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## Role of Laparoscopic Adhesiolysis in Adhesive Intestinal Obstruction

Ahmed Lofty Mustafa, Emad Mohamed Salah, Osama Abd Elaziz  
Mohamed, Waleed Ahmed Abd Elhady

General Surgery department, Faculty of medicine Zagazig University Hospitals, Sharkia, Egypt

**Corresponding author:** Ahmed  
Lotfy Mustafa Ali Amer  
E\_mail  
dr.a7med.amer2014@gmail.com

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### ABSTRACT

**Background:** Adhesive Intestinal obstruction is a serious problem after abdominal operations with higher morbidity and lead to recurrent hospitalization. The incidence, extent, and severity of peritoneal adhesions has been shown to be decreased after laparoscopy compared with open surgery, and this results in decreasing the recurrence rate for adhesions. As a result of concerns regarding iatrogenic injury to the bowel and limited visualization secondary to distended bowel, laparoscopic adhesiolysis has not gained wide acceptance.

**Subjects and method:** Between the period of November 2017 and June 2019 in the General Surgery Department of Zagazig university Hospitals 12 patient included 6 males (50.0%) and 6 females (50.0%) with mean age (38.4±7.1) complaining of adhesive intestinal obstruction all of them were operated laparoscopically for lysis of adhesions.

**Results:** laparoscopic adhesiolysis was done in (58.3%) of the study group followed by laparoscopic adhesiolysis with intraoperative enterotomy (25.0%) and lastly Conversion to open procedure for lysis of adhesions due to excessive adhesions was done in (16.7%) of the study group.

**Conclusions:** Laparoscopic adhesiolysis has been shown to be safe and feasible in experienced hands. Patients who require an emergent operation are good candidates for laparoscopic adhesiolysis. Patients who have a chronic or recurrent partial obstruction documented on a contrast study are also good candidates for laparoscopic adhesiolysis.

**Keywords:** Adhesive Intestinal Obstruction, Laparoscopic Adhesiolysis, Laparoscope

### INTRODUCTION

Adhesive Intestinal obstruction is a dangerous problem for general surgeons worldwide. About 93–100% of patients undergoing abdominal surgery will have adhesions postoperatively, these adhesions account for up to 75% of all causes of small bowel obstruction [1]. Post-operative, adhesions may be asymptomatic or may lead to a serious patients are then at increased risk for postoperative complications and prolonged hospital stay [3]. Abdominal exploration through laparotomy has been the standard treatment for

problems, including intestinal obstruction, chronic abdominal or pelvic pain and female infertility, requiring re-hospitalization and most often additional surgery, and at they can complicate future surgical procedures [2]. Extensive adhesions may preclude laparoscopic procedures and have been shown to increase blood loss, operative time, and risk of enterotomy in reoperative surgery. These adhesive small bowel obstruction. In recent years, however, laparoscopic surgery for ASBO has been introduced [4]. The potential benefits of laparoscopy include less extensive adhesion

reformation, earlier return of bowel movements, reduced post-operative pain, and shorter length of stay. In a recent systematic review and meta-analysis, laparoscopic adhesiolysis reduced risk of morbidity, in-hospital mortality, and surgical infections [4].

**Aim of the work:** The aim of this study is to evaluate the role of Laparoscopic Adhesiolysis in Adhesive Intestinal Obstruction as safe, rapid recovery and less recurrence rate for patients in Zagazig University Hospitals.

#### **PATIENTS AND METHODS**

The study included a total of 12 cases presented by adhesive intestinal obstruction included 6 males (50.0%) and 6 females (50.0%) with mean age ( $38.4 \pm 7.1$ ) complaining of adhesive intestinal obstruction all of them were operated laparoscopically for lysis of adhesions. Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Figure (1): Intestinal adhesions seen by laparoscope.

Figure (2): Band of adhesion between the intestine and the peritoneum.

