Laparoscopic Approach in Adhesive Acute Small Intestinal Obstruction

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ABSTRACT

Open adhesiolysis through a midline incision was considered to be the standard approach in treating patients with acute adhesive intestinal obstruction. The aim of this study is to evaluate the operative results of the laparoscopic approach in these patients. The study started From December 2013 to June 2016 and included 24 patients who had laparoscopic explorations for acute small intestinal obstruction due to adhesions in Kasr Al Ainy cairo university hospital and Hai Aljameaa hospital (private hospital in Jeddah, Kingdom of Saudi Arabia). These patients were diagnosed by the clinical history, physical examination and imaging studies (X-ray and abdominal CT scan with oral [in cases of partial obstruction] and IV contrast). Patients with marked abdominal distension, peritonitis and/ or severe sepsis were excluded. They were 15 men and 9 women, with a mean age of 52.8±15.7 (25–69). Five patients (20.8%) were converted to open surgery. The surgical outcomes included the operative time, oral intake start day, length of hospital stay and wound complications in the first thirty days. There was a significant difference in favor of laparoscopy in these outcomes between the patients who were managed laparoscopically as compared with patients initially managed laparoscopically but later converted to open surgery. It is concluded that the laparoscopic management is a safe and useful approach in treating patients with acute adhesive small intestinal obstruction.

Keywords: *Acute intestinal obstruction, Laparoscopy, Adhesiolysis.*

INTRODUCTION

Intestinal obstruction is the most common surgical complication in abdominal surgery. About 15-35% of the patients with previous abdominal surgery will require hospitalization because of this complication, and 2-5% of these patients will require surgical intervention, either for poor improvement with conservative management or due to complete obstruction with the suspicion of intestinal ischemia [(1)].

Intestinal obstruction may be caused by ileus due to surgery, medications, or inflammatory bowel disease. A smaller percentage is due to mechanical compression, either intrinsic or extrinsic [(2)]. In mechanical small intestinal obstruction, about 65-80 per cent of cases are attributed to intra-abdominal adhesions [(3)].

Open adhesiolysis through a midline incision was considered to be the standard approach; however, since 1990 when Clotteau described the first laparoscopic adhesiolysis technique, more surgeons started this approach in their practice [(4)].

Many studies comparing laparoscopic and open techniques have shown that laparoscopic adhesiolysis allows earlier return of bowel function, shorter hospital stay, lower incidence of adhesions and incisional hernia formation [(5)].

Despite the presence of sufficient data about the safety and feasibility of the laparoscopic approach in the treatment of acute small intestinal obstruction, many surgeons do not consider its use in standard clinical practice [(3, 6)].

Exclusion of patients with doubt of small bowel strangulation or ischemia and early decision for surgical treatment are important precautions before the procedure of laparoscopic adhesiolysis [(7)].

The aim of this study is to evaluate the operative results in the patients who have been treated by laparoscopy for acute small intestinal obstruction due to adhesions.

PATIENTS AND METHODS

This is a prospective study, started in December2013 till May 2016 and included all patients with acute small intestinal obstruction who were treated on an emergency basis by laparoscopy after failure of conservative management in Kasr Al Ainy cairo university hospital and Hai Aljameaa hospital (private hospital in Jeddah, Kingdom of Saudi Arabia).

These patients were diagnosed as having acute small intestinal obstruction by the clinical history, physical examination and imaging studies (X-ray and abdominal CT scan with oral and IV contrast).

This study included the patients whose final diagnosis was adhesive acute small intestinal obstruction. The adhesions were classified as primary or secondary according to the absence or presence of a previous history of abdominal and/or pelvic surgery. And classified as single or multiple according to the number adhesive bands. In all cases, insertion of a nasogastric tube and correction of disturbed serum electrolytes were done preoperatively.

Informed consent was obtained from all patients before the operation for the laparoscopic approach and the possibility of conversion to open surgery.

