Videolaparoscopic cholecystectomy in patients with previous abdominal surgery. Personal experience and literature review

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Abstract

Objectives. Laparoscopic cholecystectomy (LC) is today the "gold standard" treatment of gallbladder stones. Role of LC is still debated in the presence of abdominal scars due to the frequent post-operative adhesions which make access to the peritoneal cavity difficult.

This study aim to assess role and outcomes of LC on a previous abdominal surgery on the scarred abdomen.

Materials and Methods. We have carried out a retrospective study on 499 consecutive patients who had undergone LC from 2009 to 2015; 21 of these (4.2%) undergo previous abdominal surgery. In all 21 cases the pneumoperitoneum was established with Veress needle at the Palmer’s point and the procedure was carried out after adhesiolysis in 62% of cases.

Results. The mean operative time was 79±12 minutes; none of the patients with previous abdominal surgery required conversion to open cholecystectomy and there were no postoperative complications related to Veress introduction or to the adhesiolysis. The difficult dissection and adhesiolysis were more frequent in the patients with upper abdomen scar (62%) respect to lower abdomen scar (38%).

Conclusion. Patients with scarred abdomen for previous abdominal surgery had obviously more adhesions in the abdomen than patients without preceding surgery, but today previous abdominal surgery should not constitutes absolute contraindications to LC. Moreover, patients with previous lower abdominal incision had fewer adhesions in the upper abdomen than did patients with upper incision and, probably, in these cases adhesiolysis is unnecessary, if the surgical field is well exposed whereas adhesiolysis is mandatory when the adhesions are thick and widespread, to the anterior and posterior abdominal wall. Clin Ter 2017; 168(6):e357-360. doi: 10.7417/CT.2017.2034

Key words: Adhesions, Previous abdominal surgery, Cholecystectomy, Laparoscopy

Introduction

Laparoscopic cholecystectomy (LC) represents today the standard treatment for symptomatic gallbladder disease and, compared with traditional surgery, it provides for less post-operative pain, earlier oral intake, shorter hospital stay, earlier return to social and professional activity and better cosmetic outcome (1).

LC, like all other interventions conducted with minimally invasive technique, may be impeded by intraperitoneal adhesions caused by previous abdominal surgery (2).

Materials and methods

Data were retrospectively collected for 499 patients (221 male and 278 females, M:F ratio = 1:1.12, mean age 55.6 years, range 22-84 years) who had undergone LC from January 2009 to January 2015 in General and Thoracic Surgery of University Teaching Hospital in Palermo.

Of these, 21 patients (4.2%) underwent previous abdominal operation before LC; they were 11 male and 10 female (M:F=1:1.1) and the median age was 59.4 years (range 49-72 years).

These patients received right hemicolectomy (RHEM), left hemicolectomy (LHEM), partial gastrectomy (PGAS), total gastrectomy (TGAS), hysterectomy (IST), appendectomy (APP).

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ISSN 1972-6007
Data about patients with previous abdominal surgery are reported in table 1.

LC was always performed from the same equipe (CS and GG) in the French position with standard 4-trocar technique, under general anesthesia.

In all 21 cases the pneumoperitoneum was established with Veress needle at the Palmer’s point (in the left hypocondrium, just below the costal margin in the midclavicular line: we perform a skin incision with scalpel nr. 11 helded at a 30° angle to the abdominal wall, the introduction of the tip with the same angle, water test of positioning and gentle induction of pneumoperitoneum at 10 mmHg, blind introduction of the second trocar in epigastrium or into the umbilicus (slightly on the left or the right of median line according to the clinical history) and before positioning third and fourth trocar, blunt and sharp dissection with fine dissecting scissors and electrocautery.

As reported in literature (3), it was not often possible to insert trocar into the usual standard anatomical positions; with division of adhesions and the passage of cannulas under direct vision, it was possible to insert a satisfactory number of cannulas (85%) in relevant sites to perform LC; following the division of all obstructing adhesions, usually through the epigastric and left paramedian trocar, the laparoscope was then moved to the umbilical port and routine LC performed.

Intra-abdominal adhesions (table 1) were defined according to Blauer and Collins score (4):

- **Grade 0**: no adhesions;
- **Grade 1**: thin, narrow and easily separable adhesions (n=7=30%);
- **Grade 2**: thick adhesions in a well-defined area (n=5=25%);
- **Grade 3**: thick and widespread adhesions, including adhesions to the anterior and posterior abdominal wall (n=3=15%).

The statistical analysis was conducted on the 21 patients who undergone abdominal surgery before LC, using the Wilcoxon-Mann-Whitney or Mann-Whitney U test, to study the nonparametric distribution of 2 independent samples, established with ANOVA software.

