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ORIGINAL ARTICLE

Safety of Laparoscopic Cholecystectomy in High Risk Patients

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Background: Previous abdominal surgery has been reported as a contraindication related to laparoscopic cholecystectomy.

Methods: A total of 135 patients were distributed into group I (Gallstone, n = 50) and group II (Cholecystitis with a previous history of abdominal surgery or high risk patients, n = 85). The data were analyzed for open conversion rates, operative times, intra- and postoperative complications and hospital stay.

Results: The patients were classified into the following 2 groups: group 1: patients without a history of previous abdominal surgery (n_50) and group 2: patients with risk factors related to LC (n_85). Patients in the control group (II) had a longer operating time (63 ± 19.3 min vs. 52± 25.4), a higher open conversion rate (4.7% vs. 2%), and a longer postoperative stay (1.8± 1.6 days vs. 1.1±1.9) than group I, respectively. But, there was no significant difference between both the groups in characteristic variables. However, higher conversion rates as well as a longer hospital stay for patients with previous upper abdominal surgery than for those without previous upper abdominal surgery were detected in our study. Iatrogenic injury was not detected in both groups.

Conclusions: Previous abdominal operations or high risk situations are not a contraindication to safe laparoscopic cholecystectomy.

Key Words: Laparoscopic Cholecystectomy, abdominal surgery, High risk

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Introduction

The absolute contraindications for laparoscopic cholecystectomy from the 1980s (pregnancy, previous abdominal surgery, bowel obstruction, coagulopathy, obesity, cirrhosis, inability to tolerate general anaesthesia, choledocholithiasis, and acute cholecystitis) have also become today's relative contraindications [1].

Up to half of the patients undergoing attempted laparoscopic cholecystectomy would have had prior abdominal surgery [1] Previous upper abdominal surgery does not always result in adhesions that will prevent safe right upper quadrant access. The surgeon must consider the best means for obtaining access to the abdominal cavity.

With increasing experience, however, many surgeons have felt that laparoscopic cholecystectomy is feasible for such patients. As a result, we reviewed our database specifically to investigate the effect of some risk factors on laparoscopic cholecystectomy.

Patients and Methods

The study included 135 well-documented patients with gallstones (102 women, 33

men; age, 20 years to 80 years; mean age 41.5) who underwent LC at our surgical department between May 2007 and April 2008. The patients were classified into the following 2 groups: group 1: patients without a history of previous abdominal surgery (n_50) and group 2: patients with any risk factor related to LC which included (n_85) a history of upper abdominal surgery (n_11), patients with a history of lower abdominal surgery (n_5) and patients with acute cholecystitis (n_34) and chronic cholecystitis (n_35).Risk factors defined as mentioned above. Those with bowel obstruction, coagulopathy, obesity, cirrhosis, inability to tolerate general anaesthesia and pregnancy were excluded from our study. Previous abdominal surgery through a midline or paramedian incision was classified as upper abdominal surgery, when the scar extended above the umbilicus and as lower abdominal surgery when the scar was located below the umbilicus. Transverse or oblique abdominal incisions also were classified on the basis of their relationship to the umbilicus, as upper or lower abdominal surgery.

All patients underwent elective LC. Preoperative laboratory analysis of the patients included white blood cell count, total serum bilirubin, alkaline phosphatase, aspartate transaminase, alanine transaminase, and amylase. Each was in normal ranges in all patients. Preoperative Endoscopic Retrograde Cholangiopancreatography(ERCP) was performed selectively, based on preoperative clinical or laboratory indicators of common duct stones or dilated common duct on ultrasonography. The same surgical team performed all operations and all of the patients underwent surgery by the same surgeon (C.S.) with standard 4-port and 2-handed techniques. Surgeons with experience of doing more than 250 LCs over the last 5 years performed the LC.

The standard Veress needle technique was used to enter the abdominal cavity in the patients without previous abdominal surgeries and upper abdominal surgery (group1). The Hasson technique, which involves entering the abdominal cavity under direct vision through a larger incision in the navel skin, the fascia, and the peritoneum, was used for the patients with previous abdominal surgeries. A finger was introduced to remove adhesions and a purse-string suture was placed in the fascia to close the orifice around the cannula, which allows the preservation of the pneumoperitoneum (group 2). Once the peritoneal cavity was reached safely, only those adhesions that truly interfered with visualization of the area of interest were lysed. If at any point during the operation, the surgeon thought that the patient could be better served by an open cholecystectomy, conversion to the open technique was performed. After entering the abdominal cavity, adhesions attached to the midline incision line and to associate intraperitoneal sites or organs were identified and graded for severity.

