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Original Research Article

Patterns of complications and outcome of laparoscopic cholecystectomy

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ABSTRACT

Background: Cholelithiasis is known to be one of the most common biliary pathologies. Laparoscopic cholecystectomy is the gold standard for the removal of the gallbladder, because of its cosmetic benefit, short stay, cost-effective and lesser side effects. But no procedure is immune to complications and other procedure-related side effects. The present study was conducted to study the patterns of complications and outcome of laparoscopic cholecystectomy.
Methods: the present study was conducted prospectively on patients undergoing laparoscopic cholecystectomy for symptomatic gall bladder pathology. the patients undergoing laparoscopic cholecystectomy were distributed and analysed on various parameters i.e. age, sex, ultrasound abdomen findings, complications related to access, per-operative condition of gallbladder, per-operative and postoperative complication.
Results: In our study cases major complication rate 1% leading to biliary stricture for which hepaticojejunostomy was done, minor complication rate 11% and conversion to open cholecystectomy rate 2%.
Conclusions: It is concluded that laparoscopic cholecystectomy is the safe and standard procedure for the laparoscopic cholecystectomy and its major complication are preventable by strictly following the basic principles of laparoscopic cholecystectomy and keeping a low level of the threshold for converting to open cholecystectomy.

Keywords: Early recovery, Low complication, Safe laparoscopic cholecystectomy

INTRODUCTION

Cholelithiasis is one of the most common biliary pathologies and cholecystectomy is the standard treatment for that. A safe cholecystectomy means that it is safe for both patients i.e. in case of any hollow viscus organ injury any bile duct injury and for doctors also (no or minimum scope of any litigation.[1] The minimally invasive surgery, now turned into minimal access surgery has prompted us to scrutinize nearly all operations for the possible conversion to the laparoscopic technique.. The aim is to accomplish the surgical therapeutic goals with minimal somatic and psychological trauma. Minimal access surgery has reduced the wound access trauma. It is more cosmetic than the conventional technique. With increasing trend of laparoscopic cholecystectomy there has been significant increase in injury to bile duct ranging from 0.3-0.6%.[2] To prevent this a better assessment of the CBD before laparoscopic cholecystectomy using USG and biochemical measurements is highly specific. The pre-operative assessment of CBD by LFT, CBD diameter by USG before laparoscopic cholecystectomy removes the need for any routine operative cholangiography.[3]

With increasing experience, laparoscopic cholecystectomy offers cost-effectiveness both to health services and to employers by shortening the stay at the hospital, shortening the operative time and faster recovery.[4]

METHODS

A prospective study was conducted on 100 patients with symptomatic gallbladder stones documented on ultrasonography undergoing laparoscopic cholecystic-tomy, all the patients selected were on random basis. The study was conducted from January 2018 till October 2018 at Rajindra Hospital, Patiala and this study was approved by ethical research committee of institution.

Inclusion criteria

Patients with symptomatic gall bladder stones with no biochemical, clinical and ultrasonographic evidence of common bile duct stones or gall bladder mass.

Exclusion criteria

Patients with any medical illness which makes the patient unfit for surgery, patients with jaundice, pregnancy, acute pancreatitis, acute cholecystitis, gall bladder mass and stone in CBD.

A four-port laparoscopic cholecystetcomy was conducted under general anaesthesia. Intraoperative annalysis was done during the procedure to check for any complications related to procedure. Postoperative nausea, vomiting, fever, pain, abdominal discomfort, ileus, bleeding from port-site, post-operative bile leak, wound hematoma, chest infections were observed. The patients were followed up on the seventh day when stitches were removed, any persistent pain, infection, biliary fistula, wound infection, abscess or hematoma at the stitch site was noted, then on fourth week for any persistent pain, jaundice, port site hernia, stitch granuloma and time taken to return to normal routine activity were noted down. In the third month patients are followed up for any port site hernia, hypertrophic scar, biliary stricture and symptomatic improvement was noted. Also, USG and LFT were done for any persistent jaundice. Data has been collected and managed using Microsoft Excel (ver. 2007). Appropriate statistical tools were used for analysis- mean, median.

RESULTS

In the present study the majority of the patients were in the age group of 46-55 yrs (31%) followed by 36-45 years (25%) (Table 1). The youngest patient in the study was 18 years old and oldest was 75 years old. Mean age was 46.59±13.57 years. In ultrasound findings (Table 2), 62 patients had multiple gallstones whereas 38 patients had single stone, 40 patients had the stone size less than 10 mm, 53 patients had the stone size between 10-20 mm, and only 2 patients had stone size >3 cm. CBD diameter was less than 5mm in 87% patients, it was between 7.1-10 mm in only 3 % of patients. Liver and pancreas were normal on USG in all patients. Around 87% of patients had normal intraoperative findings, while 13 % patients had abnormal findings per-operatively which included wide cystic duct in 7 %, accessory artery in 2 %, cystic artery anterior to duct in 2 %, and unclear anatomy due to severe dense adhesions in 2 patients.

