Research Article

Study of laparoscopic cholecystectomy in rural hospital

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ABSTRACT

Background: Laparoscopic cholecystectomy is the preferred mode of treatment for gall stone diseases. This study is the audit of 125 laparoscopic cholecystectomy done in our institute between year 2013 to year 2014. In laparoscopic cholecystectomy common bile duct injuries were more common than open surgery. Objective of this study is to find out intra and postoperative complications in laparoscopic cholecystectomy and to find the reasons for conversion to open cholecystectomy.

Methods: This is the retrospective study of standard four port laparoscopic cholecystectomy done during year 2013 to year 2014 in our institute. The result and complications of laparoscopic surgery were documented in audit form for each laparoscopic cholecystectomy and at the end the results are analyzed.

Results: There were no common bile duct injury in our study of 125 cases and we had 5.6% conversion to open cholecystectomy due to various reasons discussed in the paper. There were no cases of postoperative abdominal abscess, port site hernia, common bile duct stricture or mortality in our study. One patient with cystic duct leak was managed successfully with post-operative endoscopic sphincterotomy and stenting of common bile duct.

Conclusions: Laparoscopic cholecystectomy as treatment of choice is associated with high success rate at our institute with added benefits of minimal invasive surgery. Our results are comparable to international standards. Critical view of safety is an essential prerequisite for prevention of bile duct injuries.

Keywords: Gall stones, Laparoscopic cholecystectomy, Calculus cholecystitis

INTRODUCTION

Carl Langenback performed first successful removal of gall bladder for gall stone diseases.¹ Since then for many years open Cholecystectomy was the treatment of choice for gall stone diseases. Erich Muhe (Germany) did first laparoscopic cholecystectomy on 12th September 1985.² First documented laparoscopic cholecystectomy using keyhole approach was by Mouret in Lyon France.¹ Since then laparoscopic cholecystectomy has become the modality of choice for gall stone disease.

Laparoscopic cholecystectomy had less recovery time, less postoperative pain and minimal scar. But laparoscopic Cholecystectomy requires the surgeon to work with two dimensional visions without tactile

perception of the tissues. This has resulted into 0.4 to 0.6% bile duct injuries reported in various reports. Open Cholecystectomy is associated with 0.1 to 0.3 % common bile duct injuries.³ There are inherent complications of laparoscopic access and dissections which cause Intraoperative and postoperative complications.

This is our retrospective study of laparoscopic Cholecystectomies for symptomatic cholelithiasis in 125 operated patients. This retrospective study was done between years 2013 to 2014.

The objectives of the study were to find Intraoperative and postoperative complications of laparoscopic Cholecystectomy within 30 day of follow-up.

Other objective was to find out safety of laparoscopic Cholecystectomies in rural setup with lack of endoscopic retrograde cholangiopancreatography to deal with common bile duct intervention for stone and common bile duct injuries in postoperative setup endoscopically.

METHODS

Qualified laparoscopic surgeons were doing laparoscopic surgery in our institute. It is essential that all surgical team members including nursing staff is adequately trained in laparoscopic surgery. Data was collected after duly recording the data of each surgery in audit form pre, intra, and post operatively.

All symptomatic patients with gall stone disease operated with laparoscopic cholecystectomy were included in study. Exclusion criteria were patients unfit for general anesthesia, patients with significant portal hypertension, uncontrollable coagulopathy and gall bladder carcinoma.

Primary indications for elective laparoscopic Cholecystectomy were biliary colic, dyspepsia due to gall stone disease and polyp of gall bladder. Patients with jaundice and cholangitis due to common bile duct stone, dilated common bile duct along with gallstone had endoscopic retrograde cholangiography with stenting, prior to laparoscopic cholecystectomy in delayed setting. Patient with gall stone pancreatitis also had laparoscopic cholecystectomy in delayed setting. Few patients with acute calculus cholecystitis had surgery within 72 hours.

All patients underwent routine blood investigations along with liver function tests, alkaline phosphatase and serum amylase, lipase as required. Cardiopulmonary status was assessed and anesthesia fitness was taken prior to laparoscopic cholecystectomy.

All patients were lying supine on OT table with right-hand tucked by the side of body and left-hand 90 degree to the body. Surgeon stands to the left of patient, first assistant by the side of surgeon holding camera. Second assistant stands to the right of patient with the scrub nurse by the side of trolley. Monitor was placed at the right side of patient near head end. Nasogastric tube was placed in the stomach to deflate it.