The operative times of patients in each group were compared. These data were not only affected by the conversion rates, but also indirectly showed the difficulty of the operations. Because of this, we compared the operative times of patients who underwent successful LC (converted patients excluded). Conversion to open, operative time, postoperative hospital stay, and any operative or postoperative complications were evaluated. In addition, the factors contributing to the conversion from a laparoscopic to an open procedure were evaluated to determine the impact of the prior surgery on conversion.

The Standard Laparoscopic Cholecystectomy procedure was performed. Adhesions of GB were separated by blunt, sharp and hydro dissection and by use of suction cannula and gauze piece. Distended GBs were decompressed by suction and aspiration. The Cystic Duct and Cystic Artery were identified, ligated and divided with endoclips. Wide Cystic Ducts were suture ligated and divided. The Fundus first method and sub total cholecystectomies

were performed for unclear anatomy of Calot's triangle. GBs were dissected from the GB fossa by the use of hook/spatula/scissors. Haemostasis was done by using monopolar cautery. GBs were extracted through the epigastric port. GB fossas were re-examined and suction dried. Drains were kept through a 5 mm port at the anterior axillary line. Port closure was used for port site bleeding. Skin closure was done with skin stapler or suture.

Statistical Analysis

The data was presented as means ± standard deviation. The Qualitative data were evaluated by the Fisher's exact test. One-way analysis of variance (ANOVA) was used for comparison of means. Statistically, P_0.05 was considered significant. The SPSS version 11.0 for Windows was used for statistical analyses.

Results

The 2 groups were similar with respect to age and sex (P>0.05). No statistically significant difference was noted among the groups with respect to the conversion rate, operation time and complication rate (P>0.05) [Table/Fig 1] in [Table/Fig 2] patients with upper abdominal surgery as compared to group1. Patients with previous upper abdominal surgery had the longest mean operative time (75 min vs. 52 min) and higher conversion rate (9% vs. 2%) than group 1 respectively (P<0.05).

(Table/Fig 1) Characteristics of patients without previous abdominal surgery and risk factor group

	Choledocholithiasis without risk factor(n=50)	High risk Group (n=85)
Age	44±6.4	*43±8.1
Gender (F/M)	36/14	*62/23
Weight	81±13.1	*82±15.3
ASA Class	1.01±0.43	*1.11±0.45
(%) Conversions n	2%	*4.7%
(Operating Time min)	52±25.4	*63±19.2
(%) Wound Infections n	0	* (1.1%)1
Post Operative Stay (days)	1.1±1.9	*1.8±1.6

*P > 0.05 by Fisher's exact test, no significant difference between both groups in characteristic variables

(Table/Fig 2) Characteristics of patients with previous upper and without abdominal surgery

	Choledocholithiasis without risk factor (n=50)	Upper abdominal surgery (N=11)
Age	44±6.4	*41±7.3
Sex F/M	36/14	*9/2
(%) Conversions n	2%	†9.09%
Operating Time(min)	52±25.4	†75±3.2
Post Operative Stay (days)	1.1±1.9	*2.4±1.2
(%) Wound Infections n	0%	*0%

†P<0.001 by Fisher's exact test. Statistically significant differences as compared with patients without previous abdominal surgery

*P> 0.05 by Fisher's exact test

The major causes of conversions were dense adhesions in the Calot's triangle or an uncertain anatomy of the biliary tree. The causes of conversions are summarized in [Table/Fig 3]. Our study showed that two converted patients with upper abdominal surgery (supraumblical midline incision) had had a previous gastrectomy. The conversion was directly attributable to adhesions. The conversion was directly attributable to uncertain anatomy in this case. In the cholecystitis patients (n_2), conversion to an open procedure was performed because of a failed pneumoperitoneum and dense adhesions in the Calot's triangle respectively. Adhesions were found in 90% (11 patients with acute and 13 patients with chronic cholecystitis, 11 patients with previous abdominal surgery) and 4% (2 patients in group 1) of patients and adhesiolysis was required in 64% (55 of 85 patients in group2), and 0% of these patients in group 1. No statistically significant difference was noted between the two groups with respect to the mean adhesion grades (P>0.05).No complications occurred that was directly attributable to adhesiolysis. The mean postoperative hospital stay in group 1 was 1.1 days. This was similar to that in the other group (P>0.05).No operative complications occurred in any of the groups.

