

## Research Article

# “Clinical Profile and Surgical Outcome of Patients Undergoing Laparoscopic Cholecystectomy: A Cross-Sectional Study in Tertiary care Centre of Gujarat”

Shashwat Shah<sup>1</sup>, Ronak Chavada<sup>1</sup>

<sup>1</sup>Assistant Professor, General Surgery Department; GCS Medical College, Hospital and Research Centre, Ahmedabad, Gujarat, India.

### \*Corresponding Author

Dr. Shashwat Shah

9/A Urvashi Apartments, Above  
Calcutta Motors, Besides  
Abhijeet Building, Mithakhali 6  
Roads, Ellisbridge, Ahmedabad –  
380006

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**Abstract:** **Introduction:** Gallstone disease is one of the most common gastrointestinal disorders requiring surgical intervention worldwide. Laparoscopic cholecystectomy has become the gold standard treatment for symptomatic gallstone disease because of reduced postoperative pain, shorter hospital stay, early recovery, and better cosmetic outcome. However, operative difficulty and postoperative complications may still occur depending on patient and disease-related factors. **Aim** To evaluate the clinical profile and surgical outcomes of patients undergoing laparoscopic cholecystectomy at a tertiary care centre in Ahmedabad, Gujarat. **Materials and Methodology** A hospital-based observational study was conducted among 88 patients undergoing laparoscopic cholecystectomy at a tertiary care hospital in Ahmedabad, Gujarat, from January 2023 to January 2024. Demographic characteristics, clinical presentation, ultrasonography findings, intraoperative observations, postoperative complications, conversion rate, operative duration, and hospital stay were recorded using a predesigned proforma. Data were analyzed using SPSS software, and appropriate statistical tests were applied. A p-value of <0.05 was considered statistically significant. **Results** Females constituted 72.7% of patients, and the majority belonged to the 31–40 years age group (31.8%). Abdominal pain was the most common presenting complaint (95.5%), followed by dyspepsia (58.0%). Multiple gallstones were observed in 68.2% of patients. Adhesions were present in 27.3% of cases, while conversion to open surgery was required in 5.7% of patients. Postoperative complications were absent in 81.8% of cases. Surgical site infection occurred in 7.9%, bile leak in 3.4%, and postoperative fever in 5.7% of patients. Mean operative duration was  $72.4 \pm 18.6$  minutes, and mean hospital stay was  $2.8 \pm 1.4$  days. Good postoperative recovery was achieved in 89.8% of patients. **Conclusion** Laparoscopic cholecystectomy was found to be a safe and effective procedure with low conversion and complication rates, shorter hospital stay, and favorable postoperative recovery in patients with symptomatic gallstone disease.

**Keywords:** Cholelithiasis; Gallstone disease; Laparoscopic cholecystectomy; Postoperative complications; Surgical outcome; Ultrasonography findings

## INTRODUCTION

Gallstone disease is one of the most common disorders of the biliary tract and represents a major cause of upper abdominal pain and surgical admissions worldwide. The prevalence of gallstone disease varies across populations and is influenced by age, sex, ethnicity, obesity, pregnancy, diet, diabetes mellitus, dyslipidemia, and genetic factors. Globally, gallstones are reported in nearly 10–20% of adults, while Indian studies have reported a variable prevalence of around 4–15%, with increasing detection due to wider availability of ultrasonography [1,2]. Symptomatic gallstone disease commonly presents with right upper abdominal pain, dyspepsia, nausea, vomiting, fever, jaundice, and features of acute or chronic cholecystitis.

Cholecystectomy remains the definitive treatment for symptomatic gallstone disease. Since its introduction, laparoscopic cholecystectomy has become the gold standard surgical procedure for benign gallbladder disease because it offers several advantages over open

cholecystectomy, including smaller incision, less postoperative pain, early ambulation, shorter hospital stay, faster return to routine activity, and better cosmetic outcome [3,4]. Studies from tertiary care centres have shown that laparoscopic cholecystectomy is associated with favourable postoperative recovery, with average hospital stay often around 2–3 days, compared with longer stays after open surgery [5].