All laparoscopic Cholecystectomies were performed with four ports. Two 10mm and two 5mm ports were used. One 10mm umbilical camera port, epigastric 10mm working port for surgeons right hand, 5mm working port for surgeons left hand just below right midclavicular line for infundibular manipulation (superior and media for posterior dissection of callots, inferior and lateral for anterior dissection of calot's) and 5 mm port at right anterior axillary line just below costal margin. Surgeon does the surgery by two hand technique with second assistant giving traction to fundus and pushes the Gall bladder over the liver towards right shoulder opening the sub hepatic space exposing infundibulum of the Gall

bladder. Patients were given reverse trendelenberg position 20 to 30% with right side up. We had used 30 degree Karl storz telescope for viewing. Third and fourth 5mm ports were 8 to 10 cm apart. Epigastric trochar directed towards calot's triangle to the right of falciform ligament.

Adhesions of liver to anterior abdominal wall were released, before sharp dissection close to gall bladder to separate adhesions from fundus, body and infundibulum. Minimal cautery (monopolar 2 to 3 second's short bursts of energy of less than 30 watts) was used for dissection. We have used Maryland dissector or hydro dissection for upper part of hepatocystic triangle dissection and then cystic plate is dissected so as to obtain critical view of safety. In almost all cases calot's dissection was done before body and fundus separated from liver bed. The dissection was well above Rouviere's sulcus as described by Strasberg's. Double titanium clips (LT 300) for cystic duct and artery were used for clipping before cutting it.

Average postoperative stay for laparoscopic cholecystectomy was three days. Those who required open conversion were hospitalized for 7 to 10 days. Epigastric port was used for extraction of gall bladder in most. Some with thick gall bladder wall or with large stone we had used umbilical port for extraction of gall bladder.

We closed 10 mm port with vicryl no. 1 suture. Skin was closed with 2.0 ethilone.

RESULTS

Our patients were between 11 years to 72 years. Symptomatic gallbladder disease was more common in females with 86 patients (75%) and 29 male (25%) patients as shown in Figure 1.

Figure 1: Showing sex distribution of patents.

Primary indication for surgery was biliary colic and 27 patients had accompanied dyskinetic symptoms. Two patients had jaundice, 5 patients came for acute cholecystitis with fever and tachycardia, and two patients required surgery for polyp as shown in Figure 2.

Figure 2: Indications for cholecystectomy.

All patients were diagnosed with calculus disease by ultrasonography and in very few patients Computer tomography or Magnetic resonance cholangiopancreatography was used. 95 patients (76%) had thin gallbladder wall less than 2mm and 30 patients (24%) had thick wall more than 2mm on ultrasonography.

Laparoscopic cholecystectomy was elective in 118 patients (94.4%), 6 patients (4.8%) underwent delayed cholecystectomy (2 to 6 weeks after acute cholecystitis or after common bile duct stenting for stone removal or dilated duct) and one had early cholecystectomy (0.8%).

Cusheri's degree of difficulty was used during surgery to know the degree of difficulty in dissection as shown in following Figure 3.⁴

Figure 3: Cusheri's degree of difficulty in dissection.

Intraoperative complications like bile leak and stone spill due to gall bladder puncture during dissection were managed laparoscopically. Intraoperative complications like bowel injury during laparoscopic access (1 case), uncontrollable bleeding from calot's triangle (1 case), obscure anatomy in calot's triangle (1 case), and four

cases of frozen hard calot's required conversion to open for safe completion of surgery (partial or total cholecystectomy).

None of the patients in our study required common bile duct exploration during laparoscopic cholecystectomy. In 47 cases (37.6%) there was good homeostasis and no bile leak visible intraoperative and those cases were managed without drain. When there was bile spill during gall bladder dissection we used no. 14 Ryle's tube to drain sub hepatic region. In total 73 cases (62.2%) we had used drain only for initial 2 days. There were 4 cases (3.2%) with epigastric port site infection. We had no mortality in postoperative period.

No patient had postoperative common bile duct injury, common bile duct stricture or port site incisional hernia after one year follow-up.

Figure 4: Causes of open conversion of laparoscopic Cholecystectomy.

DISCUSSION

Cholelithiasis is the most common biliary pathology. Gall stones are present in 4% of the general population in India and are asymptomatic in the majority of them, of about more than 80%.⁵ Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy every year, making it one of the most common operations performed.

In 1992 the national institute of health consensus development conference stated that laparoscopic cholecystectomy "provides a safe and effective treatment for most patients with symptomatic gallstones".⁵

All though there are many documented advantages for laparoscopic cholecystectomy, but there are still concerns about its possible complications which are attributed to surgeons experience and training in laparoscopic surgery, quality of laparoscopic equipment, two dimensional vision and lack of tactile perception.

Failure of operating surgeon to identify anomalous anatomy in cholecystohepatic triangle is the major cause

of complication in laparoscopic surgery, because the classical biliary anatomy occurs only in 30% individuals.¹ It is utmost important that the surgeon should be vigilant during dissection of calots triangle and should have good knowledge of the anatomy and the various anomalies.

