

ORIGINAL ARTICLE

Comparison of difficult vs simple laparoscopic cholecystectomy in a tertiary care hospital.

Ahsan Jabbar¹, Shahida Khatoon², Ishrat Rahim Katyar³, Saddam Hussain Katyar⁴, Aminah Manahil⁵, Saira Aijaz⁶

ABSTRACT... Objective: To determine the percentage of patients with difficult laparoscopic cholecystectomy for gall bladder calculi done and to compare the various factors and outcomes of simple and difficult laparoscopic cholecystectomy for gall bladder calculi done in our tertiary care hospital. **Study Design:** Cross sectional study. **Setting:** Department of General Surgery, Liaquat University Hospital, Hyderabad. **Period:** March to Aug 2025. **Methods:** A total of 73 patients aged 20–70 years, scheduled for LC, were enrolled using non-probability consecutive sampling. Difficulty was assessed intraoperatively based on anatomical and technical factors. Patient demographics, comorbidities, operative time, and hospital stay were recorded and analyzed using SPSS v26. **Results:** Simple LC was performed in 74.0% of the 73 patients, while the remaining 26.0% underwent difficult LC. The patients had a mean age of 44.15 ± 15.23 years and a mean BMI of 25.98 ± 4.41 kg/m². No significant relationships were found between LC difficulty and factors such as age, sex, BMI, diabetes, hypertension, or dyslipidemia. However, prolonged hospitalization (>8 days) was significantly associated with difficult LC ($p = 0.003$). **Conclusion:** Difficult LC was observed in over one-fourth of patients and was significantly associated with prolonged hospitalization. Preoperative identification of high-risk cases can improve surgical preparedness and reduce complications.

Key words: Difficult Cholecystectomy, Gallstones, Hospital Stay, Laparoscopic Cholecystectomy, Operative Outcome, Surgical Difficulty.

Article Citation: Jabbar A, Khatoon S, Katyar IR, Katyar SH, Manahil A, Aijaz S. Comparison of difficult vs simple laparoscopic cholecystectomy in a tertiary care hospital. Professional Med J 2026; 33(10):1853-1858. <https://doi.org/10.29309/TPMJ/2026.33.10.10321>

INTRODUCTION

It is not uncommon for people to have gallstones¹⁻³, especially in Western societies. Those who suffer from gallstone disease can not exhibit any symptoms at all, or they might present with biliary colic or other complications related to gallstone disease.⁴ Gallstones are quite common, and the vast majority of people who have them do not experience any symptoms. On the other hand, symptoms that are caused by gallstone disease are the most common reason for hospitalization and utilization of health care services in the gastrointestinal tract.⁵

The removal of the gallbladder is now typically performed using a laparoscopic procedure known as cholecystectomy. There are around 750,000 laparoscopic cholecystectomies performed annually in the United States, which accounts for approximately 90 percent of all cholecystectomies. The overall rate of major complications has dropped from the early days of the procedure.⁶⁻⁷ In cases of

acute cholecystitis, laparoscopic cholecystectomy is considered safe, with minimal conversion rates, low risk of bile duct injury, and shorter hospital stays.⁸⁻¹¹ A study conducted in India reported difficulty in 24.4% cases during laparoscopic cholecystectomy.¹²

Despite advancements over the past decade, the rates of conversion and iatrogenic injuries during laparoscopic cholecystectomy remain considerably high. Factors influencing these outcomes include the surgical technique used, the severity of gallbladder inflammation, underlying patient comorbidities, and the surgeon's level of experience, with reported conversion rates reaching up to 30%.¹³

DLC patients are more likely to experience complications, such as damage to the bile ducts, which can occur at a rate that is up to ten times higher than other patients who have simple instances. Injuries to the blood vessels and substantial bleeding are two of the most important

1. MBBS, PG Trainee (General Surgery), LUMHS, Hyderabad.

2. MBBS, FCPS, MCPS-HPE, CHPE, Associate Professor (General Surgery), LUMHS, Hyderabad.

3. MBBS, FC, Associate Professor (General Surgery), LUMHS, Hyderabad.

4. MBBS, FCPS, Medical Officer, LUMHS, Hyderabad.

5. MBBS, PG Trainee (General Surgery), LUMHS, Hyderabad.

6. MBBS, PG Trainee (General Surgery), LUMHS, Hyderabad.

Correspondence Address:

