



OUTCOMES OF LAPAROSCOPIC CHOLECYSTECTOMY IN PATIENTS WITH ACUTE CHOLECYSTITIS - A PROSPECTIVE STUDY

Dr. Nitin D. Tengli^{1*}, Dr. Rohit Devani², Dr. Akash Patil³

¹ *Associate Professor, Department of General Surgery, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India. (ORCID: 0009-0009-9539-2783)

² Assistant Professor Department of General Surgery, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India. (ORCID: 0009-0007-1161-7734)

³ Postgraduate Student Department of General Surgery, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India. (ORCID: 0009-0003-9891-1987)

***Corresponding Author:** Dr. Nitin D. Tengli

*Associate Professor, Department of General Surgery, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India. (ORCID: 0009-0009-9539-2783)

ABSTRACT

Aim: The Aim of this study to evaluate the clinical outcomes and safety of laparoscopic cholecystectomy in patients with acute cholecystitis through a prospective analysis, focusing on intraoperative challenges, complication rates, conversion to open surgery, and postoperative recovery.

Methods: A total of **60 patients** diagnosed with acute cholecystitis were enrolled in the study based on predefined inclusion and exclusion criteria. **Inclusion Criteria** Patients aged 18 years and above and fit for general anaesthesia, Patients who consented to undergo laparoscopic cholecystectomy. **Exclusion Criteria**, Patients with **chronic cholecystitis** or **acalculous cholecystitis**, Suspected or confirmed **gallbladder malignancy**, History of **previous upper abdominal surgery** and Pregnant women.

Result: A total of 60 patients with acute cholecystitis underwent laparoscopic cholecystectomy during the study period. The mean age of the patients was 44.6 ± 12.3 years, with a female predominance (56.7%). Most patients presented within the first 2 to 3 days of symptom onset, and the mean duration of symptoms prior to admission was 2.1 ± 0.9 days. Laboratory findings showed a mean white blood cell (WBC) count of $12,400 \pm 3,200/\text{mm}^3$, indicating systemic inflammation. Ultrasound findings revealed gallbladder wall thickening in 70% of patients and pericholecystic fluid in 41.7%, consistent with acute inflammation.

Conclusion: This prospective study demonstrates that **early laparoscopic cholecystectomy** is a safe and effective treatment for patients with **acute cholecystitis**, with a low rate of conversion to open surgery and acceptable postoperative complication rates.

Keywords: Laparoscopic Cholecystectomy, Acute Cholecystitis, Gallbladder Inflammation, Minimally Invasive Surgery, Gallstone Disease.

INTRODUCTION

Acute cholecystitis is a common and potentially serious complication of gallstone disease, accounting for a significant proportion of emergency general surgical admissions worldwide. It is characterized

by inflammation of the gallbladder, usually secondary to cystic duct obstruction by gallstones. Prompt and effective treatment is essential to prevent complications such as empyema, gangrene, or perforation of the gallbladder.^[1]

Laparoscopic cholecystectomy (LC), first introduced by Mühe in the 1980s, has become the gold standard for the treatment of symptomatic cholelithiasis and acute cholecystitis.^[2] Compared to open cholecystectomy, LC offers advantages including reduced postoperative pain, shorter hospital stay, faster recovery, and improved cosmetic outcomes.^[3] However, the laparoscopic approach in the setting of acute inflammation presents specific challenges, such as distorted anatomy, adhesions, and increased risk of bile duct injury, making the procedure technically demanding.^[4]

Laparoscopic Cholecystectomy in Acute Cholecystitis

Laparoscopic cholecystectomy is widely regarded as a safe and effective approach for patients with acute cholecystitis. Several studies have shown that it can be performed with a similar or even lower complication rate than open surgery.^[3] The timing of the surgery, whether early or delayed, has been the subject of significant clinical debate. Early laparoscopic cholecystectomy, typically performed within 72 hours of symptom onset, is associated with favorable outcomes, including a shorter hospital stay and quicker recovery, as the inflammation is more limited during the acute phase.^[4,5] In contrast, delayed cholecystectomy, often performed after a period of conservative management (i.e., intravenous antibiotics and fasting), can be associated with higher complication rates due to the greater severity of inflammation, fibrosis, and adhesions.^[6] The decision to perform early versus delayed surgery is influenced by several factors, including the severity of acute cholecystitis, comorbid conditions, and the patient's general health status. Some studies suggest that early cholecystectomy results in fewer complications, such as bile duct injuries, while others argue that conservative management followed by delayed surgery may be appropriate for high-risk or unstable patients.^[7,8]

