

Complications of Laparoscopic Cholecystectomy

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ABSTRACT

Objective:

To evaluate the complications of laparoscopic cholecystectomy in symptomatic cholecystolithiasis. Design and duration: Prospective study from 1st September 2007 to 30th December 2010.

Setting:

Surgical Unit, Al-Sadur Teaching Hospital, Al-Najaf.

Patients:

All patients with cholecystolithiasis who had laparoscopic cholecystectomy.

Methodology:

All patients with symptomatic gallstone disease, of both sexes and any age were evaluated by history, examination and investigations and the data collected on a proforma. Patients with chronic liver disease or those deferred by the anesthetist were excluded from the study. All patients underwent laparoscopic cholecystectomy, outcome and complications were analyzed.

Result:

350 patients underwent laparoscopic cholecystectomy in the study period. 305 (87.14%) were females and 45 (12.85%) were males. Common age group was between 21-40 years (59.42%), bleeding was the commonest complication, occurring from trocar site in 21 (6%), vascular injury in Callot's triangle in 15 (4.28%) and liver bed in 35 (10%) cases. Spilled gallstones occurred in 18 (5.14%), biliary leak in 15 (4.28%) including CBD injury in one case. Port site infection was seen in 20 (5.71%), while Conversion to open surgery was in 7 (2%) cases. Bowel injury was not reported in any of cases. Two cases of subphrenic collection and 7 cases of basal pneumonia were reported.

Late complications:

Port hernia was seen in 3 (0.85%) cases. Mortality was NOT reported in any of cases.

Conclusion:

LC is a safe and effective procedure in almost all patients with cholelithiasis. Proper preoperative work up, knowledge of possible complications and adequate training makes this operation a safe procedure with favorable result and lesser complications.

Keywords:

Laparoscopic cholecystectomy, complications, outcome Gallstone

Introduction:

Laparoscopic cholecystectomy (LC) has replaced open surgery in the treatment of cholecystolithiasis. It is now considered the first option and has become the "gold standard" in treating benign gallbladder disease.^{1,2} The risk of intraoperative injury during laparoscopic cholecystectomy is higher than in open cholecystectomy.^{3,4} It has been anticipated that this will diminish with increasing surgeon experience in the use of LC.

In USA approximately one million patients are newly diagnosed annually with gall disease and approximately 600,000 operations are performed a year more than 75-90% of them by laparoscopy.⁵

Laparoscopic cholecystectomy offers the patient the advantages of minimal invasive surgery. However with the widespread acceptance of LC the spectrum of complications in gallstone surgery has changed.

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The intraoperative complications of LC like bowel and vascular injury (trocar site), biliary leak and bile duct injuries decrease with the passage of time, because of increased experience of the surgeons, popularity of the procedure and introduction of new instruments. This study presents a 3-years experience of laparoscopic cholecystectomy with the aim to evaluate the complications of laparoscopic cholecystectomy in symptomatic cholecystolithiasis.

Material And Methods:

This prospective study was carried out in surgical Unit of Al-Sadur Teaching Hospital, Al-Najaf. from 1st September 2007 to 30th December 2010. Data was collected on a proforma designed to include demographic information, history, examination findings, investigations, operation technique and procedure, complications and their management as well as follow up. All patients undergoing laparoscopic cholecystectomy were included while patients deferred by the anesthetist or undergoing open surgery were excluded from the study.

Preoperative prophylactic antibiotics were given to all patients.

Mainly three port entry procedure was adopted while the classical 4-port approach was also done in a few cases. One port was made just below the umbilicus for the telescope and camera. The other port was made in the epigastrium 4 cm below the xiphisternum for dissection in the callot's triangle and for extraction of gallbladder. The third port was along the right mid-clavicular line above the

level of umbilicus for holding the gallbladder. In some cases where the gallbladder was long and the fundus was obscuring the dissection field another port was formed for holding the fundus

of the gallbladder at level of umbilicus along the right anterior axillary line. Cystic duct was double clipped by titanium clips and cystic artery was either clipped or cauterized (by electrocautery or by harmonic knife).