Dr. Ahsan Jabbar

Department of General Surgery, LUMHS, Hyderabad.

arain450@gmail.com

Article received on:

22/01/2026

Date of revision:

28/04/2026

Accepted for publication:

04/05/2026



issues that arise during surgical procedures. The postoperative recovery period is also typically lengthier for individuals who have undergone DLC, as evidenced by studies that demonstrate longer hospital stays in comparison to patients who have undergone straightforward operations.¹⁴⁻¹⁵

The rationale of this study is to compare outcomes between simple vs difficult laparoscopic cholecystectomy for gall bladder calculi in a tertiary care hospital. The trend of laparoscopic cholecystectomy is increasing day by day due to its popularity, ease and early return to daily routine, as well as less complications after procedure has been reported. But literature showed that the chances of difficult surgery are high in laparoscopic cholecystectomy; as varied data has been reported in literature, we have designed this study to determine the percentage of patients with difficult laparoscopic cholecystectomy for gall bladder calculi. It will help to improve our practice and to implement a better technique in local setting and take precautionary measures to reduce chances of complications (triage of cases on basis of difficulty).

METHODS

This cross-sectional study was conducted at the Department of General Surgery, Liaquat University Hospital, Hyderabad, over a duration of six months from March to August 2025 following the approval of the research synopsis. The sample size was calculated using the WHO sample size calculator, with a 95% confidence level, a 10% margin of error, and an expected prevalence of difficult laparoscopic cholecystectomy of 24.4%, resulting in a required sample size of 73 patients. A non-probability consecutive sampling technique was employed for patient selection.

Patients included in the study were aged between 20 to 70 years, of either gender, diagnosed with gallbladder calculi on radiographic imaging, and admitted for laparoscopic cholecystectomy under general anesthesia. Patients were excluded if they presented with gallbladder perforation, jaundice, cholangitis, raised alkaline phosphatase, dilated common bile duct or CBD stones, a history of endoscopic retrograde cholangiopancreatography (ERCP), or a diagnosis of acalculous cholecystitis.

Additionally, patients with a history of smoking exceeding five pack-years were also excluded.

After obtaining approval from the Ethical Review Committee and the College of Physicians and Surgeons Pakistan (CPSP) (LUMHS/REC/-814-10-6-24), patients admitted to surgical wards were approached for participation. Informed consent was obtained prior to enrollment. Baseline demographic and clinical data were recorded from ward charts, including age, gender, body mass index (BMI), and comorbid conditions such as diabetes (fasting blood sugar >200 mg/dL), hypertension (blood pressure $\geq$ 140/90 mmHg), and dyslipidemia (total cholesterol >200 mg/dL). All patients underwent laparoscopic cholecystectomy under general anesthesia. The total operative time was documented in minutes, from skin incision to closure, based on operative reports. The difficulty of the procedure was assessed intraoperatively by an unbiased consultant surgeon blinded to the study, based on anatomical findings such as dense adhesions, frozen Calot's triangle, and difficult dissection. Cases requiring conversion to open cholecystectomy were also noted.

Outcomes measured included operative time, length of hospital stay, prolonged hospital stay (defined as a stay exceeding 8 days in the absence of complications), and conversion to open surgery. All clinical and operative data were recorded on a pre-designed proforma by the consultant anesthetist present in the operating theater. SPSS version 26 was utilized for statistical analysis. Mean $\pm$ standard deviation was used to express continuous variables such as age, BMI, duration of gallstone disease, stone size, and operative time. Frequencies and percentages were used to describe categorical variables including gender, comorbidities, and procedural difficulty. The difficulty of laparoscopic cholecystectomy was stratified by factors such as age, gender, obesity, diabetes, hypertension, dyslipidemia, operative time, and extended hospital stay. Post-stratification associations were evaluated using the chi-square test.