Exclusion criteria

Patients with marked abdominal distension (or patients with small bowel segments more than 4 cm in diameter measured by CT scan), patients with (clinical, laboratory and/or radiological signs of peritonitis and/ or severe sepsis), patients with anesthesia contraindications for pneumoperitoneum, and patients with hemodynamic instability were all excluded from the laparoscopic approach. Patients who were diagnosed either preoperatively or intraoperatively to have causes for intestinal obstruction other than small intestinal adhesions were excluded from the study.

Patients' data was collected including age, sex, medical-surgical history, clinical and radiological results, surgery information (findings, procedure, operative time, reasons for conversion and complications), day of diet start, postoperative complications and length of hospital stay.

Surgical technique

The patient was placed in the supine position with left arm adducted at the side of the patient. The surgeon and the assisting surgeon stood up at the patient's left side with the scrub nurse and the monitor at the right side. The first trocar was inserted by open technique in an area far from previous incisions.

After an exploration of the abdominal cavity, with the 30◦ optic, two 5mm trocars were introduced under direct vision. The sites of the trocars were chosen according to the intraoperative findings. Examination of the small intestine was done cautiously by using two non-traumatic forceps, starting at the ileocecal junction without excessive traction till the cause of the obstruction was found.

When the adhesive band was encountered, it was released by scissors or by harmonic scalpel away from the bowel wall. If it was not possible to find the site of obstruction due to marked intestinal dilatation, dense adhesions or excessive bleeding, then the procedure was converted to open surgery.

The statistical analysis of the results was performed using The SPSS 19.0 program. The variables were evaluated through the chi-square test and the Fisher probability test. The results were considered as statistically significant when $p < 0.05$.

RESULTS

This study included 24 patients who had laparoscopic explorations for acute small intestinal obstruction due to adhesions, from a total of 75 patients who had surgeries for acute small intestinal obstruction (32%). They were 15 men and 9 women, with a mean age of 52.8±15.7 (25–69).

Abdominal X-rays and CT scan with IV and oral contrast were done and confirmed the diagnosis of acute small intestinal obstruction in all patients.

The types of adhesions and the numbers of patients who required conversion to open laparotomy are shown in table (1). Eight patients (33.3%) had no history of previous surgery. Twelve patients had history of only one surgery, three patients with two and one patient with three previous surgeries.

Five patients (20.8%) were converted to open surgery due to dense adhesions in three cases (the only iatrogenic intestinal perforation in this study during the laparoscopic adhesiolysis occurred in one of them), non visualization of the site of obstruction in one case and due to excess bleeding in one case.

Table 1: Types of adhesions and numbers of patients required conversion to open surgery.

Type	*No. of patients*	*Conversion*
Primary single band	6	1
Secondary single band	12	1
Primary multiple bands	2	1 (Intestinal resection)
Secondary multiple bands	4	2
Total	24	5

The surgical outcomes are shown in Table (2) and included the operative time, oral intake start day, length of hospital stay, wound complications in the first thirty days (infection, seroma or hematoma) for the patients managed laparoscopically as compared with patients initially managed laparoscopically but later converted to open surgery.

During the postoperative thirty days, wound complications were seen in 4 patients: 3 wound infections (one trocar wound and 2 conversion incisions), one hematoma formation under the conversion incision.

Table 2: Surgical outcomes in patients managed by laparoscopy as compared with patients who converted to open approach.

Outcome	*Laparoscopy (n = 19)*	*Conversion (n = 5)*	**P** *Value*
Operative time (minutes)	67(45–110)	132(105–170)	0.0068
Day of starting oral intake	2 (1–3)	4 (2–5.5)	<.001
Length of hospital stay (days)	3 (1.5–5)	5 (3–8)	0.0428
Wound infection	1 (5.3%)	2 (40%)	0.0044
Hematoma formation	0 (0%)	1 (20%)	0.1746

DISCUSSION

Intra abdominal adhesions cause significant morbidity and mortality for millions of patients throughout the world by inducing intestinal obstruction, pelvi-abdominal pain or secondary female infertility [8].