(Table/Fig 3) Indications for conversion to open cholecystectomy

	Choledocholithiasis without risk factor(n=50)	High risk Group (n=85)
Inadequate visualization of structures	1	0
Dense adhesion in calot triangle	0	2
Failed Pneumopritoen	0	2

The complication rates among the groups were not statistically different (P>0.05). The number and type of complications in the groups are summarized in [Table/Fig 4].

(Table/Fig 4) Number and Type of Complications in Each Group

	Choledocholithiasis without risk factor (n=50)	High risk Group (n=85)
Wound Infection	0	1
Prolonged Ileus	0	1
Urinary Tract Infection	0	0
Atelectasis	1	2
Post operative nasea/vomiting	1	2

Discussion

In this study, we evaluated a large series of consecutive patients treated by laparoscopic cholecystectomy in a single institution, to examine the impact of some risk factors on the performance of laparoscopic cholecystectomy. Risk factors based on previous studies were defined. But there were some controversies, especially regarding the previous abdominal surgery. Initial studies reporting limited numbers of patients undergoing laparoscopic cholecystectomy after previous abdominal surgery, have suggested that the procedure is feasible without an increased risk of complications [2],[3],[4],[5],[6], and in particular, that previous surgery appears to have no effect on the operating time or the open conversion rate [7]. Other studies have however shown, that prior upper abdominal surgery is a significant risk factor for open conversion and either intraoperative or postoperative complications [8],[9].In our study, we compared the data between the two groups. One time patients with any risk factor were compared to the risk factor group and other patients with a history of previous upper abdominal surgery were compared to group 1.The reason for this comparison was that previous studies had shown that there was no difference between the lower abdominal surgery group and the group with no history of abdominal surgery.

Our findings are in agreement with those of A. J. Karayiannakis, et al. [10], who reported higher conversion rates as well as a longer hospital stay for patients with previous upper abdominal surgery than for those without previous upper abdominal surgery [Table/Fig 2], although the operative times were similar in both groups. However, there were no significant differences between patients without a history of abdominal surgery and patients with risk factors. Nusret Akyurek et al. [11] believed that LC could be performed safely in patients with previous upper or lower abdominal surgery, if they do not have such conditions as acute cholecystitis, pancreatitis, CBD stones, and morbid obesity.

Previous upper abdominal surgery has been listed as a concern because of adhesion formation, which causes the bowel or other abdominal structures to adhere to the undersurface of the abdominal wall. The potential for bowel injury during trocar placement or difficulty in the visualization of the hepatobiliary structures, has dissuaded some surgeons from using the laparoscopic procedure in patients with previous abdominal surgery [6],[7],[8],[9],[10][11], [12]. On the other hand, the chances of unwanted “surprises,” such as dense adhesions, awaiting the surgeon during LC, are the same as those encountered during open cholecystectomy. However, Kuldip Singh et al. showed that adhesion was the main reason for conversion in upper abdominal surgery [13]. They mentioned that an experienced surgeon is able to lower this rate of conversion by his experience.

We believe that open insertion of the umblical ports minimizes the risk of organ injury and allows adhesiolysis in patients with previous abdominal surgery. Once the peritoneal cavity has been reached safely, the presence and extent of any adhesions will become apparent. The surgeon must resist the common tendency to excessively eliminate adhesions. Only those adhesions that truly interfered with visualization of the area of interest or would prevent the placement of subsequent cannulas under

vision should be lysed. In this study, adhesions were found in 90% and 2.35% of patients respectively, especially in those who had any risk factor or no previous abdominal surgery, adhesiolysis required in 64% and 0% of these cases respectively. No complications were directly attributable to adhesiolysis. Akyurek et.al [10] believed that the majority of adhesions from prior abdominal surgery do not alter the anatomy of the abdominal right upper quadrant and do not negatively impact the performance of a successful laparoscopic cholecystectomy. However, patients who had undergone abdominal surgery had increased difficulty during LC in terms of adhesions in the upper abdomen. But no statistically significant difference was noted in LC success rates between patients with previous upper or lower abdominal surgery in our study. We believe that with increased experience, surgeons will be able to overcome this difficulty.

The number of complications was similar among groups. In this study, operative time was longer in patients with previous upper abdominal surgery. Longer operative times are likely to be associated with an increased need for adhesiolysis.

Based on our study, LC can be performed safely in patients with previous upper or lower abdominal surgery. Previous abdominal surgery is not a contraindication for safe laparoscopic cholecystectomy. However, previous upper abdominal surgery is associated with a prolonged operation time.

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