitation facility. Complications were recorded including prolonged ileus (NPO >7 days), need to total parental nutrition (TPN), pneumonia, bowel resection, and wound infection. Surgery was defined as completed laparoscopically, converted, or open (Table 1).

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Statistical Analysis

The data analysis was performed using the χ^2 test for noncontinuous variables and the Student *t* test for continuous variables. Statistical significance was presumed if $P < 0.05$.

Results

A total of 285 cases of small bowel obstruction were identified. After review of operative findings, 75 patients were found to have adhesive small bowel obstruction. Only these patients were included. In these 75 patients with adhesive small bowel obstruction, 34 cases were attempted laparoscopically. Eleven patients were converted to open. Of these 11, 4 (36%) were converted due to dense adhesions, 4 (36%) due to inability to visualize a point of obstruction, 2 (18%) for inability to achieve pneumoperitoneum, and 1 (9%) for ischemic bowel (Fig. 1). Twenty-three operations (68%) were completed entirely laparoscopically. Primary puncture site for insufflation of the abdomen was done by the Hassan technique in 14 patients, alternate site veress needle placement (i.e., left upper quadrant) in 8 patients, and umbilical veress needle placement in 12 patients (Fig. 2). No bowel injury was noted with any of the above techniques.

Intraoperative injury to the bowel occurred in both groups. One out of 23 patients (4.6%) in the lap group and 10 out of the 52 patients (19%) in the open group had iatrogenic bowel requiring repair or resection. There was no statistical significance between both groups.

Immediate reoperation (<48 hours) was not required in any of the laparoscopically treated patients. However, in our series 1 patient required open reoperation 1 week after laparoscopy for unresolved small bowel obstruction.

Postoperative complications were compared and analyzed for statistical significance. Prolonged ileus occurred in 8.7 per cent of patients treated laparoscopically versus 40.4 per cent in the open group ($P <$

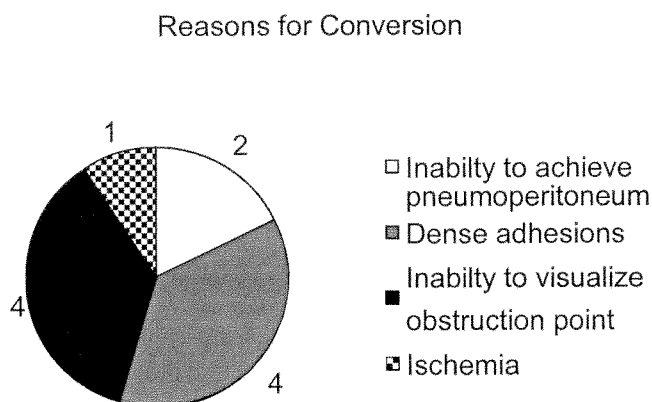


FIG. 1. Reasons for conversion.

TABLE 1. Clinical Data

	Lap	Open	Converted	P Value (Lap vs. Open)
n	23	52	11	
Age (years)	59.7	58.7	55	0.81
Op-time (hours)	2.3	3.4	3.9	<0.01
Bowel resection (%)	4.3	22.6	9	<0.01
EBL (cc)	92.2	143.4	145	<0.01
Morbidity (%)	39	74.5	63	<0.01
Mortality (%)	4.3	0	0	—
LOS (days)	7.3	13.3	12.6	<0.01

Lap, laparoscopic; EBL, estimated blood loss; LOS, length of stay.

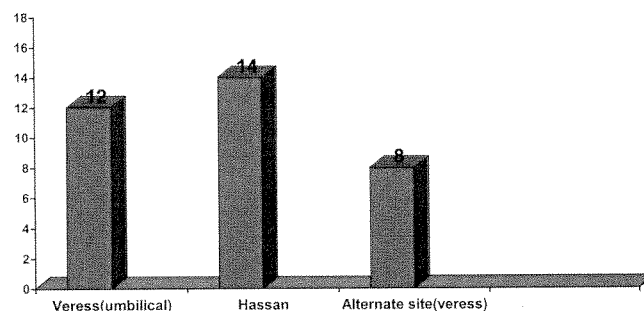


FIG. 2. Primary puncture site.

0.01). TPN was required in 13 per cent of the patients in the laparoscopic group and 23 per cent for the open group ($P < 0.05$). Pneumonia was diagnosed in 9.6 per cent of patients in the open group compared to none in the laparoscopic group ($P > 0.05$). Wound infections occurred in 4.3 per cent in the laparoscopic group versus 23 per cent in the open group ($P > 0.05$).

