

## ORIGINAL PAPER

# EXTENSIVE LAPAROSCOPIC ADHESIOLYSIS: BENEFITS AND RISKS

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## ABSTRACT

**Introduction.** The continuous process of broadening the indications of laparoscopy has determined a reevaluation of its risks and benefits in extensive adhesiolysis.

**The objective of the study.** The aim of the present study was to evaluate the efficacy and the associated risks of the laparoscopic adhesiolysis in the surgical management of the intestinal obstruction secondary to postoperative peritoneal adhesions.

**Material and methods.** 17 patients with intestinal obstruction secondary to postoperative peritoneal adhesions admitted to the Surgical Department of the

## RÉSUMÉ

**Adhésiolyse laparoscopique étendue: bénéfiques et risques**

**Introduction.** Le processus continu d'élargissement des indications de la laparoscopie a déterminé une réévaluation des risques et des avantages d'une adhésiolyse étendue.

**L'objectif de l'étude.** Le but de la présente étude est d'évaluer l'efficacité et les risques associés à l'adhésiolyse laparoscopique dans la prise en charge chirurgicale de l'obstruction intestinale consécutive à des adhérences péritonéales postopératoires.

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“Sf. Pantelimon“ Emergency Hospital from Bucharest, Romania, between January 2014 and January 2018, were treated using laparoscopic surgery. The pneumoperitoneum was made using the open technique, far from the skin scars secondary to previous surgical interventions. After identifying the postoperative peritoneal adhesions as the cause of intestinal obstruction, the entire peritoneal cavity was rigorously inspected.

**Results.** The laparoscopic exploration of the peritoneal cavity allowed for a clear identification of the cause and the level of the intestinal obstruction for all 17 patients included in the present study, 14 of them being treated by simple laparoscopic adhesiolysis, in 3 cases the conversion to laparotomy being necessary. The morbidity rate was low with no cases of death. The mean hospitalization stay was 5 days.

**Conclusions.** The laparoscopic surgery represents an efficient therapeutic alternative to the classical methods for the treatment of the intestinal obstruction secondary to postoperative peritoneal adhesions, constituting a diagnostic and therapeutic tool that has the benefits of the minimally invasive techniques.

**Keywords:** laparoscopy, adhesiolysis, benefits, risks.

## INTRODUCTION

The rapid and optimal treatment necessary for reducing the morbidity associated to chronic abdominal pain and intestinal obstruction secondary to postoperative peritoneal adhesions represents the aim of the surgical management protocol.

Even though the laparoscopic adhesiolysis has been successfully used by the gynecologists for the treatment of infertility or chronic abdominal pain, the standard of care in the management of the intestinal obstruction secondary to postoperative peritoneal adhesions is still represented by laparotomy. Considering the potential risk of iatrogenic enterotomy during trocar placement or gas insufflation, the use of laparoscopy for the treatment of the postoperative peritoneal adhesion syndrome has been avoided. The continuous process of broadening the indications of laparoscopy has determined the evaluation of its risks and benefits in the management of the intestinal obstruction secondary to postoperative peritoneal adhesions.

**Matériel et méthodes.** Entre Janvier 2014 et Janvier 2018, 17 patients souffrant d'une occlusion intestinale secondaire à des adhérences péritonéales postopératoires et admis au service de Chirurgie de l'Hôpital d'Urgence “Sfântul Pantelimon“ de Bucarest, en Roumanie, ont été traités par laparoscopie. Le pneumopéritoine a été résolu selon la technique ouverte, loin de cicatrices cutanées secondaires aux interventions chirurgicales antérieures. Après avoir identifié les adhérences péritonéales postopératoires comme étant la cause de l'obstruction intestinale, la cavité péritonéale entière a été rigoureusement inspectée.

**Résultats.** L'exploration laparoscopique de la cavité péritonéale a permis d'identifier clairement la cause et le niveau de l'obstruction intestinale pour les 17 patients inclus dans la présente étude, 14 d'entre eux étant traités par simple adhésiolyse laparoscopique, la conversion étant nécessaire dans trois cas. Le taux de morbidité était faible, sans aucun décès. La durée moyenne d'hospitalisation était de 5 jours.

**Conclusions.** La chirurgie laparoscopique représente une alternative thérapeutique efficace aux méthodes classiques de traitement de l'obstruction intestinale consécutive à des adhérences péritonéales postopératoires, constituant un outil diagnostique et thérapeutique bénéficiant de techniques les moins invasives.

**Mots-clés:** laparoscopie, adhésiolyse, avantages, risques.

## THE OBJECTIVE OF THE STUDY

The objective of the present study is to evaluate the efficacy and the associated risks of the laparoscopic adhesiolysis in the surgical management of the intestinal obstruction secondary to postoperative peritoneal adhesions.