**Surgical technique:** The patient is placed in supine position with both arms trucked along his sides. Two video monitors are used, one on each side of the operating table. The surgeon and the first assistant stand on opposite sides of the table. The initial trocar should be placed 5-10 cm away from the patient's previous scar. A minimum of 3 trocars are used, depending on the available laparoscopes; one can use three 5-mm trocars or one 11-mm trocar for the camera, and two 5-mm trocars for the laparoscopic instruments. Adhesions to the abdominal wall should be taken down first with laparoscopic scissors. Blunt and sharp dissection is preferred to use of the electrocautery. Adhesiolysis can be safely performed if dissection is done carefully

through avascular planes. The laparoscopic approach precludes feeling through these adhesions. Accordingly, a general rule that can be followed in this setting is, If you can see through it, you can cut it. When a point of obstruction is not clearly defined, the bowel should be run until all suspicious bands are removed. Upon completion of the case, it is advisable to run the bowel twice to ensure that there are no missed serosal injuries or enterotomies. Any injuries identified should be repaired laparoscopically in a single layer.

**Results:** Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group represent by mean  $\pm$  SD.

#### **Data collection:**

Demographic data of the patients were recorded (Name, age, sex, occupation, residence and social status). Detailed history was taken with emphasis on associated medical disorders and previous surgical interventions and Careful general and abdominal examinations were carried out. Intra-operative details were recorded including time, method and any difficulties or complications. Post-operative follow up of the patients was arranged weekly for one week, two weeks and four weeks to check improvement of symptoms and development of any post-operative complication.

#### **RESULTS**

This study included 12 cases undergoing laparoscopic adhesiolysis for adhesive intestinal obstruction.

Table (1) age distribution of the study group

This table shows that the mean age of the study group was ( $38.4 \pm 7.1$ ) ranged from (23-47) years, (50.0%) of them were from 40 to 50 years, (33.3%) were from 30 to 40 years and (16.7%) were from 20 to 30 years.

Table (2) complain of the study group

This table shows that abdominal pain was the commonest complain (100.0%) of the study group followed by vomiting (91.7%) of them, (83.3%) had constipation and (75.0%) had abdominal distension.

Table (3) previous operations in the study group

(there is one patient had two previous operations, open cholecystectomy and open appendectomy)

This table shows that Cesarean section was the commonest previous operation in (33.3%) of the study group followed by Open appendectomy and hysterectomy in (16.7%) of

them and all other operations had the same prevalence (8.3%).

Table (4) operations in the study group

This table shows that laparoscopic adhesiolysis was done in (58.3%) of the study group followed by laparoscopic adhesiolysis with intraoperative enterotomy (25.0%) and lastly Conversion to open procedure for lysis of adhesions due to excessive adhesions was done in (16.7%) of the study group.

Table (5) duration of hospital stay in the study group

This table shows that the duration of hospital stay in the study group was ( $2.5 \pm 0.94$ ) days ranged from (1.5-5) days.



**Figure (1):** Adhesive small bowel obstruction caused by single band adhesion: Laparoscopic surgery.



**Figure (2):** Dissection of adhesions.

## DISCUSSION

Laparoscopic surgery for postoperative small bowel obstruction allows earlier discharge after surgery and return to social activities because of its minimal invasiveness [5]. In the early 1990s, laparoscopy was first used to examine sites of small bowel obstruction [6].

A subsequent study reported that the incidence of recurrent postoperative small bowel obstruction increased in parallel to the number of years after surgery in patients who had undergone surgery for postoperative small bowel obstruction [7]. Younger age, lumpy adhesions, and postoperative complications have been reported to be risk factors for recurrence of postoperative small bowel obstructions [8].

Surgery for adhesive small bowel obstruction is associated with many procedural accidents and postoperative complications, as well as particularly high mortality among patients who are elderly or in poor general condition. Recently, many studies have reported that laparoscopic surgery is a useful procedure for the management of small bowel obstruction [8].

A study comparing laparoscopic surgery with open surgery for the treatment of acute

adhesive small bowel obstructions reported that laparoscopic surgery is associated with earlier recovery, early intestinal motility and a shorter hospital stay, as well as with low rates of conversion to open surgery and postoperative complications when performed by experienced laparoscopic surgeons. Laparoscopic surgery can thus be used as an alternative to open surgery [9].

Good surgery technique, open Hasson's laparoscopic access and the possibility of moving the operating table in different positions are needed to perform laparoscopic adhesiolysis [10].

The causes of laparotomic conversion are the aggravated exposition and fibrous adhesion treatment, then the reduced operational field caused by the small bowel dilatation, multiple adhesions and sometimes with the presence of posterior peritoneal fibrous adhesion that are treated harder than laparoscopically [11].

