# Study of complications of laparoscopic cholecystectomy

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DOI: https://doi.org/10.47372/uajnas.2018.n1.a16

## Abstract

Laparoscopic cholecystectomy has become the standard operative procedure for treating cholelithiasis. The incidence of laparoscopic complications is 1.1% to 5.2% in minor procedures and 2.5% to 6% in major ones.

We retrospectively analyzed the data of 1112 patients underwent laparoscopic cholecystectomy during the period between January 2002 and January 2014 in Departments of Surgery in Aden General Hospital, Saber and Alwaly private hospitals in Aden city. Of the 1112 patients in whom laparoscopic cholecystectomy was attempted, 62 (5.6%) required conversion to open cholecystectomy. The most common intraoperative complications are adhesions (8.9%) and inflammation (6%). Postoperative complications were developed in 137 patients (12.3%).

There are many cases of symptomatic gallstones with anatomic or pathologic considerations that prevent the laparoscopic cholecystectomy, and need to convert to laparotomy.

**Keywords:** Complication, laparoscopic cholecystectomy, conversion, adhesions, cholelithiasis.

## Introduction

Since its introduction in the late 1980s, laparoscopic cholecystectomy has replaced open cholecystectomy (10, 18).

Laparoscopic cholecystectomy has become the standard operative procedure for treating cholelithiasis (13, 14).

Minimal Access Surgery is technically demanding technique. As operative laparoscopy becomes more widely accepted, new techniques are being developed and more surgeons have adopted the form of management, the complication rate can be expected to rise. The incidence of laparoscopic complications is 1.1% to 5.2% in minor procedures and 2.5% to 6% in major ones (8). Laparoscopic cholecystectomy is considered the "gold standard" for the surgical treatment of symptomatic gallstone disease (14, 12, 22). This procedure results in: less postoperative pain, better cosmetic, shorter hospital stay, and early return to work than open cholecystectomy (19, 21).

The risk of intraoperative bile duct injury, during laparoscopic cholecystectomy, is higher than in open cholecystectomy but it is anticipated that this will decrease with the experience of surgeons(7).

The decreasing frequency of open cholecystectomy in clinical practice is, of course, reflected in a reduction in training opportunities. Nonetheless, the procedure remains the fallback gold standard in the operating theater and the courtroom with respect to safety and success, particularly in complicated cases.

A successful laparoscopic cholecystectomy is associated with a less painful postoperative course, with low analgesic requirement and a short hospital stay (4, 9, 10, 11). Although laparoscopic cholecystectomy is a procedure of choice for the treatment of gallstones due to its advantages, but it is sometimes associated with serious and life threatening complications. Many complications of laparoscopic cholecystectomy are similar to those occurring during traditional open cholecystectomy such as hemorrhage, bile leak, bile duct injuries, missed stones, acute pancreatitis, wound infections and incisional hernias at trocar site (13).

Despite the increasing experience, approximately 2% to 15% of attempted laparoscopic cholecystectomies have to be converted to open operation, usually, because of dense adhesions and inflammation (5, 6).

The current study aimed at defining intra- and postoperative complications of laparoscopic cholecystectomies. This will help the surgeon to make a right decision to convert a laparoscopic to open cholecystectomy if difficulty is encountered.

## Patients and Methods:

We retrospectively analysed the data of 1112 patients underwent laparoscopic cholecystectomy between January 2002 and January 2014 in Departments of Surgery in Aden General Hospital, Saber and Alwaly private hospitals in Aden city. A retrospective analysis; including patient demographics, preoperative clinical, and laboratory data, ultrasound findings, and intraoperative details, was performed.

Demographic data included age, sex, and history of previous abdominal surgery. Preoperative clinical data included tenderness or mass at the right upper quadrant on examination, fever, and jaundice. Preoperative laboratory data included white blood cell count, total serum bilirubin, alkaline phosphatase, Aspartate transaminase (AST), Alanine transaminase (ALT). Ultrasound results included gallstones, gallbladder wall thickness, gallbladder distension, pericholecystic fluid. Intraoperative details included findings and complications, the indication for conversion to open surgery, and postoperative complications.

The operations were performed using a standard four-puncture technique.

