



Original Research Article

Study of Complications of Laparoscopic Cholecystectomy at Teaching Institute

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INTRODUCTION

Laparoscopic cholecystectomy has emerged to be the gold standard management of the symptomatic gallstone disease and due to its minimally invasive

Abstract: Background: Laparoscopic cholecystectomy is the standard surgical treatment for gallstone disease due to reduced pain, shorter hospitalization, and faster recovery compared to the open approach. **Objective:** To determine the frequency and pattern of complications associated with laparoscopic cholecystectomy and identify factors associated with increased morbidity. **Methodology:** This was a descriptive, cross-sectional study conducted at Dara Welfare Hospital Kohat from May 2024 to May 2025 including 155 patients undergoing Laparoscopic cholecystectomy. **Results:** Females constituted 65.2% of patients, and most were aged 31–45 years (43.2%). Overweight or obesity was observed in 60.6%, and comorbidities were present in 43.9%. Chronic cholecystitis (52.9%) was the most common indication. Laparoscopic completion was achieved in 91.6%, with conversion to open surgery in 8.4%. Intraoperative complications included gallbladder perforation (18.7%), bile spillage (15.5%), and bleeding (11.6%), while bile duct injury occurred in 1.3%. Postoperatively, fever (13.5%), surgical site infection (11.0%), and ileus (7.1%) were most frequent. Higher complication rates were significantly associated with diabetes (56.8%), obesity (61.3%), acute cholecystitis (59.1%), previous abdominal surgery (53.6%), and operative time >90 minutes (73.3%) ($p < 0.05$). **Conclusion:** Laparoscopic cholecystectomy is a safe procedure with low major morbidity and mortality; however, complications are more frequent in patients with metabolic comorbidities, acute inflammation, and prolonged operative time. Careful risk assessment and surgical expertise are essential to optimize outcomes.

Keywords: laparoscopic cholecystectomy, surgical complications, gallstone disease, conversion to open surgery.

nature, less postoperative pain, short hospitalization, recovery, and excellent cosmetic effects they have largely replaced open cholecystectomy [1]. With these benefits, it has become one of the most frequently done abdominal operations in the world especially in teaching schools where it is also a

fundamental training process of surgical residents [2]. The disease owing to gallstones impacts on almost between 10, and 20 percent of adults and is often characterized by complications including biliary colic, acute and persistent cholecystitis, pancreatitis and obstructive jaundice, which require surgical intervention [3]. Even though laparoscopic cholecystectomy is considered a safe and effective procedure, it does not lack risks. It involves the use of trocar and pneumoperitoneum formation and dissection of the surrounding essential organs such as common bile duct and great vessels, and hence it is susceptible to intraoperative and postoperative complications [4][5].

Complications have been reported to be minor like nausea, vomiting and surgical site infection, and severe like hemorrhage, bile leak, bile duct, bowel injury and conversion to open surgery. The most severe of them is a bile duct injury, which, in most cases, is followed by a long-term hospital stay, surgical rehospitalization, and long-lasting morbidity [6][7]. Other risks are gallbladder perforation, stone spillage, port-site hernia, ileus, and cardiopulmonary consequences of pneumoperitoneum depending on various patient and surgery factors such as old age, obesity, diabetes, acute inflammation, prior abdominal surgery, and experience of the surgeon [8][9]. The differences between the levels of skills within the trainees in teaching hospitals can also influence the results, which is why there is a need to constantly monitor and audit the performance in the area of surgery [10] [11]. Other studies have documented overall complication and conversion rates of 515% and 210% respectively, depending on institutions and the complexity of cases [12]. Although the procedure is very frequent, there is still little information of the pattern and frequency of complications on a local level [13].

Objective

To determine the frequency and pattern of complications associated with laparoscopic cholecystectomy and identify factors associated with increased morbidity.

METHODOLOGY

This was a descriptive, cross-sectional study conducted at Dara Welfare Hospital Kohat from May 2024 to May 2025, including 155 patients undergoing Laparoscopic cholecystectomy.