When comparing intraoperative details of both techniques, the operative time during laparoscopy was significantly less than the open group ($P = 0.0003$). The number of bowel resections required as well as estimated blood loss (EBL) in the laparoscopic group were also both significantly reduced ($P < .004$). Similarly, length of hospitalization was significantly shortened in those undergoing laparoscopic adhesiolysis ($P < 0.01$).

Overall number of complications contributing to morbidity were significantly lower in those who underwent laparoscopic adhesiolysis ($P < 0.01$). Morbidity was unchanged in the converted group when compared to the open. There was only one death overall, and that was in the laparoscopic group. This was an elderly patient who had gangrenous bowel during exploration, and, due to the patient's previous wishes and family support, no treatment was rendered and the patient was allowed to expire.

Comorbid illnesses of patients in both groups were reviewed. Of the patients in the open group, 48.1 per cent had 2 or more comorbid illnesses. In the lap group, 39.1 per cent of the patients had 2 or more comorbid illnesses. Comorbid conditions included hy-

pertension, cardiovascular disease, cancer, diabetes, ulcer disease, inflammatory bowel disease, gastroesophageal reflux, diverticular disease, lung disease, renal disease, vascular disease, hematologic disorders, endocrine disorders, obesity, gynecologic disease, and psychiatric illnesses. There existed no significant difference between each group ($P = 0.21$).

The mean age of the patients was 59.7 years in the lap, 58.7 years in the open, and 55 years in the converted group. These age differences were not statistically significant.

The number of previous abdominal operations was also recorded. In the open group, 44.2 per cent of patients had 2 or more previous abdominal operations compared to 34.8 per cent of the lap group. Although a trend of fewer operations were noted in the lap group, this did not reach statistical significance ($P = 0.93$). Three patients who presented with small bowel obstruction had no previous abdominal operations. All three of these patients were initially attempted laparoscopically; however, two of these cases were converted to open as previously discussed.

Discussion

Laparoscopic surgery has been considered a relative contraindication in patients who have undergone previous abdominal surgery. However, at least 50 per cent of patients with adhesive SBO have a single obstructive band.⁴ These patients are ideal candidates for laparoscopic lysis of adhesions. It has been suggested that laparoscopy reduces postoperative adhesion formation when compared to laparotomy, further enhancing its appeal as an option in the treatment of SBO.^{5,6}

The benefits of laparoscopy such as decreased length of hospital stay and lower morbidity have to be weighed against the potential inability to achieve adequate pneumoperitoneum and the risk of bowel injury from initial trocar insertion or instrument manipulation. Trocar perforation has been reported to be as high as 3.7 per cent with blind cannulation.⁷ In our series, the Hassan technique as well as alternate needle site insertion allowed safe entry into the abdominal cavity (Fig. 2).

It is important to maintain a low threshold for conversion to laparotomy in order to prevent iatrogenic injury to friable, distended bowel. Our series revealed no difference between both groups with respect to iatrogenic bowel injury. Our conversion rate of approximately 32 per cent is well within the published rates of 6 per cent to 52 per cent.⁴

Many of the studies with lower conversion rates have been criticized for a higher reoperation, due to inadequate adhesiolysis.^{8,9} No patients in the laparoscopic group required immediate reoperation. This result is markedly different than Bailey et al.¹⁰ who

reported an early reoperation rate of 14 per cent in those who were treated laparoscopically.

Additionally, we found that those that were converted had no difference in morbidity when compared to the open group. Therefore, an attempt at laparoscopy did not harm the patients and may be warranted as an initial therapeutic step.

The overall number of complications and length of stay were significantly decreased in those treated laparoscopically compared to the traditional laparotomy. Our experience coincides with other studies by Freys et al.¹¹ and Ibrahim et al.,¹² all of which support the concept of shorter hospital stays and fewer complications. Additionally, all emphasize, as we do, the need for careful patient selection, adequate technical skills, and prudent judgment regarding conversion to laparotomy.

Conclusions

Attempted laparoscopic release of adhesions appears to be a viable option in the surgical management of small bowel obstruction. The majority of those attempted laparoscopically will be successful. Those that need conversion did not fair worse than those operated on by the open technique. Therefore, laparoscopic adhesiolysis can be attempted in selected cases without detrimental effects to the patients.

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