RESULTS

In this study, 73 patients undergoing laparoscopic cholecystectomy were evaluated. The descriptive statistics revealed that the mean age of the

participants was 44.15 years, with a standard deviation of 15.23 years, reflecting a broad age range within the study group. The average body mass index (BMI) was 25.98 kg/m² with a standard deviation of 4.41, indicating a relatively balanced representation of normal and overweight individuals. The mean operative time for the procedure was 58.85 minutes, with a wide range as suggested by the standard deviation of 23.73 minutes, capturing variability in surgical complexity. The mean duration of hospital stay was 4.37 days, and the standard deviation was 2.13 days, suggesting that most patients were discharged within a week postoperatively.

The frequency distribution of categorical variables showed that a majority of patients (64.4%) were in the younger age group of 20 to 49 years, while 35.6% were aged 50 to 70 years. Gender distribution was nearly equal, with 50.7% male and 49.3% female participants. Regarding BMI classification, 46.6% of patients had a BMI of ≤ 25 , whereas 53.4% had a BMI > 25 . Among comorbid conditions, diabetes was present in 19.2% of patients, hypertension in 43.8%, and dyslipidemia in 27.4%. Only 4.1% of patients experienced a prolonged hospital stay (defined as a stay longer than 8 days), and the same percentage (4.1%) required conversion from laparoscopic to open cholecystectomy. In terms of surgical classification, most cases (74.0%) were categorized as simple laparoscopic cholecystectomy, while 26.0% were classified as difficult.

When comparing the characteristics of patients undergoing simple versus difficult laparoscopic cholecystectomy, several trends were observed. In the younger age group (20–49 years), 66.7% underwent simple surgeries while 57.9% underwent difficult ones; the remaining patients aged 50–70 accounted for 33.3% of simple and 42.1% of difficult surgeries ($p = 0.492$). Regarding gender, 57.9% of difficult cases were male compared to 48.1% in the simple group, but again ($p = 0.465$). BMI also showed no meaningful difference, with 57.9% of difficult cases and 51.9% of simple cases having a BMI > 25 ($p = 0.650$). Similarly, the presence of diabetes, hypertension, and dyslipidemia associations with surgical difficulty, with p -values of 0.809, 0.369, and

0.902 respectively.

The only variable that demonstrated a statistically significant relationship with surgery type was prolonged hospital stay. Among the patients who had a prolonged stay, 100% (3 patients) had undergone a difficult cholecystectomy, while none from the simple group experienced such a stay ($p=0.003$), suggesting that difficult laparoscopic cholecystectomy is a strong predictor of extended hospitalization, likely due to increased intraoperative challenges and postoperative complications. These findings underscore the need for preoperative risk assessment to anticipate potential difficulty and postoperative care requirements.

TABLE-I

Descriptive statistics (Continuous Variables)

Variable	Mean	Standard Deviation
Age (years)	44.15	15.23
BMI (kg/m ²)	25.98	4.41
Operative Time (min)	58.85	23.73
Hospital Stay (days)	4.37	2.13

TABLE-II

Frequency distribution of categorical variables

Variable	Category	Frequency	Percent (%)
Age Group	1 (20-49)	47	64.4
	2 (50-70)	26	35.6
Gender	Male	37	50.7
	Female	36	49.3
BMI Group	1 (≤ 25)	34	46.6
	2 (> 25)	39	53.4
Diabetes	Yes	14	19.2
	No	59	80.8
Hypertension	Yes	32	43.8
	No	41	56.2
Dyslipidemia	Yes	20	27.4
	No	53	72.6
Prolonged Stay	Yes	3	4.1
	No	70	95.9
Conversion to Open	Yes	3	4.1
	No	70	95.9
Surgery Type	Simple	54	74.0
	Difficult	19	26.0

TABLE-III

Comparison of difficult vs simple laparoscopic cholecystectomy according to various effect modifiers

