

COMPLICATIONS OF LAPAROSCOPIC CHOLECYSTECTOMY: AN ANALYSIS OF 400 CONSECUTIVE CASES

Muhammad Afzal, Shafqat Rehman*, Muhammad Qasim Butt*

Combined Military Hospital Lahore, *Combined Military Hospital Kohat

ABSTRACT

Objectives: To analyze the complications of first 400 laparoscopic cholecystectomies (LC) for patients with symptomatic gall stone disease at a tertiary care hospital.

Study Design: Quasi-experimental study.

Place and Duration of Study: PNS Shifa Karachi and CMH Lahore, Pakistan from Nov 2009 to Jan 2013.

Patients and Methods: A prospective analysis of complications occurring in first 400 consecutive laparoscopic cholecystectomies by a single consultant/unit at a tertiary care hospital was made. Out of total 421 patients presenting with symptomatic gall stone disease in a single unit, 21 cases that underwent open cholecystectomy were excluded from the study. Laparoscopic Cholecystectomies were performed using three port and four port technique and data including age, sex, diagnosis, number of trocar placements, conversion to open surgery and its reasons, operative time, post-operative hospital stay and complications was collected on personal computer and analyzed using Statistical package for social sciences (SPSS) version 13.

Results: Total 400 patients were included in study with median age of 44years. Female to male ratio was 5.3: 1. Depending upon the preoperative diagnosis and laparoscopic findings, patients had diagnosis of Chronic cholecystitis / biliary colic 68.25%, acute cholecystitis 23.75%, empyema gall bladder 7.25%, gallstone pancreatitis 0.5% and mucocele gallbladder 0.25%. Median operating time was 30 min. Median hospital stay was 1days (range 1 – 20 days). Conversion rate was 1.25%. Postoperative complications included bleeding 0.5%, biliary peritonitis due to cystic duct leak 0.25%, biloma 0.25%, sub hepatic abscess 0.25%, subcutaneous fat necrosis right flank at drain site 0.25%, umbilical trocar site infection 2%, keloid at umbilical port site 0.25% and incisional hernia at umbilicus 0.25%. There was one hospital death due to myocardial infarction on 2nd post-operative day.

Conclusion: Laparoscopic Cholecystectomy is associated with some serious complications which can be avoided with adequate training of surgeons as well as knowledge of mechanism of typical complications.

Keywords: Bile duct injury, Complications, Laparoscopic cholecystectomy.

INTRODUCTION

Cholecystectomy is one of the most commonly performed abdominal surgical procedures, and in developed countries many are performed laparoscopically. Ninety percent of cholecystectomies in the United States are performed laparoscopically¹. Laparoscopic cholecystectomy is considered the "gold standard" for the surgical treatment of symptomatic gallstone disease². This procedure results in less postoperative pain, better cosmesis, shorter hospital stay and early return to work

than open cholecystectomy³. Although LC is a procedure of choice for treatment of gallstones due to its advantages, but it is sometimes associated with serious and life threatening complications. Many complications of LC are similar to those occurring during traditional Open Cholecystectomy (OC) such as hemorrhage, bile leak, bile duct injuries, missed stones, acute pancreatitis, wound infections and incisional hernias at trocar site. The risk of intraoperative bile duct injury during laparoscopic cholecystectomy is higher than in open cholecystectomy⁴ but it is anticipated that this will decrease with experience of surgeons. Similarly the spectrum of complications in gallstone surgery has also changed: typical minimally invasive surgery-related complications

Correspondence: Brig Muhammad Afzal, Dept. of Surgery, CMH Peshawar

Email: afzal_7@yahoo.com

Received: 23 May 2013; Accepted: 14 Feb 2014

due to trocars such as vascular and bowel injuries, complications associated with the pneumoperitoneum, as well as procedure-related complications, have raised morbidity to 2.9%⁵. The spectrum of mishaps has also changed, due to the involvement of new instruments such as stapling devices, coagulation shears and sealing systems⁶. Complications like migrating clips⁷ or stenosis of the common bile duct (CBD) due to a wrongly applied clip were completely unknown in open surgery. Recently, an unreported case of duodeno-cutaneous fistula has been seen due to a wrongly placed clip to the wall of duodenum.