Other causes of conversion are the presence of intestinal necrosis, which always demands the resection which is primarily performed laparotomically. One of the causes of conversion is inadvertent enterotomy. Saturation which is performed by open access gives more certainty and durability, especially

when performed on dilated and fragile intestine. In order to avoid accidental enterotomies, several strategies have been developed: exclusion of patients with a history of multiple abdominal surgeries, good surgical technique which implies dissection close to parietal peritoneum, avoid cutting the tenacious fibrous adhesions and always control the direction of the instruments [12].

In our study the age of the study group was ( $38.4 \pm 7.1$ ) ranged from (23-47) years, (50.0%) of them were from 40 to 50 years, (33.3%) were from 30 to 40 years and (16.7%) were from 20 to 30 years and (50.0%) of the study group were males and (50.0%) were females.

This study shows that abdominal pain was the commonest complaint (100.0%) of the study group followed by vomiting (91.7%) of them, (83.3%) had constipation and (75.0%) had abdominal distension. Postoperative intestinal adhesion formation is random and unpredictable. Intestinal obstruction is commonly attributed to intraabdominal scar tissue, a claim that is frequently substantiated by operative findings in patients requiring surgical intervention. Abdominal and pelvic pain in association with intra-abdominal scar tissue is not as well understood [13].

Adhesions can be the cause of pain if they limit the movement or distensibility of peritoneum or bowel. Stretching pain secondary to adhesions attached to the liver, intestine, or other organs may also contribute to chronic abdominal pain; and the adhesions can partially or intermittently cause intestinal obstruction. One study noted that small adhesions appear to cause recurrent pain without other symptoms, whereas large adhesions produce pain in combination with symptoms indicative of intermittent bowel obstruction [13].

This study shows that previous Cesarean section was the commonest cause of adhesive intestinal obstruction (33.3%) of the study group followed by Open appendectomy in (16.7%) of them and all other operations had the same prevalence (8.3%). Our results are similar to Niyaf et al., who found in their study

that gynecological surgeries followed by appendectomy are the commonest cause of post-operative adhesive intestinal obstruction [13].

This study shows that Pfannsteil's incision and Mc Burney's incision were the commonest previous incisions in (16.7%) of the study group followed by all other incisions had the same prevalence (8.3%). Also, this study shows that the duration since previous operations in the study group was ( $6.12 \pm 5.5$ ) years ranged from (6 months to 20 years) ago.

This study shows that laparoscopic adhesiolysis was done in (58.3%) of the study group followed by laparoscopic adhesiolysis with intraoperative enterotomy (25.0%) and lastly Conversion to open procedure for lysis of adhesions due to excessive adhesions was done in (16.7%) of the study group. Our findings are in contrast to Pekmezci et al., and Suter et al. who found that conversion rates to open procedure during laparoscopic adhesiolysis ranged from 6.7% to 43% [15][16].

In our study the duration of hospital stay in the study group was ( $2.5 \pm 0.94$ ) days ranged from (1.5-5) days. This study shows that there was no statistically significant difference between patients with laparoscopic adhesiolysis and patients with Conversion to open procedure for lysis of adhesions due to excessive adhesions in duration of hospital stay. Our results are in contrast to Sato et al., who reported that hospital length of stay in most series is 4 to 6 days for the laparoscopic group and around 12 days for the converted group [17].

Our study shows that half of the study group (50.0%) had no complications, (25.0%) had abdominal distension, (16.7%) had vomiting and (8.3%) had ileus. Bailey et al., reported that in a series of 65 patients operated on for acute bowel obstruction, 7 patients required early reoperation. The reported mortality ranges from 0% to 3%. This rate is lower than the reported mortality after open surgery of adhesiolysis, which most likely represents patient selection [18]. The incidence of intraoperative enterotomies ranges from 3% to 17.6%, with

most authors reporting an incidence of about 10% which close to our study (25.0%) [17]. Suter et al., reported an intraoperative enterotomy incidence of 15.6%, of which 62% were repaired laparoscopically [16].

One of the most dreaded complications of surgery is a missed enterotomy. Although a missed enterotomy can occur after laparotomy, the incidence is higher after laparoscopic surgery [19]. Strickland et al., found that the duration of surgery longer than 120 minutes, bowel necrosis, intraoperative perforation, and conversion were significant predictors of postoperative morbidity [11]. Levard et al. reported the incidence of wound complications to be 1.2% in the laparoscopic group compared with 10% in the converted group (P\_0.001) [20].