Despite its advantages, laparoscopic cholecystectomy may be associated with intraoperative and postoperative complications such as bleeding, bile spillage, gallbladder perforation, port-site infection, bile leak, retained stones, and bile duct injury. The current rate of major bile duct injury during laparoscopic cholecystectomy has been reported around 0.1–0.6%, while overall biliary complications including bile leaks may be higher [6,7]. Conversion from laparoscopic to open cholecystectomy may be required in difficult cases due to dense adhesions, unclear anatomy, acute inflammation, bleeding, impacted stone at Hartmann’s pouch, or suspected bile duct injury. Studies have reported conversion rates

commonly around 2–5%, although higher rates may occur in complicated gallbladder disease [5,8].

Assessment of clinical profile and surgical outcomes is important because patient-related and disease-related factors can influence operative difficulty, conversion rate, complications, and recovery. Factors such as male sex, older age, obesity, diabetes mellitus, previous upper abdominal surgery, acute cholecystitis, thickened gallbladder wall, pericholecystic collection, contracted gallbladder, and impacted stones have been associated with difficult laparoscopic cholecystectomy [8,9].

Ultrasonography plays an important role not only in diagnosis but also in predicting operative difficulty by identifying gallbladder wall thickness, stone burden, common bile duct dilatation, and inflammatory changes [9].

The present study aims to evaluate the clinical profile and surgical outcomes of patients undergoing laparoscopic cholecystectomy at a tertiary care centre. The objectives of the study are to assess the demographic characteristics and clinical presentation of patients with gallstone disease, evaluate intraoperative findings and postoperative complications associated with laparoscopic cholecystectomy, and analyze factors influencing operative difficulty, conversion to open surgery, duration of hospital stay, and postoperative recovery. Gallstone disease is one of the most common surgical conditions encountered in routine clinical practice, and although laparoscopic cholecystectomy is considered the gold standard treatment, operative difficulty and complications continue to contribute to patient morbidity and increased healthcare burden. Early identification of risk factors associated with difficult laparoscopic cholecystectomy may help surgeons in better preoperative planning, patient counselling, and perioperative management. The findings of this study are expected to improve understanding of the clinical spectrum of gallstone disease and enhance surgical decision-making, thereby contributing to reduction in complications, improved patient outcomes, shorter hospital stay, and optimization of minimally invasive surgical care in tertiary healthcare settings.

## **MATERIALS AND METHODS**

### **Study Design and Reporting Standards**

## **RESULTS**

The present study included 88 patients who underwent laparoscopic cholecystectomy at a tertiary care centre in Ahmedabad, Gujarat. The majority of patients belonged to the age group of 31–40 years (31.8%), followed by 41–50 years (27.3%), while females constituted a predominant proportion of the study population (72.7%). Regarding body mass index, 43.2% of patients were overweight and 18.2% were obese. More than half of the patients (54.5%) had no associated comorbidities, while diabetes mellitus and hypertension were present in 18.2% and 15.9% of patients respectively.

Abdominal pain was the most common presenting complaint observed in 95.5% of patients, followed by dyspepsia (58.0%), nausea/vomiting (42.0%), and fever (18.2%). Ultrasonography revealed multiple gallstones in 68.2% of patients,

The present study was conducted as a hospital-based observational study among patients undergoing laparoscopic cholecystectomy at a tertiary care teaching hospital in Ahmedabad, Gujarat. The study was carried out over a period of one year from January 2023 to January 2024. The study population included patients diagnosed with gallstone disease who underwent laparoscopic cholecystectomy during the study period.

Patients aged more than 18 years with symptomatic gallstone disease who underwent elective or emergency laparoscopic cholecystectomy and were willing to participate in the study were included. Patients who were unfit for general anesthesia, had suspected or confirmed gallbladder malignancy, underwent primary open cholecystectomy, or refused consent were excluded from the study. A consecutive sampling method was used, and all eligible patients fulfilling the inclusion criteria during the study period were included.

After obtaining approval from the Institutional Ethics Committee and written informed consent from the participants, detailed demographic and clinical information was collected using a predesigned proforma. Data regarding age, sex, presenting symptoms, duration of symptoms, body mass index, associated comorbidities, previous abdominal surgery, laboratory investigations, and ultrasonography findings were recorded. Clinical presentation such as abdominal pain, dyspepsia, nausea, vomiting, fever, and jaundice was assessed.