Variable		Simple (Count & %)	Difficult (Count & %)	Total (Count & %)	P-Value ^a
Age Group	20-50	36 (66.7%)	11 (57.9%)	47 (64.4%)	0.492
	50-70	18 (33.3%)	8 (42.1%)	26 (35.6%)	
Gender	Male	26 (48.1%)	11 (57.9%)	37 (50.7%)	0.465
	Female	28 (51.9%)	8 (42.1%)	36 (49.3%)	
BMI Group	≤25	26 (48.1%)	8 (42.1%)	34 (46.6%)	0.650
	>25	28 (51.9%)	11 (57.9%)	39 (53.4%)	
Diabetes	Yes	10 (18.5%)	4 (21.1%)	14 (19.2%)	0.809
	No	44 (81.5%)	15 (78.9%)	59 (80.8%)	
Hypertension	Yes	22 (40.7%)	10 (52.6%)	32 (43.8%)	0.369
	No	32 (59.3%)	9 (47.4%)	41 (56.2%)	
Dyslipidemia	Yes	15 (27.8%)	5 (26.3%)	20 (27.4%)	0.902
	No	39 (72.2%)	14 (73.7%)	53 (72.6%)	
Prolonged Stay	Yes	0 (0.0%)	3 (15.8%)	3 (4.1%)	0.003
	No	54 (100.0%)	16 (84.2%)	70 (95.9%)	

^aChi square test

DISCUSSION

The current study was conducted to evaluate the frequency and risk factors associated with difficult laparoscopic cholecystectomy (DLC) and to compare perioperative outcomes with simple laparoscopic cholecystectomy (SLC) in a tertiary care setting. Our findings indicate that while the majority (74%) of procedures were classified as simple, a substantial proportion (26%) were categorized as difficult. Importantly, prolonged hospital stay was significantly associated with DLC, underscoring the clinical impact of procedural complexity.

The observed rate of 26% difficult cholecystectomies in our study aligns with prior research. Abdallah et al¹⁶ emphasized that DLC is a common surgical scenario associated with longer operative times, higher complication rates, and increased need for bailout procedures, such as subtotal cholecystectomy or conversion to open surgery. Their review supports the concept that the degree of inflammation, distorted anatomy, and presence of comorbid conditions such as cirrhosis or severe acute cholecystitis are significant contributors to surgical difficulty.

Consistent with our findings, Sirajet al¹⁷ also reported

a nearly equal distribution of simple and difficult laparoscopic cases (49.4% vs. 50.6%) in a Pakistani cohort. They identified a significantly larger common bile duct (CBD) diameter as a predictive marker for surgical difficulty, suggesting that preoperative ultrasonographic assessment can guide operative planning. Although our study did not assess CBD diameter, the operative challenges observed may similarly relate to underlying anatomical variations.

Several demographic and clinical parameters including age, gender, BMI, diabetes, hypertension, and dyslipidemia showed no statistically significant relationship with procedural difficulty in our study. These findings echo those of Akita et al¹⁸ who reported that laparoscopic cholecystectomy in cirrhotic patients was not significantly associated with longer operative times but did result in increased morbidity and longer hospital stays. This suggests that while baseline comorbidities may not always predict intraoperative difficulty, they can influence postoperative recovery.

Hospital stay duration was a notable outcome in our analysis. All patients with prolonged hospitalization (>8 days) had undergone a difficult laparoscopic procedure, with a statistically significant association

($p = 0.003$). Similar findings were reported by Shabbir et al¹⁹ who observed that patients undergoing open cholecystectomy—a frequent outcome of intraoperative difficulty—experienced longer hospital stays compared to those managed laparoscopically (5.12 ± 1.58 days vs. 3.80 ± 1.37 days, $p < 0.001$). Badve et al²⁰ further explored this issue in a retrospective cohort comparing outcomes of open conversion and laparoscopic subtotal cholecystectomy. They found no significant difference in biliary events between the two groups, though laparoscopic subtotal procedures were associated with shorter hospitalization (2.9 vs. 5.1 days, $p = 0.002$), reinforcing the importance of maintaining minimally invasive techniques where feasible.

