Section: General Surgery

Original Research Article

COMPLICATIONS OF LAPAROSCOPIC CHOLECYSTECTOMY IN A TERTIARY CARE CENTRE IN NORTH INDIA

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ABSTRACT

Background: Laparoscopic cholecystectomy is the gold standard for cholelithiasis but carries risk of complications influenced by patient related and surgical factors. The frequency of complications associated with laparoscopic cholecystectomy varies. This study evaluates intraoperative and post-operative complications and their predictors.
Materials and Methods: This study was conducted in Government Medical College, Kathua. It was a prospective observational study. A prospective observational study was conducted on patients undergoing laparoscopic cholecystectomy between April 2024 to May 2025. Data included demographic (age, gender, BMI), clinical markers (WBC count, CRP), operative time, hospital stay, intraoperative and post-operative complications.
Results: Among 340 patients, 56 (16.47%) experienced intraoperative complications and 34 (10%) experienced post operative complications. Specific risk factors include male gender, elevated WBC count/CRP. Common intraoperative complications were iatrogenic gall bladder perforation, bleeding from tissue adjacent to gall bladder, and spilled gall stone. Common post-operative complications were Bleeding from abdominal cavity. Rare complications were bile leak, surgical site infection, port site hernia and subhepatic collection.
Conclusion: Laparoscopic Cholecystectomy is associated with intraoperative and postoperative complications. The incidence of major complication like injury to common bile duct and major vascular injury is acceptable in our study and comparable to other studies. The minor complications increase the length of hospital stay and morbidity. The intraoperative complications increase the duration of operation.
Keywords: Laparoscopy, cholecystectomy, cholelithiasis.

INTRODUCTION

Laparoscopic cholecystectomy is the preferred treatment for gall stone disease.[1,2] Laparoscopic cholecystectomy is associated with intraoperative and postoperative complications which varies from 0.5 to 6 %.[3-6] North India has a high prevalence of gall stone disease (6.2%),[7,8] yet regional studies on laparoscopic cholecystectomy complications are limited. This prospective observational study analyses intraoperative and postoperative complications with associated risk factors.

MATERIALS AND METHODS

Study design: The study was prospective observational study conducted at Government Medical College Kathua, located in North India. Ethical clearance was obtained and informed consent was taken. The study period was from April 2024 to May 2025. Sample size taken was 340 cases.

Inclusion and exclusion criteria
All patients with symptomatic cholelithiasis or cholecystitis were included in the study. Patients with prior upper abdominal surgery, malignancy, uncontrolled coagulopathy and pregnancy were excluded from the study.
Data collection: Data were collected during the preoperative, intraoperative, and postoperative periods. Preoperative data included demographic characteristics such as age, gender, and body mass index (BMI), along with laboratory investigations including white blood cell (WBC) count and C-reactive protein (CRP) levels. Intraoperative variables assessed were operative time, intraoperative bleeding, iatrogenic gall bladder perforation, stone spillage, bile duct injury, and conversion to open surgery. Postoperative data included bleeding from the abdominal cavity exceeding 100 ml within 24 hours, bile leak, surgical site infection, subhepatic collection, port site hernia, hematoma, duration of hospital stay, and bowel injury.

RESULTS

A total of 340 cases of laparoscopic cholecystectomy were performed over the study period. The median age of patients was 42 years. The minimum age was 16 years and maximum was 88 years. 95 (27.9%) patients were in the age group of 30-39 years. The incidence of gall stone disease is more common in females with female to male ratio of 6:1 [Figure 1].

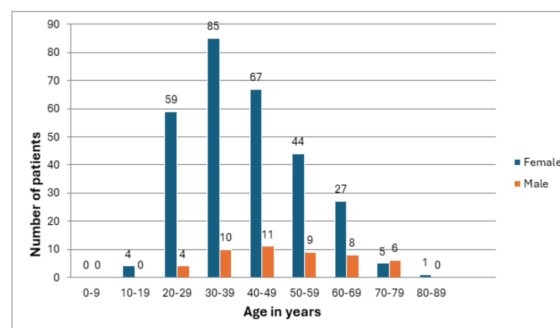

Figure 1: Gender distribution by age group.