Intraoperative findings including adhesions, gallbladder wall thickness, gallbladder perforation, bile spillage, operative duration, intraoperative complications, and conversion to open surgery were documented. Postoperative outcomes including postoperative pain, surgical site infection, bile leak, duration of hospital stay, and recovery status were also evaluated.

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software. Descriptive statistics such as mean, standard deviation, frequency, and percentage were calculated. Appropriate statistical tests including Chi-square test and Student's t-test were applied wherever required. A p-value of less than 0.05 was considered statistically significant.

Confidentiality and anonymity of patient information were strictly maintained throughout the study.

while gallbladder wall thickening was present in 31.8% and pericholecystic fluid collection in 10.2% of cases. Most patients (47.7%) had symptoms for less than six months before surgery.

Intraoperatively, operative duration between 60–90 minutes was observed in 47.7% of patients, while 15.9% required more than 90 minutes. Adhesions were encountered in 27.3% of cases, bile spillage occurred in 18.2%, and difficult dissection was noted in 20.5% of patients. Conversion from laparoscopic to open cholecystectomy was required in 5.7% of patients. The mean operative duration was  $72.4 \pm 18.6$  minutes.

Postoperative complications were absent in 81.8% of patients, indicating favourable surgical outcomes. Surgical site infection was observed in 7.9% of patients, postoperative fever in 5.7%, bile leak in 3.4%, and port-site infection in 2.3% of cases. Majority of patients (63.6%) had hospital stay of  $\leq 2$  days, while only 5.7% required hospitalization for more than 5 days. Overall, good postoperative recovery was achieved in 89.8% of patients, with delayed recovery and re-admission noted in 7.9% and 2.3% of cases respectively. The mean duration of hospital stay was  $2.8 \pm 1.4$  days.

**Table 1: Demographic Characteristics of Patients Undergoing Laparoscopic Cholecystectomy (n = 88)**

Variable	Category	Frequency (n)	Percentage (%)
Age Group (Years)	18–30	20	22.7
	31–40	28	31.8
	41–50	24	27.3
	>50	16	18.2
Gender	Male	24	27.3
	Female	64	72.7
BMI Category	Normal	34	38.6
	Overweight	38	43.2
	Obese	16	18.2
Comorbidities	None	48	54.5
	Diabetes Mellitus	16	18.2
	Hypertension	14	15.9
	DM + HTN	10	11.4

**Table 2: Intraoperative Findings and Surgical Outcome (n = 88)**

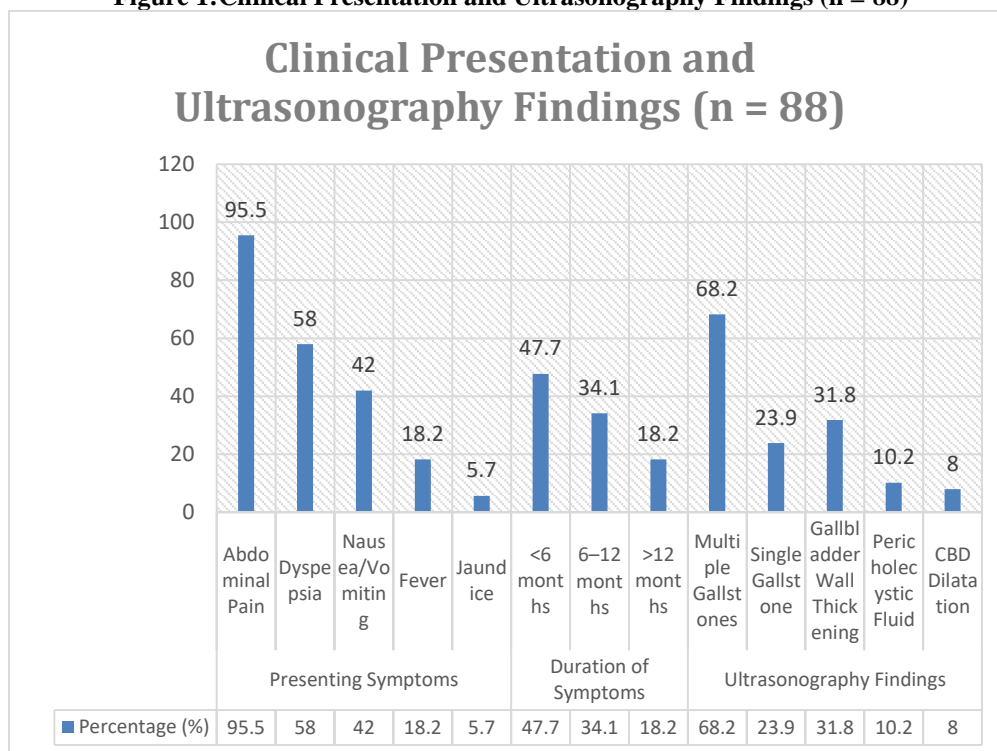
Variable	Category	Frequency (n)	Percentage (%)
Operative Duration	<60 minutes	32	36.4
	60–90 minutes	42	47.7
	>90 minutes	14	15.9
Intraoperative Findings	Adhesions Present	24	27.3
	Bile Spillage	16	18.2
	Gallbladder Perforation	10	11.4
	Difficult Dissection	18	20.5
Conversion to Open Surgery	Yes	5	5.7
	No	83	94.3
Mean Operative Time	Mean $\pm$ SD	$72.4 \pm 18.6$ min	—