## MATERIAL AND METHODS

17 patients aged between 42 and 80 years old (mean age 64 years old) have been included in the present study. The study took place in the Surgical Department of the “Sf. Pantelimon“ Emergency Hospital from Bucharest, Romania, between January 2014 and January 2018.

The female: male ratio was 9:8. Written informed consent was obtained, the study protocol respecting the ethical guidelines of the Declaration of Ethics adopted by the 18th WMA General Assembly, Helsinki, Finland, June 1964, and amended by WMA General Council of Fortaleza, Brazil, 2013 at the 64<sup>th</sup>

edition (64<sup>th</sup> WMA General Assembly, Fortaleza, Brazil, October 2013).

All patients had signs and symptoms suggestive for intestinal obstruction, the diagnosis being confirmed by imaging tests, after excluding other possible causes.

In the initial phase, all patients underwent conservative treatment: nihil per os, parenteral nutrition and hydro-electrolytic rebalancing, nasogastric and rectal tube for decompression, urinary catheter placement. For patients who had no response to the conservative therapy in 48-72 hours and in cases of altered general status, laparoscopic intervention was the method of choice.

Taking into account the fact that all patients included in the study had a personal history of abdominal or pelvic surgery, the open method of creating the pneumoperitoneum was routinely practiced through a minimal incision on the median line, at some distance from the umbilicus and from the postoperative scar; in cases with median postoperative scars, the first port was made either in the epigastrium or in the right or left hypochondrium, the 10 mm trocar being placed under direct visualization of the peritoneal cavity, the optical camera being subsequently inserted through this trocar.

After inserting the camera and visualizing the entire peritoneal cavity, two trocars of 5 mm diameter were placed in positions determined by the level of the intestinal obstruction and, after the lysis of the visceroparietal adhesions that obstructed the intraperitoneal access, the second 10 mm trocar could be inserted.

After the patient was placed in the Trendelenburg position and turned 30° to the left, a careful inspection of the entire abdominal cavity was performed and the small intestine was run along its entire tract, starting from the last ileal loop, using non-traumatic laparoscopic forceps. After identifying the level of the intestinal obstruction, lysis of the peritoneal adhesions was performed using the monopolar electrocautery, the integrity of the enteral loop caught in the peritoneal adhesion process being evaluated (Figure 1).

14 patients were successfully treated using laparoscopic adhesiolysis, 3 of the patients included in the study,

who presented multiple fibrous peritoneal adhesions, requiring conversion to laparotomy.

## RESULTS

For all patients included in the study, the laparoscopic exploration allowed to the exact identification of the level of the intestinal obstruction, confirming the diagnosis.

For 14 patients, laparoscopic adhesiolysis represented the curative method (82.35%). There were no cases of strangulation or intestinal necrosis in the present study, however, there were three cases of laparoscopic conversion to laparotomy, secondary to the intraoperative identification of a massive peritoneal adhesion block difficult to dissect (Figure 2).

The morbidity rate was low in the study group, the complications developed during the postoperative period being represented by the postoperative wound seroma in two cases and incisional hernia in one case. There were no incidents or intraoperative accidents such as enterotomy, sero-muscular dilaceration or intestinal perforation.



Figure 1. Laparoscopic view of the entero-parietal postoperative peritoneal adhesions (image from<sup>1</sup>).

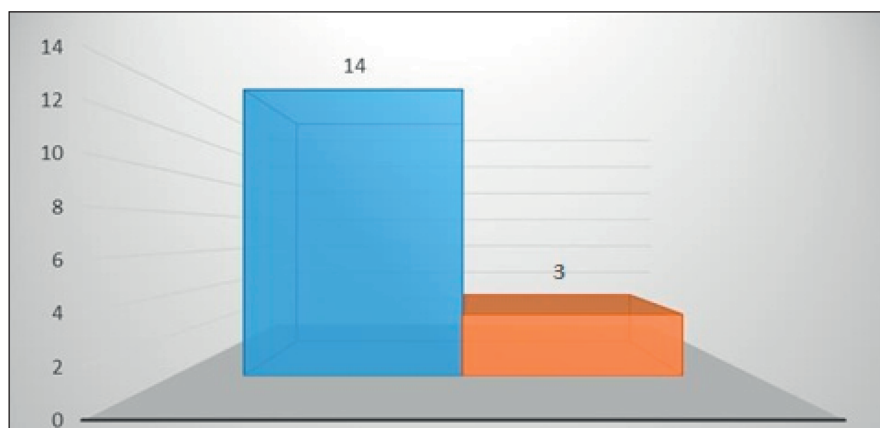


Figure 2. Number of patients who were successfully treated using laparoscopic adhesiolysis (blue column) and number of cases of conversion to laparotomy (orange column).

There were no deaths. The mean operative time was 2 h 15 min (45-150 minutes), the average hospitalization stay was 5 days (from 3 to 16 days) and the time interval required to resume the normal daily activity was between 7 and 21 days.