Cystic duct may join common bile duct at the acute angle, travel parallel to common bile duct for several centimeters, insert into the right hepatic duct or congenitally absent. Most challenging consideration is short cystic duct, for it is in this setting the common bile duct is most likely injured. Rarely right hepatic duct arises off the cystic duct.^{1,6}

Cystic artery arises from right hepatic artery, one must be absolutely sure that the cystic artery is visualized entering the gall bladder wall and is controlled near the gall bladder. Right hepatic artery may loop onto the surface of gall bladder and there may be very short cystic artery, if dissection is incomplete then there is likelihood of ligation right hepatic artery. There may be early branching of cystic artery with the other branches often found in a posterior location, occasionally cystic artery is found to the right of the cystic duct.¹

Common bile duct begins at the junction of cystic duct and common hepatic duct and traverses inferiorly to the ampulla of vater, normally 6mm diameter.

Hepaticocystic triangle is an important imaginary reference for laparoscopic cholecystectomy. It is bounded by common hepatic duct, cystic duct and inferior surface of liver and its significance is cystic artery arises with in this triangle.⁶ Blunt dissection of fibro fatty tissue in the upper part of hepaticocystic triangle which does not contain arterial and biliary anomalies and is ideal for a safe dissection in less experienced hands. If required cystic plate should be dissected before dissection in hepatocystic triangle. Sticking to critical view of safety approach can help in reducing misidentification of ductal and arterial anomalies in calots triangle.^{7,8} Calot's triangle is bounded by common hepatic duct, cystic duct and the cystic artery and is the component of hepaticocystic triangle.⁶

Accessory hepatic ducts or small bile duct may enter the gall bladder directly from its bed. There are small biliary radicals in the superficial liver parenchyma of the gall bladder bed; if these ducts are damaged they may cause postoperative bilioma.

So some patients with obscure anatomy may need Laparoscopic ultrasound for mapping biliary and vascular anatomy and is superior to operative cholangiogram. (From infundibulum or cystic duct).⁹ Literatures also mentions that Intraoperative cholangiogram is ineffective at lowering the rate of biliary injuries.⁹

Surgeon must be cautious in avoiding injury to the hepatic artery or right hepatic duct while dissecting distal

superior edge of the gall bladder away from the liver; surgeon should start dissection high on the gall bladder infundibulum with the goal of safe exposing and identifying infundibular cystic junction. The surgeon should avoid initial dissection low on the gall bladder because it has high chances of vital structure injury including common bile duct.¹⁰

In cases of severe inflammation, it is often helpful to divide the inflamed and fibrotic gallbladder along the superior and inferior margins of infundibulum before further dissection, allowing for better mobilization and retraction of the infundibulum and hence safer dissection of infundibular cystic junction.¹⁰

Sometimes top to down dissection (fundus first) should continue until critical infundibular cystic junction view is obtained. Dissection is only considered satisfactory when complete and unobstructed 360 degree view of infundibular cystic junction is obtained and it is seen that only two definite structures (cystic duct and artery) are seen entering gallbladder.¹⁰

If appropriate dissection has not resulted in a certain and critical view of safety, it is imperative to abort the laparoscopic procedure and convert to an open operation. Goal should be safe and uncomplicated removal of gallbladder. So conversion to open procedure in given situation is a mark of mature and safe surgeon.

In patients with acute cholecystitis, the reported incidence rate of common duct stone is as high as 18% and also there is increased incidence of ductal stones.¹⁰ That is reason of increased incidence of complications in laparoscopic cholecystectomy in acute situation. If the surgeon notices cystic ductal stone during surgery, he should manipulate it into gallbladder.

We had overall 5.65% conversion to open cholecystectomy which is comparative to other published literature which is around 1.95 to 13% and we could achieve zero common bile duct injury.¹¹⁻¹⁴ Out of 7 patients who required open surgery 4 were male and 3 females. So male patients had overall more conversion rate than female patient, which is consistent with other reports.¹¹⁻¹⁴

Four patients had frozen calot's triangle due to chronic inflammation which needed conversion to open surgery similar to other published literature.¹¹⁻¹⁴ It was seen that conversion was more in elderly patients. Other reasons for converting to open surgery were gastrointestinal perforation during dissection (one patient), calot's triangle bleeding (one patient) and obscure anatomy (one patient).

Injury to main bile duct is more frequent with laparoscopic cholecystectomy in many published reports, but in our study there is no main bile duct injury.^{15,16} One of our patient had cystic duct leak which was managed with postoperative endoscopic spincterotomy and stent

placement in common bile duct. Cystic duct leaks were found more frequent with laparoscopic cholecystectomy than open cholecystectomy in other reports which was consistent with our study.¹⁷ One should be cautious because most of the bile duct injuries are not visible Intraoperative and they present in postoperative period.

CONCLUSION

Laparoscopic cholecystectomy is the treatment of choice for symptomatic cholelithiasis and is associated with high success rate at our institute. Our results are similar to other published literature. Critical view of safety is an essential prerequisite for prevention of bile duct injuries.

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