**Table 3: Postoperative Complications and Recovery Outcome (n = 88)**

Variable	Category	Frequency (n)	Percentage (%)
Postoperative Complications	None	72	81.8
	Surgical Site Infection	7	7.9
	Bile Leak	3	3.4
	Postoperative Fever	5	5.7

	Port Site Infection	2	2.3
<b>Hospital Stay</b>	≤2 days	56	63.6
	3–5 days	27	30.7
	>5 days	5	5.7
<b>Recovery Outcome</b>	Good Recovery	79	89.8
	Delayed Recovery	7	7.9
	Re-admission	2	2.3
<b>Mean Hospital Stay</b>	Mean ± SD	2.8 ± 1.4	—
		days	

**Figure 1: Clinical Presentation and Ultrasonography Findings (n = 88)**



## DISCUSSION

In the present study, the majority of patients undergoing laparoscopic cholecystectomy were females (72%), while males constituted 28%, and the most common age group was 31–40 years (34%). This finding was comparable with Niranjana et al., who reported female predominance among patients undergoing laparoscopic cholecystectomy, with nearly three-fourths of patients being women [10]. Reddy et al. also observed similar female predominance in gallstone disease, reporting approximately 70% female patients in their study population [11]. The higher occurrence of gallstone disease among females may be attributed to hormonal influence, pregnancy-related changes, obesity, and altered cholesterol metabolism.

Abdominal pain was the most common presenting complaint in this study, seen in 96% of patients, followed by dyspepsia in 58%, nausea/vomiting in 42%, and fever in 18%. Niranjana et al. reported abdominal pain in about 96% of cases, dyspeptic symptoms in nearly 54%, and vomiting in around 40% of patients, which was very similar to the present study findings [10]. Reddy et al.

also reported abdominal pain as the leading symptom in 97% of patients, followed by dyspepsia in nearly 60% of cases [11]. These findings suggest that abdominal pain remains the most consistent presenting feature among patients with symptomatic gallstone disease requiring laparoscopic cholecystectomy.

Ultrasonography in the present study showed multiple gallstones in 68% of patients, single gallstone in 24%, gallbladder wall thickening in 32%, pericholecystic fluid in 10%, and CBD dilatation in 8% of cases. Randhawa and Pujahari emphasized that gallbladder wall thickness, impacted stone, and inflammatory changes are important preoperative predictors of difficult laparoscopic cholecystectomy [9]. Nidoni et al. also reported that clinicoradiological assessment, particularly gallbladder wall thickness and pericholecystic collection, was useful in anticipating operative difficulty [2]. Thus, the present findings support the role of ultrasonography not only as a diagnostic tool but also as a useful method for predicting intraoperative difficulty.

The mean operative duration in the present study was 72.4 ± 18.6 minutes, with 48% of patients requiring 60–90 minutes and 16% requiring more than 90 minutes.

