Laparoscopic treatment of acute adhesive small bowel obstruction compared with conventional method

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Abstract

Abstract: Intestinal obstruction is an abdominal emergency, and it is a common reason for surgical referral. There are many studies that demonstrated the feasibility of laparoscopy in management of acute adhesive small bowel obstruction. Although laparoscopy is a good technique for many intra-abdominal operative procedures, laparoscopy was contraindicated in abdominal surgical emergency, and intestinal obstruction. It remains unclear whether patients with acute small bowel obstruction (SBO) might benefit from this technique or not. 104 patients were included in this study and were divided into two groups, each group included 52 patients. Each group was treated by one surgical technique from those mentioned above and the results were compared with each other. Complete laparoscopic treatment was performed in 25 patients (48.1%). Major intra-operative complications occurred in 15 patients in the LAP group and 8 patients in CONV group (p= 0.156). Intra-operative perforations were more frequent in patients who had more than one previous laparotomy (P=0.066). Postoperative complications occurred in 10 patients (19.2%) in the LAP group and in 21 patients (40.4%), who had conventional surgery (P=0.032). Bowel movements started 3.5 days after operation in the LAP group, and 4.4 days after conventional operation (P=0.001). The length of hospital stay was 11.3 and 18.1 days respectively (P=0.001). From this study we can conclude than laparoscopic treatment of acute SBO was feasible in about half of these patients, morbidity is lower, hospital stay is shorter than patients with open surgery, and postoperative recovery and resumption of a normal diet is faster, but the risk of intra-operative complications increased. A laparoscopic approach seems justified in subset of patients.

Key words: LAP (laparoscopic surgery), CONV (conventional surgery), SBO (small bowel obstruction).

Introduction:

Adhesions following abdominal and pelvic surgery is important in view of their morbidity and frequent hospital re-admission. Patients with intra-peritoneal adhesions may develop chronic symptoms or present acutely with intestinal obstruction. Acute adhesive intestinal obstruction is the most common reason for emergency admission and re-admission to hospital. The obstruction is almost always in the small bowel, although the level of obstruction varies. The condition is readily diagnosed by the clinical symptoms and signs and abdominal plain film (erect and supine). Although the indication for laparoscopic surgery in elective surgery has broadened, it is not generally accepted in emergencies.[1-3] Patients for whom laparoscopy was initially considered to be contraindicated, were those with history of previous surgery or with suspected intra-abdominal adhesions or bowel obstruction.[2,4,5] However these types of procedures have been treated increasingly with laparoscopic approach as experience has grown.[6,7] Some surgeons recommend laparoscopic surgery for many reasons, such as less intra-abdominal adhesions than open surgery, and postoperative quicker recovery of intestinal motility.[12,13] So this approach has therefore been used for some small bowel

obstruction (SBO) who might benefit from these advantages. Acute obstruction may be associated with a higher risk of bowel injury and limited exposure due to severe abdominal distension than elective adhesiolysis. Some series have demonstrated the feasibility and safety of laparoscopic treatment for acute SBO,[16,21] and suggested advantages for this procedure. However, comparative data on the laparoscopic and conventional treatment of acute SBO are lacking. The present study was therefore undertaken to compare the results of laparoscopic surgery for acute SBO with those of conventional surgical treatment.

Patients and methods:

In this study 52 patients who presented with SBO were operated on laparoscopically, between January 2004 and July 2009, in Demerdash hospital, Cairo, Egypt. The results were compared retrospectively with similar number of patients who presented also by SBO and treated conventionally. Operative results and outcome of these patients were analyzed retrospectively and compared with those of conventionally treated series in matched pair analysis. Variables evaluated were operating time, reason for conversion, intra-operative and postoperative complications, length of hospital stay and bowel movements after surgery. Selection of patients for the matched-pair analysis included consideration of the number of previous laparotomies, the duration of symptoms, age and sex. Patients were included only if clinical symptoms were acute and the obstruction was confirmed at operation to be caused by adhesions. Patients with other conditions, such as incarcerated hernia or carcinoma of the caecum, were identified at operation and were excluded. The indication for laparoscopy was assessed individually by the operating surgeons according to the duration of symptoms, degree of abdominal distension, and personal experience. Insertion of 1st trocar was done under direct vision using an open technique. The incision was made distant to any previous scars. After creation of pneumo-peritoneum additional trocars were placed according to the intra-abdominal findings. All patients received standard prophylactic antibiotic, a nasogastric tube and urinary catheter. For statistical analysis, patients were divided into three groups. The LAP group comprised all patients for whom laparoscopy was intended, including those operations which were converted. The cLAP group included those patients who had a completely laparoscopic procedure, and the conventional group comprised matched pair patients who had open operation. The student (t test) was used to compare the results between different groups. Equality of variance was evaluated using the Leviene test, $p < 0.05$ was considered significant.