This study presents a 3 years' experience of laparoscopic cholecystectomy with special emphasis to the pattern of complications and morbidity related to this procedure.

PATIENTS AND METHODS

This prospective study was carried out at surgical department, PNS Shifa Karachi and CMH Lahore over a period of three years from November 2009 to January 2013. Patient selection for LC was based upon clinical diagnosis, findings of ultrasound examination, laboratory investigations and anesthetist's assessment. All patients with symptomatic gallstones, acute cholecystitis and empyema gallbladder were included. Patients with upper abdominal surgery, perforated gallbladder with abscess formation, cholecystocoduodenal fistula, and preoperative diagnosis of carcinoma gall bladder, cardiopulmonary disease, equipment failure and those with choledocholithiasis were excluded from the study. Out of 421 cases with symptomatic gall stones, 94% were laparoscopic cholecystectomies and 6% underwent open cholecystectomy. Hypertension, diabetes mellitus, hypothyroidism, and ischemic heart disease were the most common co-morbidities. Laparoscopic cholecystectomy was performed by using single chip camera and later, high definition camera by Karl Storz. Pneumoperitoneum was established by closed method using Veress needle in 80% cases, or open technique in 20% cases. Number of trocars

used for LC was three (83%) or four (15.8%). SILS was used in only 1.2% of cases. Majority of LC were performed by using a modified three port technique called sectorization rather than triangulation with 10 mm umbilical camera port, a 5mm dissecting port 4-5 cm below xiphoid sternum and a third 5mm port in left rather than right midclavicular line 10-15 cm away from umbilicus for holding Hartmann's pouch in most of the cases. Fourth port for holding fundus of gall bladder was used only in a few difficult cases with very long gall bladder. Drains were placed in few cases where bile leak or bleeding was suspected. Three doses of injectable antibiotics were given in all cases. All cases were mobilized the same evening and those without complications were discharged next morning. Data was collected on computer and analyzed using SPSS version 13. The collected data included age, sex, diagnosis, number of trocar placements, conversion to open surgery and its reasons, operative time, post-operative hospital stay and postoperative complications. Follow up was done on 5th, 10th and 30th day. All the patients were asked to report to the author's OPD in case of any late complications after 30th day of operation.

RESULTS

Total 400 patients with gallstones underwent laparoscopic cholecystectomies in the study period. The age of patients ranged from 9 years to 78 years with median age of 44 years. Out of 400 cases 84.3% (n=337) were female and 15.7% (n=63) were male with female to male ratio 5.3: 1. Depending upon the preoperative diagnosis and laparoscopic findings, patients had diagnosis of Chronic cholecystitis / biliary colic 68.25% (n=273), acute cholecystitis 23.75% (n=95), and empyema gall bladder 7.25% (n=29). There were two cases with gallstone pancreatitis and one with mucocele gall bladder. Post operatively, two cases were diagnosed as carcinoma gall bladder on histopathology. A rare case having situs inversus, cholelithiasis and acute appendicitis underwent laparoscopic surgery. Most common co-morbidities were hypertension 8.5% (n=34),

