

Scope of Laparoscopic Cholecystectomy in Patients with Previous Upper Abdominal Surgery

*MEU Bari¹, AS Arif², F Quader³, MIMN Sobhani⁴, AZMMH Tuhin⁵

ABSTRACT

Background: Laparoscopic cholecystectomy has become the treatment of choice for symptomatic gallstones. Previous upper abdominal surgery has been reported as a relative contraindication to laparoscopic cholecystectomy. This study specifically examined the effect of previous upper abdominal surgery on the feasibility and safety of laparoscopic cholecystectomy.

Methods: A number of 50 patients of adult age group (25 to 60 years) who were admitted suffering from gall bladder pathology and having history of previous upper abdominal surgery in the surgery units of a tertiary level hospital within the time period of September, 2013 to August, 2014 were included in this prospective observational study. With the consent of the patients, laparoscopic cholecystectomy was chosen as the surgical procedure. All these data were analyzed to find out the feasibility and safety of laparoscopic cholecystectomy in the patients with previous upper abdominal surgery.

Results: The patients were classified into 3 groups: group 1, patients with no adhesions, group 2, patients with minimum adhesions and group 3, patients with moderate dense adhesions. The 3 groups were similar with respect to age and sex ($P > 0.05$). Conversion to laparotomy was required in 5 (10%) patients (1 in group 1, 2 in group 2, and 3 in group 3). No statically significant difference was noted among groups with respect to the conversion rate ($P > 0.05$). No per-operative complications occurred in any of the groups. The post-operative complication rates among groups were not statistically different ($P > 0.05$).

Conclusion: Previous upper abdominal surgery is not a contraindication to safe laparoscopic cholecystectomy. However, previous upper abdominal surgery is associated with an increased need for adhesiolysis, a chance for open conversion and a prolonged operation time.

Key words: Laparoscopic cholecystectomy, previous upper abdominal surgery, intra-abdominal adhesions.

Introduction

Laparoscopic cholecystectomy is the most common laparoscopic procedure performed around the world. Laparoscopic cholecystectomy decreases postoperative pain, allows earlier oral intake, shortens hospital stay, enhances earlier return to normal activity, and improves cosmesis over open cholecystectomy. Laparoscopic Cholecystectomy is now accepted as the gold standard for the treatment of symptomatic gallbladder disease.¹⁻³

When laparoscopic cholecystectomy began in the early 1990s, previous abdominal surgery, obesity, cirrhosis and acute cholecystitis were considered absolute contraindications for performance of the laparoscopic technique. As advances of laparoscopic skills and instruments have evolved, a range of increasingly complex procedures has been performed, making all of these traditional contraindications at best relatives.⁴

¹*Dr. Md. Ehsan-Ul-Bari, Registrar, Department of Surgery, AKMMC

²Prof. Md. Abdus Salam Arif, Professor and Head, Department of Surgery, AKMMC

³Prof. Feroze Quader, Department of Surgery, Popular Medical College Hospital

⁴Prof. MIM Nasim Sobhani, Department of Surgery, AKMMC

⁵Prof. AZM Mostaque Hossain Tuhin, Department of Surgery, AKMMC

*Corresponding Author

Date of submission: 14.07.2020, Date of acceptance: 08.08.2020

Previous abdominal surgery particularly is associated with difficulty in placing the initial trocar and obtaining adequate exposure to the gall bladder. With increasing experience, however, many surgeons have felt that laparoscopic cholecystectomy is feasible for such patients. There have been limited reports on the impact of previous abdominal surgery on its safety. In this study it is also tried to find out the effect of previous abdominal surgery on laparoscopic cholecystectomy.

Materials and Methods

This study is a prospective observational study to find out the scope of laparoscopic cholecystectomy in patient with previous history of upper abdominal surgery. A number of 50 patients of adult age group (25 to 60 years) who were admitted suffering from gall bladder pathology and having history of previous upper abdominal surgery in the surgery units of a tertiary level hospital within the time period of September, 2013 to August, 2014 were included in this study. With the consent of the patients, laparoscopic cholecystectomy was chosen as the surgical procedure. The relevant data were documented. All these data were analyzed and tried to find out the feasibility and safety of laparoscopic cholecystectomy in the patients with previous upper abdominal surgery. Strict selection criteria were applied. Patients with acute cholecystitis, current biliary pancreatitis, morbid obesity (BMI>35), or common bile duct stones were excluded in the study.