Additionally, Suh et al²¹ evaluated SILC versus TILC in acute cholecystitis and found no difference in overall hospital stay, but identified surgical risk in more complex cases based on ASA grading. Although our study did not stratify by ASA classification, we observed similar challenges in intraoperative management and recovery in DLC cases. Gupta et al²² compared single-incision laparoscopic cholecystectomy (SILC) and conventional four-port laparoscopic cholecystectomy (FPLC) and concluded that although SILC is associated with better cosmetic outcomes and less postoperative pain, the operative time was longer. In our study, the mean operative time was 58.85 minutes overall, with increased variability likely attributable to DLC cases—again indicating that procedural difficulty is associated with extended surgical durations. Li et al²³ demonstrated that laparoscopic bile duct exploration with LC results in fewer complications and better postoperative recovery compared to ERCP in elderly patients. This suggests that combining expertise in advanced laparoscopic procedures may mitigate some of the complications seen in difficult gallbladder surgeries.

Collectively, the findings of this study, corroborated by extensive literature, emphasize the clinical importance of preoperative assessment to identify patients at risk of DLC. This includes consideration of factors such as CBD diameter, ASA classification, imaging features, and inflammatory markers. Furthermore, the significantly longer hospital stay

associated with difficult surgeries necessitates the development of better risk stratification protocols and surgical planning strategies. Surgeons must remain vigilant in assessing intraoperative difficulty early and should consider adopting safe bailout procedures such as subtotal cholecystectomy or fundus-first approaches when required.

A major strength of this study is its prospective design and execution in a real-world tertiary care surgical setting, providing relevant insights into operative challenges encountered during routine laparoscopic cholecystectomy. The use of a standardized proforma and intraoperative difficulty assessment by an unbiased, blinded consultant adds objectivity and reliability to the classification of cases. Additionally, the inclusion of multiple perioperative variables enhances the clinical applicability of the findings for surgical planning and patient counseling.

However, the study has certain limitations. It was conducted at a single center with a relatively small sample size, which may limit the generalizability of the results to other populations or healthcare settings. Some potentially influential variables, such as the common bile duct diameter, ASA physical status classification, and surgeon experience level, were not included in the analysis. Furthermore, the lack of long-term follow-up data precludes assessment of delayed complications or recurrence of symptoms, which may influence the overall evaluation of surgical outcomes.

CONCLUSION

This study found that 26% of laparoscopic cholecystectomies were classified as difficult, with prolonged hospital stay significantly associated with surgical difficulty. While demographic and comorbid factors showed no significant correlation, the intraoperative assessment remained key to identifying challenging cases. These findings reinforce the need for improved preoperative risk stratification and surgical preparedness.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright© 04 May, 2026.