### Results

21 patients from 499 patients (4.2%) undergoing LC received previous abdominal surgery.

Mean operating time for these 21 patients with abdominal scars (from the first incision to the final dressing) was 79±12 minutes (range 45-135), while the LC performed in patients without previous abdominal surgery had a median operating time of 41±9 minutes (range 34-61 minutes), as reported in table 1, with differences statistically significant at Mann-Whitney U test (p < 0.005) valued with ANOVA software.

### Table 1. Patients’ characteristics

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<th>Sex</th>
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<th>Time before LC (years)</th>
<th>Diagnosis</th>
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<th>First Access</th>
<th>Blauer score</th>
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<td>Grade 4</td>
<td>Yes</td>
<td>90</td>
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RHEM = right hemicolectomy, LHEM = left hemicolectomy, PGAS = partial gastrectomy, TGAS = total gastrectomy, IST = hysterectomy, APP = appendectomy

AC = acute cholecystitis, CC = chronic cholecystitis

VLH = Veress left hypocondrium, UM = Hasson umbilical
A tubular silicon drain (12 Ch) has been positioned in the foramen of Winslow in all patients and removed the first post-operative day; no further drain has been positioned in case of adhesiolysis.

None of the patients with previous abdominal surgery required conversion to open cholecystectomy and there were no postoperative complications related to Veress introduction or to the adhesiolysis.

The difficult dissection and adhesiolysis were more frequent in the patients with upper abdomen scar (appendectomy and hysterectomy in 13/21 patients=62%) respect to lower abdomen scar (8/21=38%).

Moreover, these patients had a statistically comparable post-operative pain, use of analgesics and post-operative stay (mean 1.2 days, range 1-2) to those who did not received previous abdominal surgery (mean 1.1 days, range 1-2).

Discussion

From literature data (table 2), in patients who undergo LC, previous abdominal surgery has often been evaluated as a cause of failure or conversion to open surgery, but the findings have been inconclusive (5): although some studies argue that previous abdominal surgery is not predictive of conversion (adhesions from these operations should not alter surgical anatomy of the upper right quadrant), others studies suggest that previous upper abdominal operations can be a predictive risk factor for conversion to open surgery due to visceral lesion (small bowel perforation in 33%, liver lacerations in 20%, colon injuries in 17%, duodenal injuries in 10% and injuries to iliac veins, stomach, small bowel mesentery and ovary in < 5%) (3), or to inadequate visualization of gallbladder (difficult entry, lack of working space) in 12% of cases (6).

In a historic milestone work, the Authors performed a prospective analysis of the potential causes of failure of LC requiring conversion to the open operation. Of the first 285 LC performed, 12 cases had previous upper abdominal surgery. This group’s conversion rate was 25%, compared to 4% for those without previous upper abdominal surgery. This statistically significant difference was further enhanced when the subgroup that had previous gastroduodenal surgery was selected out, with a conversion rate of 50%. All the failures were attributable to adhesions, and lower abdominal surgery scars did not seem to pose a problem (3).

Therefore, the most important predictive factor of adhesion formation is the history of previous abdominal surgery. Up to 93% of patients with prior median laparotomy presented with intra-abdominal adhesions, whereas only 10% of those without prior abdominal surgery had adhesions, and, in autopsy studies, adhesions are formed in 67% of cases with prior abdominal surgery (7). Conversely, although prior surgery is a major cause of adhesions, other study demonstrates that 31% of scars from previous abdominal surgery have been free of adhesions and up to 10% of patients without any prior surgical scars will have spontaneous adhesions of the bowel or omentum (8).

In case of previous surgery, many authors propose guidelines according to which LC can be performed safely in these patients: starting in the left subcostal area and the Veress needle and blind insertion of the first trocar seems to be a safe choice (7); another possibility is to use a “cut down technique” for the introduction of the first trocar, dissection of adhesions before the placement of the upper midline port, retrograde dissection of the gallbladder from the liver bed, and finally the division of the cystic artery and duct (9). In our experience, we began the dissection in a retrograde fashion only if extensive adhesions were encountered around the gallbladder.

One or more ports should be used for wider exposure (5 mm) of repositioning the camera (10-12 mm). Essential instruments includeatraumatic graspers, scissors with cautery, and, eventually, the ultrasonic dissector.