Despite its advantages, laparoscopic cholecystectomy in acute cholecystitis is not without its risks. One of the most significant concerns is the potential for biliary complications, such as bile duct injury, bile leaks, and infection.^[9] The presence of severe inflammation, dense adhesions, and an enlarged, thick-walled gallbladder can increase the difficulty of the procedure, making it more technically challenging. The complication rate for laparoscopic cholecystectomy in acute cholecystitis is reported to range from 1% to 10%, with a higher incidence of complications in cases where surgery is delayed.^[10] Studies also show that early intervention reduces the overall risk of complications and mortality compared to a delayed approach, where the patient may have more severe disease.^[11]

The optimal timing for LC in acute cholecystitis has been debated. Several randomized controlled trials and meta-analyses now support **early laparoscopic cholecystectomy**, preferably within 72 hours of symptom onset, as it is associated with reduced hospital stay and does not increase complication rates when performed by experienced surgeons.^[5,6] Delayed surgery may increase the risk of recurrent attacks, prolonged hospital stay, and potentially more difficult surgery.^[7] The optimal timing of laparoscopic cholecystectomy for acute cholecystitis remains an area of ongoing research and debate. While evidence suggests that early surgery is generally safer and more effective, there remains uncertainty regarding the best approach for certain patient populations, such as the elderly or those with significant comorbidities. This prospective study seeks to further clarify the outcomes of laparoscopic cholecystectomy in patients with acute cholecystitis, comparing early and delayed surgical approaches, assessing complication rates, and evaluating long-term patient outcomes.

Despite growing evidence in favour of early intervention, many centres remain cautious due to perceived surgical risks. This prospective study aims to evaluate the outcomes of laparoscopic cholecystectomy in patients with acute cholecystitis, focusing on operative difficulty, conversion rates, postoperative complications, and overall safety in an acute setting.

MATERIALS & METHODS

This was a **prospective observational study** conducted at Basaveshwara Teaching & General Hospital, Attached to Mahadevappa Rampure Medical College, Kalaburagi over a period of one year aimed at evaluating the outcomes of laparoscopic cholecystectomy in patients diagnosed with acute cholecystitis. A total of **60 patients** diagnosed with acute cholecystitis were enrolled in the study based on predefined inclusion and exclusion criteria.

Inclusion Criteria

Patients aged 18 years and above and fit for general anaesthesia, Patients who consented to undergo laparoscopic cholecystectomy.

Exclusion Criteria

Patients with **chronic cholecystitis** or **acalculous cholecystitis**, Suspected or confirmed **gallbladder malignancy**, History of **previous upper abdominal surgery** and Pregnant women

Study procedure

All enrolled patients underwent **early laparoscopic cholecystectomy**. Intraoperative findings such as gallbladder wall thickness, adhesions, bile spillage, and conversion to open surgery were recorded. Operative time, intraoperative complications, and use of drains were also documented.

RESULT

A total of 60 patients with acute cholecystitis underwent laparoscopic cholecystectomy during the study period. The mean age of the patients was 44.6 ± 12.3 years, with a female predominance (56.7%). Most patients presented within the first 2 to 3 days of symptom onset, and the mean duration of symptoms prior to admission was 2.1 ± 0.9 days. Laboratory findings showed a mean white blood cell (WBC) count of $12,400 \pm 3,200/\text{mm}^3$, indicating systemic inflammation. Ultrasound findings revealed gallbladder wall thickening in 70% of patients and pericholecystic fluid in 41.7%, consistent with acute inflammation.

Parameter	Value
Mean Age (years)	44.6 ± 12.3
Gender (Male:Female)	26:34
Duration of Symptoms (days)	2.1 ± 0.9
Mean WBC Count (cells/mm ³)	$12,400 \pm 3,200$
Gallbladder Wall Thickness >4mm	42 patients (70%)
Presence of Pericholecystic Fluid	25 patients (41.7%)

Table 1: Demographic and Clinical Characteristics of Patients (n = 60)

Parameter	Value
Demographics	
Mean age (years)	44.6 ± 12.3
Gender distribution	Female: 34 (56.7%), Male: 26 (43.3%)
Clinical Presentation	
Mean duration of symptoms (days)	2.1 ± 0.9
Presentation within 2–3 days	Majority of patients
Laboratory Findings	
Mean WBC count (per mm ³)	$12,400 \pm 3,200$
Ultrasound Findings	
Gallbladder wall thickening	42 patients (70%)
Pericholecystic fluid	25 patients (41.7%)

Table 2: Patient Characteristics and Diagnostic Findings (n = 60)