## DISCUSSION

The current standard treatment of the intestinal obstruction secondary to peritoneal adhesions is represented by open surgery<sup>1,2</sup>.

A pathological entity commonly encountered in the daily activity of the emergency units, the intestinal obstruction secondary to peritoneal adhesions, is usually characterized by hydro- electrolytic imbalances<sup>3-5</sup>, which explains the type of the surgical approach through laparotomy, in order to allow for a free manipulation of the intestinal loops and a rapid identification of the obstruction area<sup>6</sup>, thus ensuring early treatment and, implicitly, rapid recovery of the patients by reducing the anesthetic and surgical time. In the postoperative period, however, patients undergoing laparotomy have a high risk of chronic abdominal pain, ileus, hydro-electrolyte disturbances, cardiovascular complications and exacerbation of the peritoneal adhesion formation process and, thus, a high risk of recurrence of the obstruction<sup>7,9</sup>. These complications support a minimally invasive surgical management, the continuous extension of the laparoscopic indications promoting it as an optimal therapeutic method for the intestinal obstruction secondary to peritoneal adhesions<sup>10</sup>.

The high risk of iatrogenic intestinal perforation during the insertion of trocars or gas insufflation, in patients with intestinal obstruction secondary to peritoneal adhesions, causes the use of the laparoscopic adhesiolysis to be avoided in the treatment of this pathology. However, given the advantage of minimally invasive surgery, although there is a high degree of difficulty through limited intraoperative visibility and laborious dissection, laparoscopic adhesiolysis can be successfully used, under the condition of using the open method for creating the pneumoperitoneum<sup>11</sup>.

Patient positioning in Trendelenburg, rotated 30° to the left, allows the assessment of the entire intestine and colic tract<sup>10</sup>.

The careful selection of the cases undergoing laparoscopic adhesiolysis is a first essential step in order to ensure optimal and safe treatment of the patients with intestinal obstruction secondary to postoperative peritoneal adhesions. An important criterion to be considered in the process of establishing the indication of laparoscopic adhesiolysis is represented by the professional experience of the surgeon<sup>12</sup>.

The Bologna Guideline for the management of the intestinal obstruction secondary to peritoneal

adhesions, developed by Ten Broeket et al, sets out as criteria necessary for the safety of the laparoscopic adhesiolysis, the following: adequate professional experience, at most two laparotomies in the personal history of the patient and a high suspicion of a single adhesion band causing the intestinal obstruction. According to the same guide, the laparoscopic surgery reduces the intensity of the reforming process of the peritoneal adhesions and thus decreases the incidence of recurrence (IIB level of evidence)<sup>13</sup>.

Recent studies have demonstrated the high efficacy of the laparoscopic adhesiolysis in reducing the postoperative morbidity of the patients with intestinal obstruction secondary to postoperative peritoneal adhesions (IIC level of evidence)<sup>13</sup>.

Patients with fever (38°C), leukocytosis > 11000 / mmc, signs of peritonitis and major intestinal distention may be laparoscopically evaluated, however, rapid conversion to classical surgery in the case of intestinal necrosis or massive adhesion block is mandatory<sup>14-17</sup>.

In the present study, laparoscopic adhesiolysis was shown to be an effective treatment method for 14 patients with intestinal obstruction secondary to peritoneal adhesions, for 3 patients, conversion to classical surgery being required.

Anticoagulant prophylaxis is mandatory even for cases with early mobilization and short in-hospital stay<sup>18-23</sup>.

The main differential diagnoses for the patients in our study were bowel paresis in retroperitoneal tumors<sup>24,25</sup>, diverticulitis<sup>26,27</sup> or other particular conditions of bowel obstruction like phytobezoar<sup>28</sup>.

The morbidity rate was low, with no mortality, the average hospitalization stay being reduced, with a rapid recovery of the daily activity.

The limits of the study are represented by its design (a retrospective, case series, observational study with a small number of patients included).

## CONCLUSIONS

- Laparoscopic adhesiolysis, being a type of minimally invasive surgery, may stop the vicious circle of peritoneal adhesion reformation following surgical interventions.
- Taking into account the technological evolution and the increasing level of surgical experience, the indications of laparoscopic surgery are constantly expanding.
- Laparoscopic surgery allows the inspection of the entire peritoneal cavity, the precise localization of the level of the intestinal obstruction and the early treatment, the minimal- invasive character being associated with low rates of morbidity and mortality.



- A careful selection of the cases with proper indication for laparoscopic adhesiolysis represents the essential step in the therapeutic management of the intestinal obstruction secondary to postoperative peritoneal adhesions.
- There is a need for elaborate, prospective, case-control, randomized studies that can certainly establish the indications and effectiveness of the laparoscopic adhesiolysis

#### Compliance with Ethics Requirements:

„The authors declare no conflict of interest regarding this article“

„The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study“

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