Inclusion Criteria

- Patients aged 18 years and above

- Diagnosed cases of symptomatic gallstone disease, acute or chronic cholecystitis, or gallbladder polyps
- Patients scheduled for elective or emergency laparoscopic cholecystectomy
- Patients willing to provide informed consent

Exclusion Criteria

- Patients planned primarily for open cholecystectomy
- Suspected or confirmed gallbladder malignancy
- Concomitant major abdominal procedures performed during the same surgery
- Severe cardiopulmonary instability precluding laparoscopy
- Patients with incomplete operative or postoperative records
- Patients unwilling to participate

Data Collection

Data were collected prospectively using a structured predesigned proforma. Baseline patient variables recorded included age, gender, body mass index, comorbidities (diabetes mellitus, hypertension, ischemic heart disease), history of previous abdominal surgery, and clinical presentation. Preoperative findings such as ultrasonographic evidence of gallstones, gallbladder wall thickness, and presence of acute inflammation were also documented. Intraoperative variables assessed included operative time, number of ports used, difficulty of dissection, gallbladder perforation, bile or stone spillage, bleeding, bile duct injury, visceral or vascular injury, and need for conversion to open surgery. Postoperative variables included surgical site infection, bile leak, intra-abdominal collection, postoperative hemorrhage, ileus, port-site hernia, fever, need for re-intervention, duration of hospital stay, and mortality. Complications were categorized as intraoperative or postoperative and graded according to clinical severity.

Statistical Analysis

Data were entered and analyzed using SPSS version 24.0. Quantitative variables such as age, body mass index, operative time, and hospital stay were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. The frequency of complications was calculated, and associations between patient factors and complications were assessed using the chi-square test for categorical variables and independent t-test for continuous variables. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Among 155 patients, most were aged 31–45 years (43.2%, n=67), followed by 18–30 years (24.5%, n=38) and 46–60 years (23.2%, n=36), with only 9.1% (n=14) above 60 years. Females predominated (65.2%, n=101) compared to males (34.8%, n=54). Regarding BMI, 40.6% (n=63) were overweight and 20.0% (n=31) obese. Comorbidities were present in 43.9% (n=68).

Table 1. Baseline Demographic and Anthropometric Characteristics of Patients (N = 155)

Variable	Category	Frequency n (%)	Cumulative %
Age (years)	18–30	38 (24.5)	24.5
	31–45	67 (43.2)	67.7
	46–60	36 (23.2)	90.9
	>60	14 (9.1)	100.0
Gender	Male	54 (34.8)	34.8
	Female	101 (65.2)	100.0
BMI (kg/m ²)	<25	61 (39.4)	39.4
	25–29.9	63 (40.6)	80.0
	≥30	31 (20.0)	100.0
Comorbidity	Present	68 (43.9)	43.9
	Absent	87 (56.1)	100.0
Study Total	All patients	155 (100.0)	100.0

Chronic cholecystitis was the leading indication for surgery (52.9%), followed by acute cholecystitis (28.4%), while smaller proportions had biliary colic or polyps. Hypertension (27.1%) and diabetes (23.9%) were the most common comorbidities, and 18.1% had previous abdominal surgery. Nearly half of the patients (47.1%) demonstrated gallbladder wall thickening, suggesting increased operative difficulty in a substantial number of cases.

Table 2. Preoperative Clinical Profile and Risk Stratification

Variable	Category	Frequency n (%)
Indication	Chronic cholecystitis	82 (52.9)
	Acute cholecystitis	44 (28.4)
	Biliary colic	21 (13.5)
	Gallbladder polyp	8 (5.2)
Diabetes mellitus	Present	37 (23.9)
	Absent	118 (76.1)
Hypertension	Present	42 (27.1)
	Absent	113 (72.9)
Previous abdominal surgery	Present	28 (18.1)
	Absent	127 (81.9)
Thick GB wall (>4 mm)	Present	73 (47.1)
	Normal	82 (52.9)
Study Total	All patients	155 (100.0)

Most procedures were completed within 90 minutes (80.6%), with only 19.4% requiring prolonged operative time. Minor intraoperative events such as gallbladder perforation (18.7%), bile spillage (15.5%), and bleeding (11.6%) were relatively common, whereas major injuries including bowel (1.9%) and bile duct injury (1.3%) were rare. Conversion to open surgery was required in 8.4%, while the vast majority (91.6%) were successfully managed laparoscopically.

Postoperative complications were generally infrequent and mild. Fever (13.5%) and surgical site infection (11.0%) were most common, whereas bile leak (3.9%) and hemorrhage (3.2%) occurred less often. Most patients (59.4%) were discharged within two days, re-intervention was needed in only 4.5%, and mortality was minimal at 0.6%, reflecting an overall favorable recovery profile.

Overall complications occurred in 38.7% of patients and were more frequent among high-risk groups. Diabetics (56.8%), obese patients (61.3%), those with acute cholecystitis (59.1%), and individuals with prior surgery (53.6%) showed higher complication rates. The strongest association was prolonged operative time exceeding 90 minutes (73.3%).