Drain was put through the right sided port where ooze was suspected in dissection area or in difficult cases. The average operation time was 40 minutes. Three doses of injectable antibiotics were given till the next morning.

Patients were mobilized on the same evening while they were discharged home the next morning or the second day with advice for follow up visit after 7 days to assess the patient for complication.

Result:

A total of 350 patients had laparoscopic cholecystectomy during the study period. Majority (56.4%) of the cases were aged between 21-40 years, 33.33% were in 41 -60 age while 25 patients were below 20 years, 11 patients had age more than 60 years and 87.14% were females

as shown in Table 1..

Table 1: Age and sex of patients (n = 350)

Characteristic	No. of Patients	% age
<i>Age</i>		
< 20 years	20	5.57%
21-40 Years	208	59.42%
41-60 years	112	32%
> 60 Years	10	2.85%
<i>Sex</i>		
Male	45	12.85%
Female	305	87.14%

Table 2 shows the investigation. Routine preoperative investigation were done in all cases, liver function tests (LFTs) were performed in 70 cases who looked jaundiced or had history of jaundice. Serum amylase was done in 5 cases.

Ultrasonography was done in all cases while CT scan was done in 7 cases due to a doubtful mass in the epigastrium(2 cases reported mucocele of GB, 4 cases empyema of GB and one case phlegmone of GB). ERCP (endoscopic retrograde cholangiopancreatography) was done preoperatively in 4 patients who had clinical jaundice and had deranged

LFTs(2 cases reported CBD stone(s) which successfully extracted, while 2 cases were negative). Postoperatively ERCP was done in 2 cases for retained CBD stones in which endoscopic sphincterotomy(EST) and stone extraction was performed.

Also MRCP (Magnetic resonance cholangiopancreatography) was done postoperatively in 2 cases

, one case of postoperative jaundice which reported CBD obstruction due to retained CBD stone, and another case of postoperative biliary leak which reported normal biliary tree and most probably a leak from gallbladder bed(Strasberg type A).

Table 2: Investigations (n = 350)

Investigations	No of Patients	%
Live function tests	70	20
Serum amylase	5	1.42
Ultrasonography	350	100
CT scan	7	2
ERCP	6	1.71
MRCP	2	0.57

Gallbladder was sent for histopathology in all cases, 283 patients reported for follow up with biopsy report. 256 cases were reported as chronic cholecystitis,

27 as acute cholecystitis and none of the cases were reported as adenocarcinoma of gallbladder as shown in table 3.

Table 3: Biopsy report (n = 350)

Histopathology	No. of cases	%
Bladder sent for histopathology	350	100
Report available	283	80.85
• Chronic Cholecystitis	256	73.14
• Acute Cholecystitis	27	7.69
• Adenocarcinoma	0	0

Operative and postoperative complications:

Bleeding during the procedure was the commonest complication as shown in Table 4. Bleeding from trocar site occurred in 21 (6%) cases, from vascular injury in the callot's triangle in 15 (4.28%) and from liver bed in 35 (10%) cases. Port site infection was the second common complication occurred in 20 (5.71%) cases while gallstones spillage occurred in 18 (5.14%) cases where maximum number of stones were retrieved during the procedure. Biliary leak were reported in 15 (4.28%), one patient intraoperative and 14 patients postoperative. In 6 patients it stopped spontaneously on 5th day and on 14th day in 7 patients, among those patients with biliary leak, 6 patients needed percutaneous drainage catheter (under ultrasound guide) for bilioma, while 2 patients needed intervention, one patient with partial tangential CBD injury, discovered intraoperatively and managed by T-tube and another case of severe postoperative pancreatitis and lesser sac

collection managed by explorative laparotomy and drainage.

Bowel injury was not reported in any of cases.

Seven patients developed basal pneumonia postoperatively.

Two patients were developed subphrenic collection and pleural effusion, who needed percutaneous tube drainage.

Common bile duct (CBD) stricture was not reported in any of cases during follow-up. Port site hernia was also a late complication and occurred in 3 (0.85%) cases.

seven (2%) cases out of 350 were converted to open cases due to adherent gallbladder in 2 cases, 3 due to distorted anatomy, one case due to CBD injury and one case due to bleeding during procedure which was uncontrolled with conventional methods.