Results:

The LAP and CONV groups were comparable in age, sex, number of previous laparotomies and duration of symptoms **Table(1)**. Previous operations were mostly appendicectomies and gynecological operations followed by previous intestinal obstruction, cholecystectomy and colonic resection. Fifty two patients underwent laparoscopy for acute SBO. Conversion to open surgery was necessary in 27 patients 51% **Table(2)**. Compete laparoscopic treatment was performed in 25 patients. Operative time was longer in LAP group than the CONV group (103 and 84 min; $P > 0.05$). Whereas the operating time in the cLAP group was comparable to that of conventional surgery (83 versus 84). Major intra-operative complications occurred in 15 patients 28.8% in the LAP group and 8 patients 15% in the CONV group ($P=0.156$) **Table(3)**. Complications occurred in 10 patients during laparoscopy and another 5 patients after conversion to open surgery. Perforations occurred in 2 patients, and one patient developed hemorrhage. Serosal tears occurred in 4 patients in the LAP group and 3 in the CONV group. The number of previous laparotomies was identified as a risk factor for intra-operative complications. Major intra-operative complication occurred in 11 of 26 patients with two or more previous laparotomies compared with 4 of 26 with fewer laparotomies ($P=0.066$). The duration of symptoms had no influence on the complication rate. Patients in the LAP group had quicker recovery of bowel movements ($P < 0.001$), shorter time for hospital stay ($P < 0.001$),

Table(4), and fewer postoperative complications than those who had a conventional procedure **Table(5)**. Two patients developed anastomotic leak and were treated by laparotomy with resection and reconstruction of the anastomosis.

Table (1): Patients' characteristics.

	LAP	CONV
No of patients	52	52
Age	59.3	64.8
Sex	38.14	40.12
No of pervious operations	1.5	1.5
Duration of symptoms	1.4	1.1

Table (2): Reasons of conversion to open surgery.

Cause	Number of patients
Extensive adhesions or problem in view	10
Complications	7
Uncertain of the intestinal viability	6
Need for resection	4

Table (3): Intraoperative major complications during laparoscopic and conventional treatment of acute small bowel obstruction.

Intra-operative complications	LAP			CONV	P
	During LAP	After conversion	Total		
Number	52	27	52	52	
Perforations	9 (17.3%)	5 (18.5)	14 (26.9%)	7 (13.5%)	0.143
Hemorrhage	1 (1.9%)	0 (0%)	1 (1.9%)	0 (0%)	1.00
Mesenteric injury	0 (0%)	0 (0%)	0 (0%)	1 (1.9%)	1.00
Total	10 (19.2%)	5 (18.5%)	15 (28.8%)	8 (15.4%)	0.156

Table (4): Postoperative results.

Type of surgery	LAP	CONV	p	cLAP	Conversion
Number	52	52		25	27
Hospital stay (days)	11.3	18.1	0.001	8.5	13.9
Recovery of bowel movements	3.5	4.4	0.001	2.9	4.0
Eating	5.1	6.4	0.004	4.0	6.1
Postoperative complications	10	21	0.032	1	9

Table (5): Postoperative complications.

Post-operative complications	LAP	CONV	cLAP	Conversion
Wound infection	3	6	0	3
Anastomotic leak	2	0	1	1
DVT	0	1	0	0
Delayed bowel movements	4	7	0	4
Pulmonary	1	2	0	1
Cardiac	0	2	0	0
Death	0	2	0	0

Discussion:

Laparoscopic surgery for acute SBO was 1st described by Bastug et al.[6,7] And since this time many studies were done to evaluate different techniques dealing with that pathology, although many studies were done on that issue. The studies comparing the results of laparoscopic and conventional treatment are lacking. The conversion rate was 51.99% in this study which was slightly higher than previous reported values of about 45%.[21,24,25] The main reason for conversion was an obscured view due to intestinal distension.[7,20,26] A reduced field of vision together with the vulnerability of the bowel limits the use of laparoscopy and may explain why laparoscopy for acute SBO has the highest rate of conversion in laparoscopic surgery.[27]

There is evidence that laparoscopic treatment of acute SBO leads to a higher rate of bowel injury than conventional surgery.[25] The rate of bowel perforation in this series was 26.9% in the LAP group. All perforations occurred during adesiolysis and were not related to trocar insertion, indicating that open insertion of the 1st trocar can be performed safely. The incidence of perforation was higher in this series than reported values 25.5%.[7,20,21,25] For laparoscopic procedures the 5 perforations that occurred after conversion demonstrates the vulnerability of the bowel and complexity of adhesion in these patients. On the other hand, no perforation or recurrent obstruction was missed in this series. Although intra-operative bowel perforation did not worsen the postoperative course, the incidence during laparoscopic treatment was nearly twice that of conventional open operation, and perforation was significantly more common in patients with two or more previous laparotomies. The number of laparotomies and complexity of operation are known to increase postoperative adhesion formation.[29,30] Although postoperative complications have been shown to occur more frequently after converted procedure than after complete laparoscopic surgery of SBO;[7,25] complications after laparoscopic and conventional surgery have not been compared. In the present study, patients in whom laparascopic treatment was intended had fewer postoperative complications, quicker recovery of bowl movements and a shorter hospital stay than conventionally treated patients. Bailey et al,[28] have also shown a shorter hospital stay after laparoscopic surgery compared with open management of acute SBO. An advantage with regard to bowel movements has been described previously only for laparoscopically treated patients compared with those whose operations for acute SBO were converted.[24] In the present study laparoscopic treatment of acute SBO led to a shorter period of postoperative ileus than open treatment, even when conversion was included laparoscopic treatment of acute adhesive SBO was feasible in half of these patients, who benefited from a low postoperative complication rate, a quicker recovery of bowel function and a shorter hospital stay. An attempt at laparoscopic management of acute SBO seems justified in patients with fewer than two previous laparotomies but should not be offered to other patients because of the unacceptably high risk of intra-operative bowel perforation.

Conclusion:

Laparoscopic adhesiolysis for small bowel obstruction is feasible but can be convenient only if performed by skilled surgeons in selected patients. The laparoscopic adhesiolysis for small bowel obstruction is satisfactorily carried out when early indicated in patients with a low number of laparotomies resulting in a short hospital stay and a lower postoperative morbidity. Although a higher small bowel obstruction recurrence remains the major postoperative risk of the laparoscopic management of these patients.

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