## Results:

Of the 1112 patients in whom laparoscopic cholecystectomy was attempted, 62 (5.6%) required conversion to open cholecystectomy.

The reasons for the conversion to open surgery are summarized in Table 1. The most common reason for conversion was severe adhesions, inflammation, and edema causing difficulty in exposure and dissection in 53 patients. In four cases, bleeding could not be controlled laparoscopically, and in two other cases a common bile duct injury was occurred. Two patients had impacted cystic duct stones and one patient had cholecystogastric fistula that was converted to laparotomy for definitive closure of the fistula.

Table 1: Reasons for conversion to laparotomy

| The reasons | Number of patients |
|---|---|
| Severe adhesions and edema | 53 |
| Uncontrolled bleeding | 4 |
| Impacted cystic duct stone | 2 |
| Common bile duct injury | 2 |
| Cholecystogastric fistula | 1 |
| Total | 62 (5.6%) |

Table 2 summarizes the intraoperative difficult findings and complications. During surgery, adhesions were found in the 99 patients (8.9%), inflammation in 67 patients (6%), and distended gallbladder in 25 patients (2.2%). Impacted cystic duct stone 2 patients (0.2%) and cholecystogastric fistula one patients (0.1%) were found. Intraoperative complications were bleeding in 31 patients (2.8%) and perforation of the gallbladder in 32 patients (2.9%).

Common bile duct and small bowel injuries occurred in 2 patients (0.2%) and 1 patient (0.1%) respectively, they both required laparotomy.

There was no operative mortality.

Table 2: Intraoperative difficult findings and complications

| Intraoperative data | Number of patients (n = 1112) | % |
|---|---|---|
| **Difficult Findings** | | |
| Adhesions | 99 | 8.9 |
| Inflammation | 67 | 6 |
| Distended gallbladder | 25 | 2.2 |
| Impacted cystic duct stone | 2 | 0.2 |
| Cholecystogastric fistula | 1 | 0.1 |
| **Complications** | | |
| Bleeding | 31 | 2.8 |
| Perforation of the gallbladder | 32 | 2.9 |
| Common bile duct injury | 2 | 0.2 |
| Small bowel injury | 1 | 0.1 |

Postoperative complications have developed in 137 patients (12.3%); Chest infection and ileus were the common postoperative complications occurred in 47 patients (4.2%), and 49 patients (4.4%) respectively (Table 3). In particular, chest infection was developed more frequently after conversion to open cholecystectomy. Three out of six patients with bile leakage, and two with postoperative bleeding required reoperation. We had only one case (0.1%) of small bowel injury which occurred during trocar insertion presenting with enterocutaneous fistula. This patient had previous abdominal surgery and adhesion of small bowel to the anterior abdominal wall. Enterocutaneous fistula was treated medically.

Table 3: Distribution of postoperative complications

| Postoperative complications | Number of patients (n = 1112) | % |
|---|---|---|
| Chest infection | 47 | 4.2 |
| Bleeding | 2 | 0.2 |
| Bile leakage | 6 | 0.5 |
| Ileus | 49 | 4.4 |
| Wound infection | 23 | 2.1 |
| Urinary tract infection | 9 | 0.8 |
| Enterocutaneous fistula | 1 | 0.1 |
| Total | 137 | 12.3 |

## Discussion:

Because of the presence of inflammation and dense adhesions, the procedure tends to be more difficult with a higher risk of conversion.

A policy of converting, if there is no progress in dissection of the Calot's triangle within 15 to 30 minutes, may be adopted for high-risk patients (1).

In our study, during surgery, adhesions were found in 99 patients (8.9%) and inflammation in 67 patients (6%).

The most common reason for conversion was severe adhesions, inflammation, and edema (frozen triangle of Calot) causing difficulty in exposure and dissection in 52 patients.

Bleeding is one of the commonest complications of LC. Overall incidence of uncontrolled bleeding during LC is 0.1% to 1.9%, from trocar insertion site, from liver bed due to close proximity of middle hepatic vein or its radicals to gallbladder fossa in up to 10 to 15% of the patients and from injury to vessels especially cystic artery which has high association with right hepatic arterial injury (3).

Incidence of major vascular injury involving aorta iliac vessels vena cava inferior mesenteric arteries and lumbar arteries is 0.07% to 0.4% (16).