In a study by Shayani et al., with a mean follow-up of 11 months after laparoscopic adhesiolysis, the only patient who has required repeat abdominal surgery for recurrent symptoms is 1 of the 3 patients who required major bowel resection at the time of her initial adhesiolysis, supporting the adequacy of our technique of adhesiolysis [13].

Cost analysis has not been addressed in any of the series in the literature. The long-term results regarding recurrence are limited, with most series reporting a mean follow-up between 12 and 24 months [18]. Navez et al., reported that 85% (29 of 34) of the patients treated laparoscopically were asymptomatic with a mean follow-up of 46 months [21].

The series with the longest follow-up (mean 61.7 months) reported 87.5% (14 of 16) of the patients treated laparoscopically were asymptomatic [16].

The predictive factors for successful laparoscopic adhesiolysis are non-medial laparotomy (Mc Burney incision), less than two laparotomies, one fibrous adhesion causing obstruction, lack of peritoneal stimulus during physical examination (performing the surgery within 24 hours from the occurrence of symptoms [22].

On the other side, number of laparotomies more than two, the presence of multiple adhesions

can be considered a relative contraindication [23].

Absolute contraindications are the presence of intestines necrosis due to the obstruction, enormously dilated loops because they narrow the operative field, serious comorbidity such as cardiovascular, respiratory and hemostatic disorders [24].

Through the comparison of laparoscopic and laparotomic access at small bowel obstruction the following was determined: the duration of surgery is longer at laparoscopy compared to open surgery [9].

The duration of hospitalization, initiation of peristalsis, postoperative morbidity rate is lower with laparoscopic approach [25]. With laparoscopic adhesiolysis we avoid laparotomy, which can cause another adhesion and bowel obstruction [22].

Laparoscopic adhesiolysis at small bowel obstruction is feasible but suitable only if performed by an experienced laparoscopic surgeon with selected patients. The appropriate selection of patients is essential in order to avoid the increased morbidity rate noticed due to laparotomic conversion. The factors to be considered are: the number of previous laparotomies, a type of surgical procedure, adhesion degree, the time elapsed from the beginning of symptoms, the degree of bowel loops dilatation in X-ray images, conjunction with ischemia and intestines necrosis. Laparoscopic adhesiolysis is safe and reliable technique [26].

Conflict of interest: No

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## REFERENCES

1. Barmparas, G., Branco, B. C., Schnüriger, B., Lam, L., Inaba, K., & Demetriades, D.. The incidence and risk factors of post-laparotomy adhesive small bowel obstruction. *J. Gastrointest. Surg.* 2010; 14(10), 1619-1628.
2. Brüggmann, D., Tchartchian, G., Wallwiener, M., Münstedt, K., Tinneberg, H. R., & Hackethal, A. Intra-abdominal adhesions: definition, origin, significance in surgical practice, and treatment options. *DTSCH. ARZTEBL. INT.* 2010 ; 107(44), 769.
3. Attard, J. A. P., & MacLean, A. R. Adhesive small bowel obstruction: epidemiology, biology and prevention. *Can. J. Surg.* 2007; 50(4), 291.