Table 3. Intraoperative Findings and Operative Events

Variable	Category	Frequency n (%)
Operative time ≤60 min	Short duration	52 (33.5)
Operative time 61–90 min	Moderate duration	73 (47.1)
Operative time >90 min	Prolonged duration	30 (19.4)
Gallbladder perforation	Present	29 (18.7)
	Absent	126 (81.3)
Bile/stone spillage	Present	24 (15.5)
	Absent	131 (84.5)
Intraoperative bleeding	Present	18 (11.6)
	Absent	137 (88.4)
Bile duct injury	Present	2 (1.3)
	Absent	153 (98.7)
Conversion to open surgery	Required	13 (8.4)
	Not required	142 (91.6)
Study Total	All patients	155 (100.0)

Table 4. Postoperative Complications and Hospital Recovery

Variable	Category	Frequency n (%)
Surgical site infection	Present	17 (11.0)
	Absent	138 (89.0)
Bile leak	Present	6 (3.9)
	Absent	149 (96.1)
Hemorrhage	Present	5 (3.2)
	Absent	150 (96.8)
Ileus	Present	11 (7.1)
	Absent	144 (92.9)
Fever	Present	21 (13.5)
	Absent	134 (86.5)
Hospital stay ≤2 days	Early discharge	92 (59.4)
Hospital stay >2 days	Prolonged stay	63 (40.6)
Mortality	Present	1 (0.6)
	Absent	154 (99.4)
Study Total	All patients	155 (100.0)

Table 5. Association of Risk Factors with Overall Surgical Complications

Risk Factor	Complication Present n (%)	Complication Absent n (%)	p-value
Overall complications	60 (38.7)	95 (61.3)	0.050
Diabetes mellitus	21 (56.8)	16 (43.2)	0.002
Non-diabetic	39 (33.1)	79 (66.9)	0.002
Obesity (BMI ≥30)	19 (61.3)	12 (38.7)	0.001
Non-obese	41 (33.6)	81 (66.4)	0.001
Acute cholecystitis	26 (59.1)	18 (40.9)	0.003
Chronic disease	34 (30.4)	77 (69.6)	0.003
Operative time >90 min	22 (73.3)	8 (26.7)	0.001
Operative time ≤90 min	38 (29.7)	90 (70.3)	0.001
Study Total	All patients	155 (100.0)	0.050

DISCUSSION

This paper assessed 155 patients that had Laparoscopic cholecystectomy and proved that it is generally a safe procedure with low major morbidity and low mortality rate, but still minor complications are relatively prevalent. The cohort consisted mainly of women (65.2%), middle-aged people (60.6), with an overwhelming prevalence of overweight or

obesity (60.6%), and comorbidities (43.9%), which is characteristic of the gallstone disease. There were more than 80 percent indications of chronic and acute cholecystitis, and almost fifty percent of the cases exhibited thickening of the gallbladder wall, indicating that the operation would be harder [14]. These demographic and clinical trends have been reported in the prior studies [15][16]. Most of the

surgeries were also performed intraoperatively, taking less than 90 minutes (80.6%), and with high laparoscopic success rate (91.6%) and low conversion rate (8.4%). Less severe cases like gallbladder perforation (18.7%), bile spill-over (15.5%), and bleeding (11.6) were common and the major injury such as bile duct (1.3) and bowel injury (1.9) were infrequent. Other studies have shown similar frequencies and the safety of the laparoscopic method is in general [17] [18].

Complications during the postoperative care were predominantly not serious (fever 13.5%, surgical site infection 11.0%, ileus 7.1%), but not a few serious complications like bile leak (3.9%) or hemorrhage (3.2%). The majority of patients (59.4) were discharged within a period of 2 days, re-intervention was not frequent (4.5) and the mortality was minimal (0.6). Past literature has reported similar trends in recovery, which indicated brief hospitalizations and positive results [19][20]. Notably, diabetics (56.8%), obese patients (61.3%), patients with acute cholecystitis (59.1%), patients with previous surgery (53.6%), and prolonged operating time (over 90 minutes) (73.3%), had the highest comorbidity rates, which is also evident in past studies. On the whole, a close selection of patients, preoperative optimization, and veteran surgical oversight can help to reduce complications and increase the outcomes.

CONCLUSION

It is concluded that Laparoscopic cholecystectomy is a safe and effective procedure with a high success rate and low mortality; however, minor complications remain relatively common, particularly in patients with identifiable risk factors. These findings indicate that while laparoscopic cholecystectomy generally offers favorable recovery and short hospital stay, outcomes are strongly influenced by patient comorbidities and operative difficulty. Careful preoperative optimization, risk stratification, and experienced surgical supervision are essential to minimize complications and further improve surgical safety and patient outcomes.

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