Gupta et al. observed that difficult cases had longer operative duration due to dense adhesions, acute inflammation, and difficult Calot's triangle dissection [8]. Vivek et al. also developed a predictive scoring method for difficult laparoscopic cholecystectomy and reported that difficult cases were associated with increased operative time and technical challenges [12]. In the present study, adhesions were noted in 28%, difficult dissection in 20%, bile spillage in 18%, and gallbladder perforation in 12% of patients, indicating that inflammatory and anatomical factors contributed to operative difficulty.

Conversion to open surgery was required in 6% of patients in the present study. This finding was comparable with Kama et al., who reported that conversion was associated with factors such as male sex, previous upper abdominal surgery, acute cholecystitis, dense adhesions, and unclear anatomy [13]. Singh and Ohri also reported that difficult laparoscopic cholecystectomy was commonly related to adhesions, distorted anatomy, and inflammatory gallbladder disease, leading to conversion in selected cases [16]. Rosen et al. similarly identified acute inflammation, older age, male sex, and technical difficulty as important predictors of conversion [17]. The conversion rate in the present study was within the acceptable range and reflected appropriate surgical judgment in difficult cases. Postoperative complications were absent in 82% of patients in this study, indicating favourable postoperative outcomes. Surgical site infection was observed in 8%, postoperative fever in 5%, bile leak in 3%, and port-site infection in 2% of cases. Aashu et al. reported surgical site infection in approximately 6–10% of patients and bile leak in around 2–4% of cases, which was comparable with the present study [15]. The WSES guideline by de'Angelis et al. highlighted that bile leak and bile duct-related complications, although uncommon, remain clinically important and require early recognition and timely management [7]. The low rate of bile leak in the present study indicates satisfactory operative safety and postoperative monitoring.

The mean hospital stay in the present study was  $2.8 \pm 1.4$  days, with 64% of patients discharged within two days. Soper et al. described laparoscopic cholecystectomy as the gold standard because it offers reduced postoperative pain, shorter hospitalization, and earlier return to routine activities [3]. SAGES guidelines also support laparoscopic cholecystectomy as the preferred approach for benign gallbladder disease due to its minimally invasive benefits and faster recovery [4]. In the present study, good recovery was achieved in 90% of patients, delayed recovery was observed in 8%, and readmission occurred in only 2%, supporting the effectiveness of laparoscopic cholecystectomy in routine surgical practice.

Overall, the present study findings were consistent with previous national and international literature. Female predominance, abdominal pain as the most common presentation, multiple gallstones on ultrasonography, low conversion rate, acceptable complication profile, and

short hospital stay were comparable with earlier studies. The study further highlights that careful preoperative clinical and ultrasonographic assessment, identification of difficult cases, and timely intraoperative decision-making are essential for improving surgical outcomes and reducing complications in laparoscopic cholecystectomy.

## CONCLUSION

The present study concluded that laparoscopic cholecystectomy is a safe, effective, and reliable surgical procedure for the management of symptomatic gallstone disease. The majority of patients were middle-aged females presenting with abdominal pain and dyspeptic symptoms. Ultrasonography findings such as multiple gallstones and gallbladder wall thickening were commonly observed and were useful in identifying potentially difficult cases. Most surgeries were completed successfully laparoscopically with a low conversion rate to open surgery. Postoperative complications were minimal, hospital stay was short, and the majority of patients achieved good postoperative recovery. The findings of the study support the role of laparoscopic cholecystectomy as the preferred treatment modality for gallstone disease due to its favorable surgical and postoperative outcomes.

## Limitations

The study was conducted at a single tertiary care centre, which may limit generalizability of the findings to other healthcare settings. The sample size was relatively limited, and long-term postoperative follow-up was not included in the study. Advanced assessment of quality of life and long-term recurrence of biliary symptoms were not evaluated. In addition, variations in surgeon experience and operative expertise could have influenced intraoperative and postoperative outcomes.

## Recommendations

Preoperative clinical and ultrasonographic assessment should be performed carefully to identify patients at risk of difficult laparoscopic cholecystectomy. Early surgical intervention may help reduce complications associated with chronic inflammation and adhesions. Adequate surgical training and adherence to standard laparoscopic techniques are essential to minimize bile duct injuries and conversion rates. Larger multicentric studies with long-term follow-up are recommended to further evaluate postoperative quality of life, recurrence of symptoms, and predictors of surgical outcomes following laparoscopic cholecystectomy.

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