4. Nordin, A. and J. Freedman. "Laparoscopic versus open surgical management of small bowel obstruction: an analysis of clinical outcomes." *Surg. Endosc.* 2016; 30(10): 4454-4463.
5. Nakamura, T., Sato, T., Naito, M., Ogura, N., Yamanashi, T., Miura, H., ... & Watanabe, M. Laparoscopic surgery is useful for preventing recurrence of small bowel obstruction after surgery for postoperative small bowel obstruction. *Surg Laparosc Endosc Percutan Tech* 2016; 26(1), e1.
6. Paterson-Brown, S., & Vipond, M. N. Modern aids to clinical decision-making in the acute abdomen. *British Journal of Surgery* 1990; 77(1), 13-18.
7. Foster, N. M., McGory, M. L., Zingmond, D. S., & Ko, C. Y. Small bowel obstruction: a population-based appraisal. *J. Am. Coll. Surg.* 2006; 203(2), 170-176.
8. Duron, J. J., du Montcel, S. T., Berger, A., Muscari, F., Hennes, H., Veyrieres, M., & Hay, J. M. French Federation for Surgical Research. Prevalence and risk factors of mortality and morbidity after operation for adhesive postoperative small bowel obstruction. *Am J Surg* 2008; 195(6), 726-34.
9. Wullstein, C., & Gross, E. Laparoscopic compared with conventional treatment of acute adhesive small bowel obstruction. *Br J Surg* 2003; 90(9), 1147-1151.
10. Strickland, P., Lourie, D. J., Suddleson, E. A., Blitz, J. B., & Stain, S. C. Is laparoscopy safe and effective for treatment of acute small-bowel obstruction?. *Surg. Endosc.* 1991; 13(7), 695-698.
11. Parent, S., Tortuyaux, J. M., Deneuille, M., Bresler, L., & Boissel, P. What are the small bowel obstructions to operate and how to do it?. *ACTA GASTRO-ENT BELG* 1996; 59(2), 150-151.
12. Camazine, B. The medicolegal fallout from laparoscopic bowel injury. *Cont Surg* 2004; 60, 380-81.
13. Shayani, V., Siegert, C., & Favia, P. The role of laparoscopic adhesiolysis in the treatment of patients with chronic abdominal pain or recurrent bowel obstruction. *JSLs.* 2002; 6(2), 111.
14. Niyaf, A., Bhandari, R. S., & Singh, K. P. Management of adhesive intestinal obstruction. *JIOM.* 2010; 32(2), 18-20.
15. Pekmezci, S., Altinli, E., Saribeyoglu, K., Carkman, S., Hamzaoglu, I., Paksoy, M., ... & Sirin, F. Enteroclysis-guided laparoscopic adhesiolysis in recurrent adhesive small bowel obstructions. *Surg Laparosc Endosc Percutan Tech.* 2002; 12(3), 165-170.
16. Suter, M., Zermatten, P., Halkic, N., Martinet, O., & Bettschart, V. Laparoscopic management of mechanical small bowel obstruction. *Surg. Endosc.* 2000; 14(5), 478-483
17. Sato, Y., Ido, K., Kumagai, M., Isoda, N., Hozumi, M., Nagamine, N., ... & Sugano, K. Laparoscopic adhesiolysis for recurrent small bowel obstruction: long-term follow-up. *Gastrointest. Endosc.* 2001; 54(4), 476-479.
18. Bailey, I. S., Rhodes, M., O'Rourke, N., Nathanson, L., & Fielding, G. Laparoscopic management of acute small bowel obstruction. *Br J Surg* 1989; 85(1), 84-87.
19. Nagle, A., Ujiki, M., Denham, W., & Murayama, K. Laparoscopic adhesiolysis for small bowel obstruction. *Am J Surg* 2004; 187(4), 464-470.
20. Levard, H., Boudet, M. J., Msika, S., Molkhov, J. M., Hay, J. M., Laborde, Y., ... & French Association for Surgical Research. Laparoscopic treatment of acute small bowel obstruction: a multicentre retrospective study. *ANZ J Surg* 2001; 71(11), 641-646.
21. -Navez, B., Arimont, J. M., & Guiot, P. Laparoscopic approach in acute small bowel obstruction. A review of 68 patients. *Hepato-gastroenterology.* 1998; 45(24), 2146-2150
22. Perniceni T. Traitement laparoscopique des occlusions aiguës de l'intestin grele: limites et indications. *Referentiel Association Francaise de Chirurgie (AFC) n°4513 cree(e) le 28/04/2005 par Pr Denis Collet* Prevention et traitement des occlusions du grele su bride.
23. Benoist, S., DE WATTEVILLE, J. C., & Gayral, F. Place de la coelioscopie dans les occlusions aiguës du grele. *GASTROEN CLIN BIOL* 1996; 20(4), 357-361.
24. Szomstein, S., Menzo, E. L., Simpfendorfer, C., Zundel, N., & dz, R. J. Laparoscopic lysis of adhesions. *WORLD J SURG* 2006; 30(4), 535-540.
25. Khaikin, M., Schneidereit, N., Cera, S., Sands, D., Efron, J., Weiss, E. G., ... & Wexner, S. D. Laparoscopic vs. open surgery for acute adhesive small-bowel obstruction: patients' outcome and cost-effectiveness. *Surg. Endosc.* 2007; 21(5), 742-746.
26. Konjic, F., Idrizovic, E., Hasukic, I., & Jahic, A. Laparoscopic Management of Adhesive Small Bowel Obstruction. *Acta Inform Med* 2016; 24(1), 69.

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