The types of previous abdominal surgeries were also recorded. Preoperative laboratory analysis of patients included white blood cell count, total serum bilirubin, alkaline phosphatase, aspartate transaminase, alanine transaminase and amylase.

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 purse-string suture was placed in the fascia to close the orifice around the cannula, which allows preservation of the pneumoperitoneum. 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 would 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 the associated intraperitoneal sites or organs were identified and graded for severity. Of the patients who had adhesions, the following 3-point grading system was used to define severity: grade 1, filmy thickness, avascular; grade 2, moderate thickness, limited vascularity; grade 3 dense thickness, well vascularized. The electro cautery (Monopolar) and the scissors were used to divide the adhesions.

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).

Spss version 11.5 for windows was used in statistical analysis. 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.

Results

Among the 50 cases 30 patients were male and 20 patients were female. The patients were classified into 3 groups: group 1, patients with no adhesions, group 2, patients with minimum adhesions and group 3, patients with moderate dense adhesions. The 3 groups were similar with respect to age and sex ($P>0.05$). Conversion to laparotomy was required in 5 (10%) patients (1 in group 1, 2 in group 2, and 3 in group 3). No statically significant difference was noted among groups with respect to the conversion rate ($P>0.05$). The major causes of conversions were dense adhesions which causes bowel or other abdominal structures to adhere to the undersurface of the abdominal wall or an uncertain anatomy of the biliary tree. In the other patients (groups 2 and 3), conversion to an open procedure was performed because of failed pneumoperitoneum. No per-operative complications

occurred in any of the groups. However, 10 patients had postoperative complications including wound infections, retained common bile duct stone, trocar-site bleeding, sub phrenic abscess, urinary tract infection, urinary retention, postoperative nausea/vomiting, pulmonary embolism, prolonged ileus, urinary retention, atelectasis. The complication rates among groups were not statistically different ($P>0.05$).

Table-I: Types of Surgery in Patients with Previous Upper Abdominal Surgery

Types of Previous Surgery	Number of Patients
Gastrectomy (Total or Subtotal)	15
Simple suture with Graham patch (Perforated Peptic Ulcer)	9
Heller myotomy (Achalasia)	2
Antireflux procedures	5
Partial cystectomy, pericystectomy (Hydatid liver cyst)	5
Liver resections (segmentectomy)	2
Splenectomy	2
Epigastric hernia	5
Vagotomy and drainage procedures	5

Table-II: Distribution of patient according to grading of adhesions found during peroperative period, n=50

Group	Types of adhesions	Total no of patient	% of patient
Group 1	No adhesion	8	16%
Group 2	Minimum adhesion	27	54%
Group 3	Moderate adhesion	15	30%

Table-III: Comparative operation time in selected 3 groups

Group	Mean operation time (Min)
Group 1	50 ± 5
Group 2	60 ± 5
Group 3	68 ± 5

▪ Converted patients were not included in this table.

Table-IV: Causes of conversion to open cholecystectomy in each group

Cause	Group 1	Group 2	Group 3
Dense adhesion undersurface of abdominal wall	1	-	1
Uncertain anatomy	-	1	-
Friable Gall bladder	-	-	1
Failed pneumoperitoneum	-	1	-
Thick cystic duct	-	-	1

Table-V: Number and types of complication in each group

Complications	Group 1	Group 2	Group 3
Wound infection	-	-	1
Retained Common bile duct stone	-	1	-
Trocar-site bleeding	1	-	-
Pulmonary embolism	-	1	-
Sub phrenic abscess	-	-	1
Urinary tract infection	1	-	-
Prolonged ileus	-	-	1
Urinary retention	1	-	-
Post-operative nausea/vomiting	-	-	1
Atelectasis	-	-	1