REFERENCES

- Hjaltadottir K, Haraldsdottir KH, Moller PH. **IGallstones - review**. Laeknabladid. 2020 Oct; 106(10):464-72.
- Sohail Z, Shaikh H, Iqbal N, Parkash O. **Acute pancreatitis: A narrative review**. J Pak Med Assoc. 2024 May; 74(5):953-58.
- Verdonk RC, de Zeeuw S, de Reuver PR. **Galstenen IGallstones**. Ned Tijdschr Geneesk. 2024 Oct 15; 168:D8252.
- Yuksekdag S, Bas GÜ, Okan I, Karakelleoglu A, Alimoglu O, Akcakaya A, et al. **Timing of laparoscopic cholecystectomy in acute cholecystitis**. Nigerian Journal of Clinical Practice. 2021 Feb 1; 24(2):156-60.
- Roa JC, García P, Kapoor VK, Maithel SK, Javle M, Koshiol J. **Gallbladder cancer**. Nat Rev Dis Primers. 2022 Oct 27; 8(1):69.
- Alexander HC, Bartlett AS, Wells CI, Hannam JA, Moore MR, Poole GH, et al. **Reporting of complications after laparoscopic cholecystectomy: A systematic review**. HPB (Oxford). 2018; 20(9):786-94.
- Fletcher R, Cortina CS, Kornfield H, Varelas A, Li R, Veenstra B, et al. **Bile duct injuries: A contemporary survey of surgeon attitudes and experiences**. Surg Endosc. 2020; 34(7):3079-84.
- Gallaher JR, Charles A. **Acute cholecystitis: A review**. JAMA. 2022 Mar 8; 327(10):965-75.
- Timerbulatov MV, Grishina EE, Aitova LR, Aziev MM. **Sovremennye printsipy bezopasnosti pri vypolnenii laparoskopicheskoi kholetsistektomii [Modern principles of safety in laparoscopic cholecystectomy]**. Khirurgiia (Mosk). 2022; (12):104-108.
- Cao J, Liu B, Shi J, Meng X, Zhang H, Pan Y, et al. **Safety of ambulatory laparoscopic cholecystectomy in the elderly**. ANZ J Surg. 2021 Apr; 91(4):597-602.
- Ramírez-Giraldo C, Torres-Cuellar A, Van-Londoño I. **State of the art in subtotal cholecystectomy: An overview**. Front Surg. 2023 Apr 21; 10:1142579.
- Nidoni R, Udachan TV, Sasnur P, Baloorkar R, Sindgikar V, Narasangi B. **Predicting difficult laparoscopic cholecystectomy based on clinicoradiological assessment**. J Clin Diagn Res. 2015; 9(12):PC09-12.
- Zaman J, Razzak R, Imaduddin S. **Frequency of difficult cholecystectomy in patients with thick-walled gall bladder**. Pak J Med Dent. 2015; 4(2):11.
- Di Buono G, Romano G, Galia M, Amato G, Maienza E, Vernuccio F, et al. **Difficult laparoscopic cholecystectomy and preoperative predictive factors**. Sci Rep. 2021 Jan 28; 11(1):2559.
- Ramírez-Giraldo C, Alvarado-Valenzuela K, Isaza-Restrepo A, Navarro-Alean J. **Predicting the difficult laparoscopic cholecystectomy based on a preoperative scale**. Updates Surg [Internet]. 2022; 74(3):969-77.
- Abdallah HS, Sedky MH, Sedky ZH. **The difficult laparoscopic cholecystectomy: A narrative review**. BMC Surg. 2025; 25:156.
- Siraj MI, Kazim E, Haider S, Memon ZA, Ibrahim F, Muqet A, et al. **Frequency of easy and difficult laparoscopic cholecystectomy for cholelithiasis**. Biol Clin Sci Res J. 2024; 1160.
- Akita M, Ajiki T, Ueno K, Tsugawa D, Shinozaki K, Toyama H, et al. **Comparison between outcomes of laparoscopic cholecystectomy in patients with liver cirrhosis or with normal liver function**. Int Surg. 2017; 102:489-95.
- Shabbir U, Anwar J, Hussain S, Abrar M, Akram A, Ahsan M, et al. **Comparative study of morbidity of open cholecystectomy vs laparoscopic cholecystectomy in complicated gall stone disease**. Prof Med J. 2024; 31(02):160-4.
- Badve SB, Turcotte J, Brennan JC, Klune J, Feather CB, Rehrig S, et al. **Comparison of long-term outcomes between conversion to open and laparoscopic subtotal cholecystectomy in the difficult gallbladder: a single-center retrospective study**. Am Surg. 2025; 91(5):819-25.
- Suh S, Choi S, Choi YR, Lee B, Cho JY, Yoon YS, et al. **Outcome of single-incision laparoscopic cholecystectomy compared to three-incision laparoscopic cholecystectomy for acute cholecystitis**. Ann Hepatobiliary Pancreat Surg. 2023; 27(4):372-9.
- Gupta A, Gupta JK, Jhobta RS, Mahajan A. **Comparison between single incision laparoscopic cholecystectomy using conventional laparoscopic instruments vs. four port laparoscopic cholecystectomy in patients of symptomatic cholelithiasis: A prospective randomised study**. Int Surg J. 2023; 10(8):1325-31.
- Li Y, Wu T, Wang J. **Comparison of laparoscopic cholecystectomy outcome with laparoscopic versus endoscopic bile duct exploration in elderly patients with cholecystolithiasis and choledocholithiasis**. J Coll Physicians Surg Pak. 2025; 35(5):562-7.

AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Ahsan Jabbar : Data collection, data analysis, paper writing.
2	Shahida Khatoon : Review of manuscript.
3	Ishrat Rahim Katyar : Literature review.
4	Saddam Hussain Katyar : Data analysis.
5	Aminah Manahil : Review of manuscript.
6	Saira Aijaz : Paper writing.