combined diabetes mellitus and hypertension 3.5% (n=14), diabetes mellitus alone 1.75% (n=7), ischemic heart disease 1.5% (n=6), para-umbilical hernia 1.25% (n=5), acute pancreatitis 0.75% (n=3) and Cirrhosis, hypothyroidism and hyperthyroidism 0.25% (n=1) each. The operating time from skin incision till the closure of wound, ranged from 15 to 120 minutes with median time 30 min. Median hospital stay was 1 day (range 1 – 20 days). Conversion rate was 1.25% (n=5). Reasons for conversion were bleeding from cystic artery (n=2), liver bed bleeding (n=1), CHD injury (n=1) and cholecystoduodenal fistula (n=1). Postoperative complications included bleeding 0.5% (liver bed n=1, omentum n=1), biliary peritonitis due to cystic duct leak 0.25% (n=1), intra-abdominal collection/abscess 0.5% (biloma n=1, subphrenic abscess n=1), subcutaneous fat necrosis right flank around drain site 0.25% (n=1), umbilical trocar site infection 2% (n=8), keloid at umbilical port site 0.25% (n=1) and incisional hernia at umbilicus 0.25% (n=1) as shown in fig. There was one hospital death due to myocardial infarction on 2nd post-operative day.

DISCUSSION

Laparoscopic cholecystectomy is the procedure of choice for majority of patients with symptomatic gallstones disease. In our study 94% patients had LC and 6% OC which is in consistent with other studies¹. With advances in laparoscopic instruments and technique refinements this procedure is getting safer and safer and morbidity and mortality is decreasing day by day. Some of serious complications related to LC are discussed. In 2.5% to 14% of cases conversion of LC to OC is needed⁸⁻¹⁰ due to massive bleeding, bile duct injuries, obscure anatomy, bowel injuries and cholecystoduodenal fistula although surgeons do not consider it a complication. In this study, conversion rate was 1.25%. Bleeding is one of the commonest complications of LC. Overall incidence of uncontrolled bleeding during LC is 0.1% to 1.9%. and can occur from three sites i.e., 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 patients⁸ and from injury to vessels especially cystic artery which has high association with right hepatic arterial injury. Bleeding from trocar insertion site usually occurs after removal of trocar when pneumoperitoneum is reduced. It is recommended that removal of trocars should be done under vision after reducing pneumoperitoneum. Incidence of major vascular injury involving aorta, iliac vessels, vena cava, inferior mesenteric arteries and lumbar arteries is 0.07%–0.4%⁹. The mortality rate due to bleeding is 0.05%–0.2%¹⁰. In our study, frequency of uncontrolled bleeding was 1.25%. In two cases intraoperative bleeding occurred from cystic artery injury and in another case there was continued oozing of blood from liver bed; these three cases were converted to open cholecystectomy. In 4th case, bleeding occurred from omental injury during trocar insertion which was missed during operation unfortunately. Patient presented with acute abdomen on 1st post op day and laparotomy had to be performed to identify and manage the cause. Another case presented with haemoperitoneum two weeks postoperatively and laparotomy revealed oozing from liver bed due to undiagnosed coagulopathy. There was no major vessel injury in our series.

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. Incidence can be reduced by using locking clips¹¹. Problem is usually suspected whenever there is delay in recovery or there is uncommon post-operative course. Ultrasonography, MRCP, ERCP and PTC will usually help in identifying the complication and its location¹². Frequency of bile leak in our study was 0.5% (n=2). First case presented with biliary peritonitis on 1st post-operative day and laparotomy revealed slippage of clip from cystic duct stump. Second patient presented with sub-hepatic collection on 8th post-operative day and exploratory laparotomy was done for biloma and

cause could not be identified. Peritoneal lavage was done and patient made uneventful recovery.

Major bile duct injury is 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 case¹³. 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 injuries¹⁴. Most of these lesions are diagnosed postoperatively, usually later than in open cholecystectomy. This is a major problem because besides surgeon's experience, early diagnosis and primary repair gives the best results¹⁵. We recommend availability of intra-operative cholangiogram at all laparoscopic centers especially during the learning curve of surgeons for the early diagnoses of all such injuries. In our study, we had only one case (0.25%) of common hepatic duct (CHD) injury due to an accidental tear in its anterior wall which was identified preoperatively and a T tube was placed laparoscopically. However case was converted to open to ascertain the exact nature of injury. Our incidence of bile duct injury is at par with other studies. Late post-operative strictures result from excessive use of diathermy near the CBD or following biliary reconstructions for injuries during cholecystectomy¹⁶. We did not get any case of post-operative biliary stricture in our study.