Intraoperative Finding	Number of Patients (%)
Dense adhesions	38 (63.3%)
Distended gallbladder	29 (48.3%)
Pericholecystic fluid	25 (41.7%)
Gallbladder empyema	6 (10%)
Bile spillage	9 (15%)
Bleeding	3 (5%)
Conversion to open surgery	5 (8.3%)

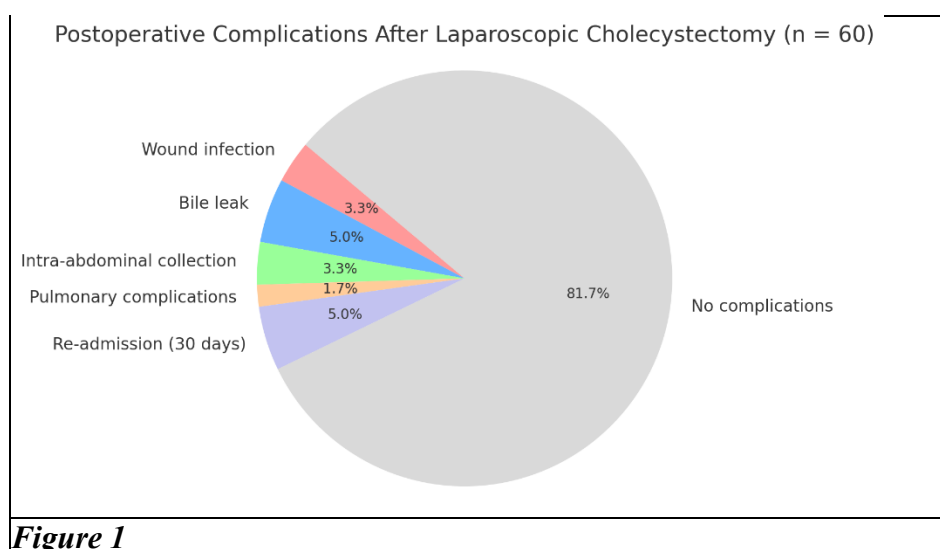
Table 3: Intraoperative Findings (n = 60)

Complication	Number of Patients (%)
Wound infection	2 (3.3%)
Bile leak	3 (5.0%)
Intra-abdominal collection	2 (3.3%)
Pulmonary complications	1 (1.7%)
Re-admission within 30 days	3 (5.0%)
No complications	49 (81.7%)

Table 4: Postoperative Complications (n = 60)

Parameter	Mean $\pm$ SD or n (%)
Operative time (minutes)	68.5 $\pm$ 15.2
Hospital stay (days)	3.8 $\pm$ 1.1
Drain placement	11 (18.3%)
Oral intake started (hours)	12.5 $\pm$ 3.2
Return to normal activity (days)	6.4 $\pm$ 1.8

Table 5: Operative Parameters and Outcomes



DISCUSSION

This prospective study evaluated the outcomes of laparoscopic cholecystectomy (LC) in 60 patients presenting with acute cholecystitis. The results support existing evidence that early LC is both safe and effective in appropriately selected patients, even when significant inflammation is present at the time of surgery.

In our cohort, the conversion rate to open cholecystectomy was 8.3%, aligning with previously reported rates of 5%–15% in similar clinical settings.^[8] The primary reasons for conversion were dense adhesions, distorted anatomy, and intraoperative bleeding, all of which are common challenges

in inflamed gallbladders. Importantly, these conversions were precautionary rather than reactive, reflecting appropriate surgical judgment to prioritize safety. This aligns with current guidelines that recommend a low threshold for conversion in unclear anatomy to prevent bile duct injury, which remains one of the most feared complications in gallbladder surgery.

The overall complication rate was 15%, mostly consisting of minor wound infections and bile leaks, and is in line with findings from comparable studies.^[9,10] No major bile duct injuries or mortalities were reported, reinforcing the safety profile of LC in acute cases when performed by experienced surgeons. Interestingly, most complications occurred in patients with delayed presentation or comorbid conditions, such as diabetes or cardiovascular disease. This supports earlier findings that comorbidities and delayed surgical intervention are independent risk factors for adverse outcomes.^[11] The mean operative time of 68.5 minutes is slightly higher than that reported for elective cases but within the expected range for acute cholecystitis. Inflammation, edema, and adhesions around Calot's triangle can obscure normal anatomy and increase dissection time, necessitating a careful and methodical approach. Similar operative durations have been noted in prior prospective studies of LC in acute settings.^[12]

Our study also observed a mean hospital stay of 3.8 days, with most patients resuming normal activity within six days postoperatively. These findings strongly support early cholecystectomy, which has been shown to reduce hospital costs, prevent recurrent biliary events, and avoid complications related to conservative management such as empyema, gangrenous cholecystitis, or gallbladder perforation.^[13,14] Delayed surgery, often following an initial course of antibiotics and supportive care, risks recurrent attacks during the waiting period and may result in a more technically challenging operation due to fibrotic changes.