Table 1: Distribution of age of patients.

Age (years)	Patients	Percentage (%)
16-25	6	6
26-35	17	17
36-45	25	25
46-55	31	31
56-65	13	13
66-75	8	8
Total	100	100
Mean age	46.59±13.57	
Median	47.50	
Range	18-75	

Table 2: Ultrasound findings.

Ultrasound findings		Patients	Percentage (%)
No. of stones	Single	38	38
	Multiple	62	62
Size of stone	<10 mm	40	40
	10-20 mm	53	53
	21-30 mm	5	5
	>30	2	2
CBD diameter	≤5 mm	87	87
	5.1-7.0 mm	10	10
	7.1-10.0 mm	3	3
Liver/ pancreas	Normal	100	100
	Abnormal	0	0

There were no complications related to the veress needle, trocar and pneumoperitoneum, there was one bowel injury, which was recognized intraoperatively, and patient was immediately converted to open cholecystectomy, there was a duodenal injury which was repaired along with cholecystectomy was also done. The post-operative period was uneventful. The peroperative conversion was two out of 100 patients due to dense adhesion. one patient had wound infection at first week, which was managed with antibiotics and regular dressing. 4 patients came with moderate pain abdomen for which ultrasonography was done and was managed with symptomatic treatment, out of four 1 patient showed collection in subhepatic space on ultrasonography. The patient underwent laparotomy for the same, after thorough irrigation, the drain was put again in subhepatic space. Patient was then discharged after 10 days in satisfactory condition (with drain). The drain output showed decreasing trend on follow-ups. The patient then presented to us with ‘jaundice’ and pain abdomen after about 3 months, then MRCP was performed, and it showed proximal ‘biliary stricture’ and then the patient underwent Roux-en-Y hepaticojejunostomy. The post-

operative period was uneventful and the patient recovered well.

Table 3: Per-operative complication.

Per-operative complication		Patients	Percentage (%)
Cystic duct	Yes	0	0
	No	100	100
CBD	Yes	0	0
	No	100	100
Liver	Yes	0	0
	No	100	100
Bowel	Yes	1	1
	No	99	99
Thermal	Yes	0	0
	No	100	100
Any other	Yes	0	0
	No	100	100

There was 1 bowel injury during the surgery. There was no injury to cystic duct, CBD, liver or any thermal injury (Table 3).

Table 4: Post-operative complication.

Problem	1st week	4th weeks	3rd month
Jaundice	0 (0%)	0 (0%)	1 (1.02%)
Pain abdomen	4 (4.08%)	0 (0%)	0 (0%)
Wound infection	1 (1.02%)	0 (0%)	0 (0%)
Biliary stricture	0 (0%)	0 (0%)	1 (1.02%)
Hypertrophic scar	0 (0%)	0 (0%)	0 (0%)

There was no port site hernia and no hypertrophic scar in our study. 78.35% patients returned to normal work in 6-10 days' period. 100 % of the patients returned their normal work in period of 15 days. The average time to resume normal work was 9.90±1.67 days, with range of 8-14 days.

Two cases of conversion to open cholecystectomy had been excluded from above statistical analysis (one returned to normal work in 20 days, other in 25 days).

One case who underwent laparotomy in 2nd week for pain abdomen and subhepatic collection has also been excluded (she returned to normal household work after 20 days of laparotomy)

Table 5 shows that 78.35% patients returned to normal work in 6-10 days' period. 100% of patients returned their normal work in period of 15 days.

The average time to resume normal work was 9.90±1.67 days, with range of 8-14 days.

Table 5: Duration of return to work.

Return to work (day)	Patients	Percentage (%)
≤5	00	0
6-10	76	78.35
11-15	21	21.65
Total	97	100
Mean±SD	9.90±1.67	
Range	8-14	

DISCUSSION

Laparoscopic cholecystectomy is the gold standard treatment at the present for cholelithiasis. In the present study majority of patients are in age group 46-55 years with an average age of 46.59 years and the range being 18-75 years. Various other studies showing average age are Bailey et al, 5-47 (16-94) years, Schirmer et al, 6-43.2±1.2 years (17-83), southern surgeons club 7-47 (18-76) years, Radunovic et al, 8-51 (16-98) years, all are compatible with present study.