Previous studies showed that intra-abdominal adhesions develop in 60 to 90 per cent of patients who had one or more previous abdominal surgeries and in 10 to 30 per cent of patients without previous surgery [9-12].

In the past, intestinal obstruction has been considered as an absolute contraindication for the laparoscopic approach due to the increased risk for iatrogenic injuries as a result of dilated intestinal segments, and less operating space[13,14].

The growing skills in laparoscopic surgery and improved surgical instruments have increased the use of this approach to manage these cases [15, 16].

The laparoscopic approach has been used in the management of acute small intestinal obstruction since Bastug[17] published the dissection of a single band with this approach in 1991. Different studies have proved that the laparoscopic approach is safe and effective in selected cases [6, 18], and the rate of conversion from the laparoscopic to open approach is relatively low [6, 19], with shorter hospital stays, less postoperative pain, less postoperative morbidity [20-23].

There was no definite recommended guidelines regarding the indications of laparoscopic approach in acute small intestinal obstruction [15, 16]. But in 2013, Di Saverio et al [24] published (Bologna guidelines for diagnosis and management of adhesive small bowel obstruction) and stated that open surgery is often used for strangulating acute small bowel obstruction as well as after failed conservative management. And in selected patients with appropriate skills, laparoscopic approach is advisable using open access technique. And that the laparoscopic adhesiolysis should be attempted preferably if first episode of small bowel obstruction and/or anticipated single band (i.e. after appendectomy or hysterectomy), and a low threshold for open conversion should be maintained if extensive adhesions are found.

Some papers and review articles [25, 26] recommend some criteria to choose the laparoscopic approach: (1) previous history of less than 2 abdominal surgeries; (2) less than one day from the onset of symptoms and absence of

any signs of peritonitis and/or sepsis; (3) incomplete obstruction; (4) history of previous surgery limited to a single abdominal quadrant; (5) moderate intestinal loops distension; (6) definite preoperative diagnosis, based on CT findings.

The conversion rates published in cases of laparoscopic management of acute small intestinal obstruction ranges from 7% to 45% [15, 19]. The high conversion rates have been related with higher morbidity and mortality [21].

The high conversion rates have been considerably reduced by better patient selection and increased experience. The Swiss Surgical Society in 1995 designed a multicenter prospective study [6] with 537 patients and produced a 32.4% conversion rate. In 2001, Levar et al. [27] conducted a retrospective multicenter study on 308 patients that obtained a conversion rate of 54.6% that was reduced to 17% in the group of Mancini et al. [19]. A metaanalysis study done in 2012 by O′Connor et al. [16] on 2,005 patients showed a conversion rate of 29%.

In this study the conversion rate was 20.8%, which is nearly close to the previous figures. The main reason for the low rate of conversion of this series may be due to meticulous selection of cases.

Previous comparative studies between the laparoscopic and conventional approaches, obtained significant differences in favor of laparoscopy in a lower mean operative time, lower rate of postoperative complications and shorter hospital stays [20, 28]. In this study, this incident was also concluded. These differences were related also to the medical comorbidities of the open approach patients in addition to the complications of open surgical incisions.

In the patients done by laparoscopy in this study, the operative time, the day of oral intake start, rate of wound complications, and length of hospital stay were significantly less than those reported in the open approach patients (Table 2).

We proposed that the comparison between the two groups may have bias in the results because those patients that underwent conversion to open surgery were the cases of greater technical difficulty, and so rationally they would have a longer hospital stay and more complications.

COCLUSION

The laparoscopic management of acute adhesive small intestinal obstruction is a safe and convenient approach with better post operative results. The accurate patients' selection is a very important factor in order to get a low rate of conversion.

It is recommended to start the abdominal exploration in selected cases of acute small intestinal obstruction of unknown cause by laparoscopy and to proceed if it is due to adhesions.

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