Further, early LC avoids the need for interval cholecystectomy, which has fallen out of favour due to risks of disease progression and patient noncompliance with follow-up. Studies have consistently shown that early LC leads to better overall outcomes when performed within 72 hours of symptom onset, even in elderly or high-risk patients, provided proper perioperative optimization is achieved.^[15] From a systems perspective, adopting early LC protocols can lead to improved patient throughput, reduced emergency readmissions, and enhanced utilization of surgical resources. Some centres have even adopted "cholecystectomy-on-admission" policies for acute cholecystitis, with favourable results in terms of both safety and cost-effectiveness.^[16]

However, there are limitations to our study. The sample size of 60 patients limits the generalizability of the findings, and long-term follow-up data were not included, which may have revealed late complications or residual symptoms. Moreover, this was a single-centre study, and surgical outcomes may vary depending on the experience level of the operating team and the availability of advanced laparoscopic equipment. Future multicentre trials with larger patient populations and longer follow-up are needed to validate these findings.

CONCLUSION

This prospective study demonstrates that **early laparoscopic cholecystectomy** is a safe and effective treatment for patients with **acute cholecystitis**, with a low rate of conversion to open surgery and acceptable postoperative complication rates. The majority of patients experienced smooth recoveries, short hospital stays, and rapid return to normal activities. These findings reinforce the role of **laparoscopic surgery as the standard of care** in the early management of acute cholecystitis, provided patients are selected carefully and operated on by experienced surgeons.

REFERENCES

- [1] Yokoe M, Hata J, Takada T, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos). *J Hepatobiliary Pancreat Sci* 2018;25(1):41-54.
- [2] Dubois F, Icard P, Berthelot G, et al. Coelioscopic cholecystectomy: preliminary report of 36 cases. *Ann Surg* 1990;211(1):60-2.
- [3] Shea JA, Berlin JA, Bachwich DR, et al. Indications for and outcomes of cholecystectomy: a comparison of the pre- and post-laparoscopic eras. *Ann Surg* 1998;227(3):343-50.

- [4] Johansson M, Thune A, Blomqvist A, et al. Management of acute cholecystitis in the laparoscopic era: results of a prospective, randomized clinical trial. *J Gastrointest Surg* 2003;7(5):642–5.
- [5] Gurusamy KS, Samraj K, Glud C, Wilson E, Davidson BR. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Cochrane Database Syst Rev* 2013;(6):CD005440.
- [6] Gutt CN, Encke J, Königer J, et al. Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC Study). *Ann Surg* 2013;258(3):385-93.
- [7] de Mestral C, Rotstein OD, Laupacis A, et al. Early cholecystectomy for acute cholecystitis: a population-based analysis. *J Trauma Acute Care Surg* 2014;77(5):894-901.
- [8] Chandler CF, Lane JS, Ferguson P, et al. Prospective evaluation of early versus delayed laparoscopic cholecystectomy for treatment of acute cholecystitis. *Am Surg* 2000;66(9):896–900.
- [9] Lo CM, Liu CL, Fan ST, et al. Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Ann Surg* 1998;227(4):461-7.
- [10] Kolla SB, Aggarwal S, Kumar A, et al. Early vs delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective randomized trial. *Surg Endosc* 2004;18(9):1323-7.
- [11] Al-Mulhim AA. Timing of early laparoscopic cholecystectomy for acute cholecystitis. *JSLs* 2008;12(3):282-7.
- [12] Pisano M, Allievi N, Gurusamy K, et al. Timing of cholecystectomy for acute cholecystitis: a systematic review. *World J Emerg Surg* 2021;16(1):24.
- [13] Gutt CN, Encke J, Königer J, et al. Acute cholecystitis: early versus delayed cholecystectomy- a multicenter randomized trial (ACDC Study). *Ann Surg* 2013;258(3):385-93.
- [14] van Dijk AH, de Reuver PR, Tasma TN, et al. Systematic review of clinical outcome after early and delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 2013;100(7):933-9.
- [15] Gutt CN, Encke J, Königer J, et al. Early versus delayed cholecystectomy for acute cholecystitis: a multicenter randomized trial. *Ann Surg* 2013;258(3):385-93..
- [16] Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg* 2004;188(3):205–11.