Discussion

Clear benefits' of laparoscopic cholecystectomy have rendered it the procedure of choice for symptomatic cholelithiasis.⁵ A number of absolute or relative contraindications have been cited in regard to laparoscopic cholecystectomy. Previous upper abdominal surgery has been listed as a concern because of adhesion formation, which causes bowel or other abdominal structures to adhere to the undersurface of the abdominal wall.⁶ The potential for bowel injury during trocar placement or difficulty in visualization of the hepatobiliary structures has dissuaded some surgeons from using the laparoscopic procedure in patients with previous abdominal surgery.⁷ On the other hand, the chance of unwanted "surprises", such as dense adhesions, awaiting the surgeon during laparoscopic cholecystectomy are the same as those encountered during open cholecystectomy. In our series, 50 patients had undergone previous abdominal surgery, listed in **Table I**. In this study, our conversion rate was 10% in patients with previous

upper abdominal surgery. The rate of conversion to open cholecystectomy and the complication rate were virtually identical to those found in the patients without prior surgery. This observation is consistent with reports in previous published works.

The chi-square test was used for comparison of proportions. One-way analysis of variance (ANOVA) was used for comparison of means. Statistically, $P < 0.05$ was considered significant. SPSS version 11.5 for Windows was used in statistical analyses.

The patients were classified into 3 groups: group 1, patients with no adhesions, group 2, patients with minimum adhesions and group 3, patients with moderate dense adhesions, shown in **Table II**. The 3 groups were similar with respect to age and sex ($P > 0.05$). Conversion to laparotomy was required in 5 (10%) patients (1 in group 1, 2 in group 2, and 3 in group 3). No statically significant difference was noted among groups with respect to the conversion rate ($P > 0.05$). Comparative operation times in selected 3 groups were shown in **Table III**. The major causes of conversions were dense adhesions which causes bowel or other abdominal structures to adhere to the undersurface of the abdominal wall or an uncertain anatomy of the biliary tree. The causes of conversions are summarized in **Table IV**. Our study showed that one of the converted patients with upper abdominal surgery (supra-umbilical midline incision) had a previous total gastrectomy. The conversion was directly attributable to adhesions. In the other patients (groups 2 and 3), conversion to an open procedure was performed because of failed pneumoperitoneum and dense adhesions of abdominal structures undersurface of the abdominal wall respectively.

No per-operative complications occurred in any of the groups. However, 10 patients had postoperative complications including wound infections, retained common bile duct stone, trocar-site bleeding, subphrenic abscess, urinary tract infection, urinary retention, post-operative nausea/vomiting, pulmonary embolism, prolonged ileus, urinary retention, atelectasis]. The complication rates among groups were not statistically different ($P > 0.05$). The number and type of complications in the groups are summarized in **Table V**.

We believe that open insertion of the umbilical 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.⁸ Only those adhesions that truly interfere with visualization of the area of interest or would prevent the placement of subsequent cannulas under vision should be lysed.⁹ No complications were directly attributable to adhesiolysis. In our opinion, the majority of adhesions from prior abdominal surgery does not alter the anatomy of the abdominal right upper quadrant and do not negatively impact the performance of a successful laparoscopic cholecystectomy. Our overall laparoscopic success rate in patients with previous abdominal surgery was 90%. However, patients who had undergone abdominal surgery had increased difficulty during LC in terms of adhesions in the upper abdomen. We believe that with increased experience, surgeons will overcome this difficulty. In university hospitals, however, institutional experience is more important than the surgeon's experience because inexperienced surgeons perform operations under the supervision of more experienced surgeons, and these reflect the institutional experience. Active participation of faculty members in the operating theater may have enhanced the learning experience.

The number of complications was similar among groups. The cases of pulmonary embolism and subphrenic abscess are likely explained by the fact that patients with previous upper abdominal surgery had long operative times and were most likely to have bacterial contamination.¹⁰⁻¹¹ In this study, operative time was little longer in patients with previous upper abdominal surgery. Longer operative times are likely associated with an increased need for adhesiolysis.