In our study, bleeding occurred in 31 patients (2.8%). Frequency of uncontrolled bleeding was o.4% (4 patients). In three cases, intraoperative bleeding occurred from cystic artery injury and in the other case there was continued oozing of blood from liver bed; these four cases were converted to open cholecystectomy.

Major bile duct injury is the most serious and most common reported complication. Incidence varied in different studies depending upon surgeon's experience.

It is predicted that a surgeon had a 1.7% chance of a bile duct injury occurring in the first case and 0.17% chance of a bile duct injury in the 50th case (20).

In addition to the surgeon's experience, other factors include aberrant anatomy chronic inflammation with dense scarring operative bleeding obscuring the field or fat in the portal area contributing to the biliary injuries (5, 15, 17).

Iatrogenic common bile duct injury is the worst complication of laparoscopic cholecystectomy (2, 6).

In our study, we had only two cases (0.2%) of common bile duct injury due to an accidental tear in its anterior wall which was identified intraoperatively. Both cases were converted to open and a T tube was placed.

In our study, two patients had impacted cystic duct stones. Both cases were converted to open surgery because laparoscopically was difficult to remove the impacted stones, and there were a high risk of CHD and CBD injury.

One patient had cholecystogastric fistula and was converted to laparotomy for definitive closure of the fistula.

In particular, chest infection was developed more frequently after conversion to open cholecystectomy. Three out of six patients with bile leakage and two with postoperative bleeding required reoperation.

Frequency of postoperative bleeding was 0.2% (2 patients). These patients required exploratory laparotomy which revealed slippage of clip from cystic artery stump.

Bile leak usually results from injuries that involve leakage into the gallbladder bed from either the minor hepatic ducts or the cystic duct most often due to clip failure.

Frequency of bile leak was 0.5% (6 patients). Three patients required exploratory laparotomy which revealed slippage of clip from cystic duct stump.

Bowel injury usually occurs during trocar insertion and rarely during dissection of adhesions or with diathermy. Incidence is 1 to 4 per 1000 laparoscopic cholecystectomies (2).

In our study, we had only one case (0.1%) of small bowel injury which occurred during trocar insertion presenting with enterocutaneous fistula.

This patient had previous abdominal surgery and adhesion of small bowel to the anterior abdominal wall. Enterocutaneous fistula was treated medically.

## Conclusion:

There are many cases of symptomatic gallstones with anatomic or pathologic considerations that prevent the laparoscopic cholecystectomy, and need to convert to laparotomy.

Many complications of laparoscopic cholecystectomy are similar to those occurring during traditional open cholecystectomy.

Adequate training of surgeons with knowledge and experience makes laparoscopic cholecystectomy effective and safe procedure with low morbidity and mortality.

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# دراسة مضاعفات استئصال المرارة بالمنظار

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## الملخص

استئصال المرارة بالمنظار أصبح العملية النموذجية لعلاج حصوات المرارة. إنَّ حدوث المضاعفات لهذه العملية يتراوح بين 1.1% إلى 5.2% في الحالات البسيطة و2.5% إلى 6% في الحالات المعقدة.

في هذه الدراسة قمنا بالتحليل بأثر رجعي لملفات 1112 مريض أُجريت لهم استئصال المرارة بالمنظار خلال الفترة بين يناير 2002 ويناير 2014 في أقسام الجراحة بمستشفى عدن العام، صابر الأهلي والوالي الأهلي في مدينة عدن. 62 (5.6%) مريض منهم احتاجوا إلى التحول إلى العمليات المفتوحة لإستئصال المرارة. أكثر المضاعفات أثناء العمليات كانت التلاصقات (8.9%)، والالتهابات (6%). 137 (12.3%) مريض تعرضوا لمضاعفات مختلفة بعد العمليات.

هناك كثير من حالات حصوات المرارة ببعض الخصائص التشريحية والوظيفية تحول من غير استخدام المنظار لاستئصال المرارة وتحتاج إلى التحول إلى العمليات المفتوحة.

**الكلمات المفتاحية:** مضاعفات، استئصال المرارة بالمنظار، تحويل، تلاصق، حصوات المرارة.