Bowel injury usually occurs during trocar insertion and rarely during dissection of adhesions or with diathermy. Incidence is 1 to 4 per 1000 laparoscopic cholecystectomies¹⁷. Injuries that are identified per-operatively or those presenting with acute abdomen in post-operative period are managed by laparotomy and primary repair. Alternatively, in cases where the presentation is more indolent and controlled, standard enterocutaneous fistula management with nutritional support and adequate drainage

and wound care is also appropriate. There was no case of bowel injury in our study.

Spilled gallstone is relatively common complication in LC. Estimated incidence is 10% and 30%¹⁸. However, most of the cases remain silent. Rarely these stones present with secondary

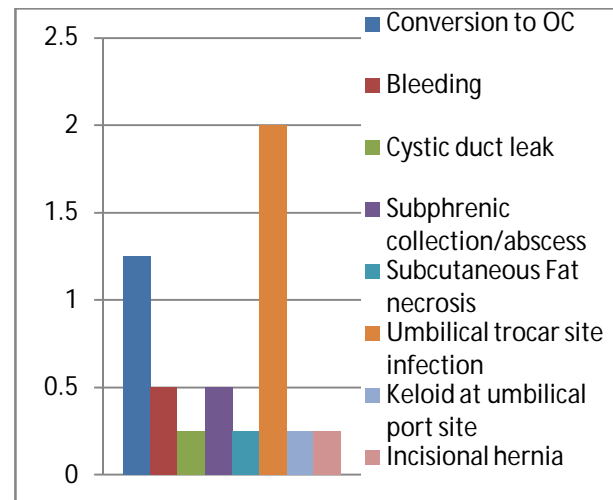


Figure: Showing different complications of laparoscopic cholecystectomy in present study.

complications. The most frequent one is intra-abdominal abscess formation followed by abdominal wall infection or permanent sinus¹⁹. Some other serious complications reported in the literature are small bowel obstruction²⁰, incarceration in a hernia sac²¹ and trans-diaphragmatic migration that results in pleural empyema or expectoration of bile and pus²². In our study, no secondary complication of stone spillage was seen. Port site hernia is another complication which was seen in one case (0.25%) in our study. Herniation occurred on 3rd post-operative day through umbilical port site due to excessive coughing. Extraction of gallbladder through epigastric port reduces the incidence of port site hernia by preventing the enlargement of umbilical port²³.

One of the advantages of minimally invasive surgery is reduced post-operative wound infection i.e., 2% as compared to 8% in open cholecystectomy²⁴. Frequency of port site

infection in our study was 2% (n=8). All eight cases of port site infection were managed with wound toilet, drainage and daily dressings with appropriate antibiotics. In our study there was one case of subphrenic abscess for which laparotomy was done. One case developed subcutaneous fat necrosis right flank around the drain site.

In the present study, all major postoperative complications five in number including hemorrhage (1%), bile leakage (1%) and suspected acute peritonitis (0.5%) requiring reoperation occurred during first 100 consecutive laparoscopic cholecystectomies. Only one patient had undergone reoperation during last 300 consecutive laparoscopic cholecystectomy procedures. Laparoscopic cholecystectomy has reduced the hospital stay and is being performed as outpatient procedure due to easy and less painful recovery. In this study, the average hospital stay was 1.2 days which ranged from 1 to 20 days. This study clearly showed that laparoscopic cholecystectomy can be performed safely and effectively. This indicates that all cases of gallstones either complicated or not can be treated laparoscopically and complication rate is reduced by the increased experience and skills of the surgeon.

CONCLUSION

Laparoscopic cholecystectomy is associated with some very serious complications to the patient which were completely unknown during the era of open cholecystectomy. However adequate training of surgeons as well as knowledge of mechanism of typical complications with low threshold for conversion to open makes it effective and safe procedure with low morbidity and mortality.

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