There was no mortality reported in any of cases.

203 patients reported for follow-up after 2 weeks while 147 were lost to follow-up.

Table 4: Complications (n = 350)

Complications	No. of cases	%
Bleeding trocar site	21	6%
Vascular injury	15	4.28%
Liver Bed	35	10%
Spilled gallstones	18	5.14%
Biliary leak	15	4.28%
Bowel injury	0	0%
Conversion to open surgery	7	2%
Pneumonia	7	2%
Subphrenic collection with	2	0.54%
Pleural effusion		
Pancreatitis	1	0.28%
Port site infection	20	5.71%
Retained CBD stones	2	0.54%
CBD stricture	0	0%
Port hernia	3	0.85%
Mortality	0	0%

Discussion:

Laparoscopic cholecystectomy has virtually replaced conventional open cholecystectomy as the gold standard for symptomatic cholelithiasis and chronic cholecystitis.^{6,7} In acute cholecystitis the reports are scanty and conflicting.⁷

The application of laparoscopic technique for cholecystectomy is expanding very rapidly and now performed in almost all countries. The laparoscopic approach brings numerous advantages at the expense of higher complication rate especially in training facilities.

This study was specially aimed to focus on the different preoperative and other complications of LC. In our study majority (59.4%) of the patients were in the age group 21-40 years while 20(5.57%) were less than 20 years of age mainly children with hemolytic anemia referred by pediatrician for elective cholecystectomy.

87.14% were females. However in a study of LC in acute cholecystitis the mean age was 43.7 years with a female to male ratio of 4.5:1.7 In another study of 281 cases of LC there were 140 men and 141 women with a mean age of 56.9 years (range 23-89 years).⁸

Curro et al, recommend elective early LC in children with chronic hemolytic anemia and asymptomatic cholelithiasis in order to prevent the potential complications of cholecystitis and choledocholithiasis which lead to major risks, discomfort and longer hospital stay.⁹

We used the three port approach for LC in 311 (88.6%) of our cases while classical 4-port approach was also used in the remaining difficult cases. However recently a two port needlescopic cholecystectomy using all 3 mm miniaturized instruments is considered feasible and may further improve the surgical outcomes in terms of pain and cosmesis.¹⁰

In our cases we used, direct trocar insertion without pneumoperitoneum in majority of cases, while we used the veress needle for creating pneumoperitoneum in some cases.

Direct trocar insertion in one of the studies on LC, pneumoperitoneum was shown to

be safe, efficient, rapid and easily learned alternative technique, reducing the number of procedure related complications.¹¹

The reported incidence of injuries from trocars or veress needle is up to 0.2%. Bile duct injury is a severe and potentially life threatening complication of LC and several studies report 0.5% to 1.4% incidence bile duct injuries.¹²

Cystic duct leak is an infrequent but potentially serious complication of LC and can be reduced by using locking clips instead of simple clips.

In our series bile duct injury was minimum and biliary leak occurred in only 15 (4.28%) cases. In 6 cases the leak stopped after the 5th day of operation without any intervention and on 14th

day in 7 patients, among those patients with biliary leak, 6 patients needed percutaneous drainage catheter (under ultrasound guide) for bilioma. while 2 patients needed intervention, one patient with partial tangential CBD injury, discovered intraoperatively and managed by T-tube and another case of severe postoperative pancreatitis and lesser sac collection managed by explorative laparotomy and drainage.

Vascular injury was encountered commonly in our series. There were 21 (6%) cases of trocar site bleeding, of these 18 cases were controlled with pressure alone while 3 cases required port site exploration and ligation of vessels. Vascular injury in the Callot's triangle during dissection occurred in 15(4.28%) cases and in 14 cases bleeding was controlled with clip application while in one case was converted to open cholecystectomy

(0.28%). Liver bed bleeding was controlled with either diathermy or clips while drain was put in most of cases. Only few data are available on the real incidence of bleeding complication from the liver however in a meta-analysis by Shea, 163 patients out of 15,596 suffered vascular injury required conversion with a rate of 8%.⁵

Concomitant vascular injuries during LC increase the overall morbidity.