Recent studies revealed that acute cholecystitis, pancreatitis, morbid obesity, and common bile duct (CBD) stones were the factors that might cause conversion to an open procedure and affect the hospital stay, operative time, and perioperative and post-operative complication rates.¹²⁻¹⁴ We excluded such cases to determine the correct and objective probability of conversion to an open procedure in patients with

previous upper abdominal surgery. If we had included these patients, conditions like pancreatitis, acute cholecystitis, morbid obesity, and CBD stones would have affected the conversion rate, the operation time, the perioperative complications, and the hospital stay. We found that the operative time, conversion rate, perioperative complication rate, and postoperative hospital stays of these excluded patients were increased. When excluded patients were evaluated, combining previous upper abdominal surgery with any of these exclusions showed an increase in the perioperative complication rate, the mean operative time, and the mean postoperative hospital stay time ($P < 0.05$).

Conclusion

Laparoscopic Cholecystectomy can be performed safely in patients with previous upper abdominal surgery, if they do not have such conditions as acute cholecystitis, pancreatitis, CBD stones and morbid obesity. There are also some limitations and complications which were found during the study. During the operative procedure, almost all patients need adhesiolysis. There are also chance of conversion in extensive adherent cases and patients having uncertain anatomy, friable gall bladder, failed pneumoperitoneum and thick cystic duct. The post-operative complications noticed are almost as likely occurring to the patients underwent laparoscopic cholecystectomy without having history of upper abdominal surgery. The operation time was also little more and directly affected by the grade of adhesions present in patients due to previous abdominal surgery. Finally it is concluded that laparoscopic cholecystectomy can safely be done in patients with previous history of upper abdominal surgery with a minimum limitation and complication.

Conflict of interest: None.

References

1. Cuschieri A, Dubois F, Mouiel J, et al. The European experience with laparoscopic cholecystectomy. *Am J Surg.* 1991;161:385–387.
2. Trondsen E, Reiertsen O, Andersen OK, et al. Laparoscopic and open cholecystectomy. A prospective, randomised study. *Eur J Surg.* 1993; 159:217–221.
3. The Southern Surgeons Club A prospective analysis of 1518 laparoscopic cholecystectomies. *N Engl J Med.* 1991; 324:1073–1078.
4. Kama NA, Kologlu M, Doganay M, et al. A risk scores for conversion from laparoscopic to open cholecystectomy. *Am J Surg.* 2002; 181:520–525.
5. Frazee RC, Roberts JW, Symmonds R, et al. What are the contraindications for laparoscopic cholecystectomy? *Am J Surg.* 1992; 164:491–494.
6. Alponat A, Kum CK, Koh BC, et al. Predictive factors for conversion of laparoscopic cholecystectomy. *World J Surg.* 1997; 21:629–633.
7. Moore MJ, Bennett CL. The learning curve for laparoscopic cholecystectomy. The Southern Surgeons Club. *Am J Surg.* 1995; 170:55–59. *oll Surg.* 1994;179:696–704.
8. Bonatsos, G., Leandros, E. and Dourakis, N. et al. "Laparoscopic cholecystectomy. Intraoperative finding and postoperative complications". *Surg. Endosc.* 1995; 9: 889-93.
9. Caprini, J., Areelus, J. and Swanson, J. et al. "The ultrasound localization of abdominal wall adhesions" *Surg. Endosc.* 1995; 9: 283-5.
10. Riedel, H., Lehmann-Willembrock, E., Meche, H. ySem, K. The frequency distribution of pelviscopic (laparoscopic) operations, including complication rates: Statistics of Federal Republic of Germany in the years 1983-5". *Zent. CI. Gynakol.*, 2, 78.
11. Schirmer, B., Dix, J. and Schiez, R. et al. The impact of previous abdominal surgery on outcome following laparoscopic cholecystectomy" *Surg. Endosc* 1995;9: 1085-9.
12. Schirmer BD, Edge SB, Dix J, et al. Laparoscopic cholecystectomy. *Ann Surg.* 1991; 213:665–677.
13. Gadacz TR, Talamin MA. Traditional versus laparoscopic cholecystectomy. *Am J Surg.* 1991; 161:336–338.
14. Yu SC, Chen SC, Wang SM, Wei TC. Is previous abdominal Surgery a contraindication to laparoscopic cholecystectomy? *J Laparo-endoscopic Surg.* 1994; 4:31–35.