In our study, LC in previous scarred abdomen was feasible and safe for all patients. The Veress needle technique

Table 2. Literature review

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Patients</th>
<th>Age (years)</th>
<th>Sex (male/female)</th>
<th>Drain (n/%)</th>
<th>Operative time (minutes)</th>
<th>Bile duct injury (n/%)</th>
<th>Bleeding (n/%)</th>
<th>Conversions (n/%)</th>
<th>Conversions for adhesions (n/%)</th>
<th>Hospital stay (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yu SC, 1994 [9]</td>
<td></td>
<td>55 SAB 7 UAI</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
<td>35.9±38 77.6±36</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
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</tr>
<tr>
<td>Patel M, 1996 [3]</td>
<td>1 UAI 5 UALI</td>
<td>38 61.6±10.12</td>
<td>1/0</td>
<td>Not reported</td>
<td>100 101±10.4</td>
<td>0 0</td>
<td>0 0</td>
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<td>1±1.05</td>
<td>1±1.43</td>
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<tr>
<td>Karayanakis AJ, 2003 [10]</td>
<td>58 UAI 153 LAI</td>
<td>59.4±13.4 47.8±14.2</td>
<td>30/28 0/153</td>
<td>Not reported</td>
<td>66.4±34.2 50.8±24</td>
<td>Not reported</td>
<td>0 1/0.7</td>
<td>11/19 5/4.3</td>
<td>8/72.7 2/40</td>
<td>3.4±2.1 2.6±1.4</td>
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<tr>
<td>Sasaki A, 2008 [11]</td>
<td>51 UAI</td>
<td>67.3±9.0 34/17</td>
<td>51/100</td>
<td>Not reported</td>
<td>108±63.6</td>
<td>1/1.9</td>
<td>1/1.9</td>
<td>2/3.9</td>
<td>0</td>
<td>4.6±2.2</td>
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<tr>
<td>Ercan M, 2009 [5]</td>
<td>66 UAI 567 LAI 44 UALI</td>
<td>57.8±12.8 52.7±13.7 56.0±11.32</td>
<td>45/21 73/494 24/20</td>
<td>37/56.06 132/23.28 29/65.90</td>
<td>60.8±30.5 39.8±22.05 57.1±26.7</td>
<td>0 0 1/2.27</td>
<td>4/6.06 38/6.70 2/4.54</td>
<td>18/27.27 16/2.82 11/25</td>
<td>17/94.4 12/75 9/81.8</td>
<td>1.98±1.23 1.36±1.01 1.73±1.15</td>
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</table>

UAI = upper abdominal incisions; LAI = lower abdominal incisions; ULAI = upper + lower abdominal incisions
in left hypochondria was used for all the patients with previous abdominal incisions, and pneumoperitoneum was well established. Relevant adhesions (Blauer score ≥ 2) were, as expected, more frequent in patients who had undergone previous abdominal surgery (66%), with 61% of these patients requiring blunt laparoscopic adhesiolysis. In fact, the technical ability to lyse the fine-filmy, dense vascularized, or cohesive adhesions should be a familiar skill for the advanced laparoscopist, where filmy adhesions are the easiest to manipulate and may provide a good practice field for the inexperienced laparoscopic surgeon (7).

LIMIT OF THE STUDY: the literature review included study of different quality, with low number of patients and with lacking of some data, suggesting caution in the interpretation of the results. It is unclear whatever the clinical studies include enough patients in order to have power to detect significant differences.

Moreover, in these studies has not been reported if residents or fellows or trainee or experienced surgeons has been involved, because of LC is one of the most common general surgical procedures and essential component of surgical resident training (12).

Conclusions

Patients with scarred abdomen for previous abdominal surgery had obviously more adhesions in the abdomen than patients without preceding surgery, but today previous abdominal surgery should not constitutes absolute contraindications to LC.

However, these patients should be preoperatively informed of the high conversion rates associated with their conditions.

LC can be performed safely in patients with previous abdominal surgery if we (1) know well clinical history of the patient, (2) use the adequate technique for the insertion of first trocar, preferably by placing the Veress needle in the left upper quadrant, (3) dissect the adhesion before the upper midline port is inserted, (4) and retrogradely dissect the gallbladder from the liver bed, and (5) divide the cystic artery and duct last.

Moreover, rarely, unintentional injuries to the intestines can occur, and therefore particular attention should be paid to this possibility during the dissection of adhesions.

We found also that patients with previous lower abdominal incisions (appendectomy, hysterectomy) had fewer adhesions in the upper abdomen than did patients with upper incision: probably, in these cases adhesiolysis is unnecessary, if the surgical field is well exposed.

Competing interest section

All the Authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the Authors

Competing interests

The authors declare that they have no competing interests.

Authors’ contributions

GG conceived the study and designed either the manuscript either the review of literature; moreover, he has given final approval of the version to be published; GG and BDO has been involved in drafting the manuscript and pictures; SR and MC has been involved in drafting the manuscript; GM has been involved in drafting the manuscript and revising it critically for important intellectual contents; all authors read and approved the final manuscript.

References