Spillage of gallstones into the peritoneal cavity during LC occurs frequently due to

iatrogenic gallbladder perforation and may be associated with complications, and every effort should be made to remove spilled gallstones but conversion is not mandatory.

15-17 Incidence is estimated between 10% and 30%.

5 Abscess and fistula formation in the abdominal wall after stone spillage has been reported.¹⁶

In a retrospective study from Switzerland, only 1.4% of patients with spillage of gallstones during LC developed serious postoperative complications.⁵

In our study gallstone spillage occurred in 18(5.14%) cases and maximum number were retrieved during the procedure, and no postoperative complications due to spilled gallstones was recorded. Port site infection occurred in 20(5.71%) cases and were treated with antibiotics daily dressings and debridement. Significant reduction in the postoperative infection is one of the main benefits of minimally invasive surgery as the rates of surgical site infection is 2% versus 8% in open surgery.¹⁸ In another study it is reported as 1.4% in laparoscopic surgeries versus 14.8% in open cases.¹⁹

Bowel injuries incidence in LC is 0.07-0.7% and most probably occur during the insertion of the trocars, seldom during dissection or adhesiolysis and they often remain undetected during operations.⁵

There was no reported case of bowel injury in our study. Intestinal ischemia and small bowel evisceration after LC have also been reported.

20,21 Bowel injury can be prevented by trocar placement under direct vision and inspection of abdomen before withdrawing laparoscope.⁵

In our study LC was converted to open surgery in 7 (2%) patients. In 2 cases the gallbladder was adherent, only one case of vascular injury during LC where bleeding could not be controlled with routine methods, and was converted to open, while in 3 cases with disturbed anatomy. Only one case of tangential CBD injury was reported as a cause of conversion. Tayab M et al, in their study identified two preoperative risk factors for conversion, ultrasonographic signs of inflammation and age more than 60 years.²² Al Salamah, has reported disturbed anatomy in the

region of Callot's triangle as the most common cause of conversion observed in 41.5% of converted cases while male gender, age over 65 years, high leukocytes count, gallbladder wall thickness more than 4 mm on USG were observed as the most significant determinants for conversion to open procedure.⁷ A conversion rate of 1.88% has been reported in a series of 1220 patients from a single center.²³

Bile duct injury during LC is a dreaded complication and may lead to post LC benign biliary strictures after few months, increasing the morbidity and mortality related to the procedure.

24 Late postoperative strictures are usually the result of biliary reconstruction for injuries after cholecystectomy or excessive use of electrocautery near CBD.²⁵

There was no reported case of CBD stricture in our study during the period of follow-up.

Other minor complications in our study were Portsite hernia in 3 cases, one at epigastric site and 2 at umbilical port site. Repair was done at an interval of 4-6 months. Holes greater than 5 mm diameter should be closed at fascial level and also removal of gallbladder from epigastric hole is important to prevent enlargement of umbilical port.²¹

In all cases we did remove gallbladder from epigastric hole.

Mortality was fortunately NIL in our series. Others have reported a morbidity of 2.9% with no mortality.⁷

Seven of our patients developed basal pneumonia and were treated with antibiotics and chest physiotherapy.

Two of our patients had got right subphrenic collection with right sided pleural effusion that needed percutaneous tube drain. Average hospital stay was 2 days in our study while it has been reported as 2.29 days including the prolonged stay in complicated cases in a study from a single center by Vagenas K et al.²³

In spite of the above mentioned complications, the overall outcome was satisfactory, with better patient acceptance of the procedure.

Conclusions:

LC is one of the most frequently performed laparoscopic operations. It has a low rate of mortality and morbidity. LC is a safe and effective procedure in almost all patients presenting with cholelithiasis. Most of the complications are due to lack of experience or knowledge of typical error. A rational selection of patients and proper preoperative work up as well as knowledge of possible complications, a low threshold for conversion, in combination with adequate training makes this operation a safe procedure with favorable results.

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