In our study 56 (16.47%) patients developed intraoperative complications. The most common intraoperative complication was iatrogenic perforation of gall bladder 22(6.47%), bleeding from tissue adjacent to gall bladder 14(4.11%), spilled gall stone 10 (2.94%), bleeding from abdominal wall/port 6(1.76%). Bile duct injury which is a major complication occurred in only one patient and lead to conversion to open in this case. Two more case were converted to open due to difficult access to Calot's triangle [Table 1].

Table 1: Intraoperative complications

Type of intraoperative complication	N	%
Iatrogenic perforation of gall bladder	22	6.47
Bleeding from tissue adjacent to gall bladder	14	4.1
Spilled gall stone	10	2.94
Bleeding from abdominal wall/port	6	1.76
Bleeding from cystic artery	3	0.3
Injuries to CBD	1	0.29

8 patients had history of prior ERCP with CBD stent. One patient with history of ERCP with common bile duct stent had malposition of stent in cystic duct which was identified intraoperatively after cutting the cystic duct along with stent, then stent was removed after grasping with Maryland and applying counter traction at cystic duct. After removal of stent from cystic duct, duct secured with ligature. 34(10%) patients developed post-operative complications.

The most common post-operative complication was bleeding from abdominal cavity, bile leak through drain, surgical site infection. The rare complications were subhepatic collection 1(0.29%), port site hernia 2(0.58%), abdominal wall hematoma 2(0.58%). Carcinoma of gall bladder was confirmed by histopathological examination in 2 patients. Correlation between the variables and the incidence of complications [Table 2].

Table 2: Post-operative complications

Post-operative complication	N	%
Bleeding from abdominal cavity >100ml/24hour	17	5
Bile leak	6	1.7
Surgical site infection	4	1.17
Subhepatic collection	1	0.29
Port site hernia	2	0.58
Hematoma	2	0.58

The intra operative and post-operative complications were more common in males, statistically significant (p value 0.005), in group with BMI>25 (p value 0.001), in group with WBC count >11X109 (p value 0.008) and in group with CRP >5 (p value 0.008). There was no statistically significant difference in complication among patients with age group >65 years versus <65 years [Table 3].

Table 3: Correlation between variables and incidence of complications.

Variable	Domain	n =340	IOC(n=56)	POC(n=34)	P value
Age	<65	316(92.9%)	51(16.1%)	30(9.49%)	0.563
	>65	24(7%)	5(20.8%)	4(16.6%)	
Gender	Male	48(14.11%)	15(31.25%)	7(14.58%)	0.0056
	Female	292(85.8%)	41(14.04%)	27(9.27%)	
BMI	<25	156	12(7.6%)	6(3.8%)	0.0001
	>25	184	44(23.9%)	28(15.22%)	
WBC Count	<11X109 /L	218(64.11%)	16(7.3)	13(5.9%)	0.008
	>11X109/L	122(35.80%)	21(17.21)	19(15.7%)	
CRP	<5	182(53.52%)	14(7.6%)	9(4.9%)	0.008
	>5	158(46.47%)	28(17)	22(13.92%)	

DISCUSSION

Laparoscopic cholecystectomy is the treatment of choice for gall stone disease. The advantage of laparoscopic cholecystectomy over open cholecystectomy are minimal trauma, decrease pain, short hospital stay, quick recovery, early return to work and satisfactory cosmetic outcomes. However laparoscopic cholecystectomy is associated with numerous intraoperative and postoperative complications with associated risk factors.

In our study a total of 340 cases of laparoscopic cholecystectomy were observed for complications. Majority of patients were aged 30-39 years. 292 patients were female and 48 patients were male. A total of 90 (26.4%) cases developed complications out of which 56 (16.47%) were found to be intraoperative and 34 (10%) were postoperative.