In present study closed method for creating pneumo-peritoneum was used. There was no veress needle or trocar related injury. The incidence was nil as reported by studies of Bailey et al, Schirmer et al, Cuschieri et al, Chotai et al.[5,6,9,10] All studies are compatible to the present study.[10]

Major vascular injuries are considered the most fatal complications of laparoscopic cholecystectomy. Major vessels can get punctured by trocars or veress needle is unique complication associated with laparoscopic cholecystectomy.[2] Using safety shields and direct view trocars cannot prevent serious injuries. The vascular injuries can be avoided by following safe techniques in laparoscopic cholecystectomy.[11] Bailey et al used closed technique of the veress needle insertion in 93% of their patients.[5] In 7% of patients open approach was used because of previous abdominal surgery. Chotai et al included 160 patients in their study (97 cases in open method and 63 cases in closed method).[10] No major complication occurred in any group. In the present study the results were comparable to the results reported by Cuschieri et al and Schirmer et al.[9,6] In their study there was no veress needle or trocar related injury. Bile duct injury is an iatrogenic catastrophe which is associated with high morbidity. The incidence of bile duct injuries as reported by various studies of Cuschieri et al (0.3%), Bailey et al (0.6%), Schirmer et al (0.6%), Kok et al (0.5%), Duca et al (0.1%), Vagenas et al (0.65%), Viste et al (0.4%), Radunovic et al (0.13%) are compatible with present study showing 1% of bile duct injury.[5-9,12-15] In that one case, a bile duct injury was diagnosed postoperatively. The main risk factors identified for the bile duct injury are dangerous anatomy, dangerous pathology, and dangerous surgery.[16] Other contributory

factors are severe inflammation, abnormal anatomy, improper visualisation.[17]

Hugh et al recommended identifying Rouviere's sulcus as a fixed point ventral to the right portal pedicle.[18] The importance of identifying rouviere's sulcus is that cystic artery and duct lay invariably antero-superior to the sulcus confirming the anatomy in the triangle of calot. sometimes, bowel injuries can occur. The bowel injuries as reported by various studies are Southern surgeons club (0.3%), Dezial et al (0.14%-0.08%), Sasmal et al (0.07%).[2,8,19] We also had a complication of duodenal injury, during the procedure which was detected at that time and was reaired at the same time with favourable outcomes. Vagenas et al reported injury to 2nd part of duodenum in one (0.08%) patient.[14] The injury was managed by conversion to open cholecystectomy and suturing of the traumatic lesion. Bile leaks after cholecystectomy are a common phenomenon but majority of these leaks are sub-clinical. Clinically important leaks are less frequent. Various laparoscopic cholecystectomy series report bile leak by previous studies of Peters et al (1%), Panpimanmas and Kanyaprasit (0.29%), Goswami et al (0.74%), are compatible with present study (1%).[20-22] Majority of bile leaks after laparoscopic cholecystectomy appear to be related to problems with cystic duct stump, leak from accessory hepatic duct of Luschka and injury to major bile duct.[22]

Goswami et al showed biliary leakage in 0.74% cases of laparoscopic cholecystectomy, 4 cases from GB bed, duct of luschka, minor accessory duct, in 1 case -from cystic duct stump, 2 cases from CHD injury and 2 cases from CBD injury, 1 from aberrant hepatic duct.[22] In present study there is 1 patient of biliary leakage who presented to hospital with complaint of pain abdomen after 1 week of laparoscopic cholecystectomy. USG was done which showed collection in subhepatic space, the patient underwent laparotomy for the same, later the patient presented with jaundice, on MRCP the patient had proximal biliary stricture and after 3 months of post cholecystectomy the patient went for Roux-en-Y hepaticojejunostomy. The post-operative period was uneventful. In order to prevent bile leakage, proper posterior window should be made, proper skeletonization of cystic duct should be done and 2 clips must be applied to the proximal end of cystic duct and one to the distal end. Clips must be applied in such a way that end of both limbs of a clip can be seen projecting beyond the duct and no other external tissue is included. Clips should not be used if cystic duct is large or thick, in these circumstances- applying a ligature (either preformed or handtied) is the proper technique to occlude the cystic duct, Strasberg et al.[24] Convert the laparoscopic surgery into open surgery if ligation not done properly.[14]

Post-operative stay in our study ranged from 1-5 days. Patients who were converted to open had stayed more than 7 days. Laparoscopic cholecystectomy patients were discharged when the patient was ambulatory, had no complaint of pain, vomiting, and had tolerated well orally.

Southern surgeons club reported mean hospital stay of 1.2 days.[7] Vagenas et al reported mean hospital stay of 2.29 days.[14] Cuschieri et al 11 days (7-42).[9] Mean duration of return to work was 9.90±1.67 days (8-14) similar to the other studies.

CONCLUSION

We concluded that laparoscopic cholecystectomy is safe procedure with low complication, low morbidity and lower mortality and offers cost-effectiveness both to health services and to employers by shortening the stay at the hospital, shortening the operative time and faster recovery. Various bowel, vascular and bile duct injuries can be avoided by following the safer techniques of insertion of needle and trocar and proper analyzing the calot's anatomy.

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