Biliary injury is a major complication of laparoscopic cholecystectomy that is associated with increased morbidity and mortality. Various studies show that the incidence of injuries to common bile duct is 0.1-0.6%.[5,6,10] In our study we report one case (0.29%) of common bile duct injury that was managed by direct repair with placement of a T-tube and abdominal drain.

Vascular injuries are the common complications of laparoscopic cholecystectomy. Various studies have shown intraoperative bleeding ranging from 2-7%.[11-14] In our study 14 cases (4.1%)had intraoperative bleeding from tissue adjacent to gall bladder, 6 cases (1.76%) had bleeding from abdominal port site and 3 cases (0.3%) had bleeding from cystic artery. No major vascular injury was seen in our study.

One patient with history of ERCP with CBD stent had malposition of CBD stent in cystic artery which was identified intraoperatively and managed by removing the stent from cystic duct. The cystic duct ligated with suture, post operative course was uneventful. 3 cases (0.8%) were converted to open cholecystectomy in our study (one due to CBD injury and 2 due to difficult access to Calot's triangle.

In our study 17 cases (5%) had bleeding from abdominal cavity >100ml/24 hour in postoperative period. 2 cases (0 58%) had haematoma at port site which was managed conservatively. 22 cases (6.47%) had iatrogenic perforation of gall bladder which was common intraoperative complications in our study. Among iatrogenic perforation cases, 10 cases (2.94%) had spilled gall stones. Similar results were observed by other study done by Radunovic M et al,[9] which reported 5.27% incidence of iatrogenic perforation of gall bladder out of that 2.02% were associated with spilt gall stones. However, Duca et al,[15] reported 15.9 % incidence of iatrogenic perforation of gall bladder during laparoscopic cholecystectomy.

In our study there were 6 cases (1.7%) with bile leak from abdominal drain in postoperative period that was managed conservatively. Radunovic M et al,[9] report 1.89% incidence of bile leak in postoperative period which is similar to our study. Various other studies [4,16-18] observed 1% of bile leak associated with laparoscopic cholecystectomy which is mainly caused by slipped cystic duct ligature or leak from accessory or anomalous bile duct.

In our study one case (0.29%) had subhepatic collection (bilioma) which was managed by USG guided pig tail drainage, antibiotics and analgesics. 2 cases (0.58%) developed port site hernia. Various studies [18-20] shows incidence of port site hernia in the range of 1.8-5.4%. In our study we report 4 cases (1.17%) of surgical site infection after laparoscopic cholecystectomy. Various studies [21-25] reported surgical site infection rate in the range of 0.3 to 3.71%.

In our study no patient had injury to the intestine, however a study conducted by Shamiyeh et al,[26] have 0.87% incidence of intestine injury. The average operative time in our study was 58 minutes (range 20-150 minutes) which was similar to study conducted by Behera TK et al,[27] which had average operative time of 53 minutes.

Average post-operative length of stay was 2 days (range 1-12 days) in our study and similar results (average hospital stay of 2.29 days) were published by Vagenas K et al.[28] However, Leeder PC et al,[29] demonstrated that laparoscopic cholecystectomy can be performed as a day care procedure. Increasing age, conversion to open and complex operation were associated with longer operative time and post-operative length of stay.

CONCLUSION

Laparoscopic cholecystectomy is a safe minimally invasive procedure for management of cholelithiasis but associated with various intraoperative and postoperative complications. The complications are

more common in male patients, in patients with BMI>25, WBC count >11X109 /L and CRP > 55. Common intraoperative complications were perforation of gall bladder and bleeding from adjacent tissues. The most common postoperative complications were bleeding from abdominal cavity and bile leak through drain. Major complications like injury to common bile duct and difficulties to access Calot's triangle should be identified and conversion to open is considered a necessary procedure to increase favourable outcome.

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