

Laparoscopic Versus Open Cholecystectomy: A Comparative Analysis of Clinical Outcomes**Shailesh Haribhai Barmeda¹, Divyang Dhirajlal Patel², Vinaykumar Raghuvirdas Hariyani³**^{1,2,3}Associate Professor, Department of General Surgery, GMERS Medical College, Junagadh, Gujarat, India

Received: 01-05-2026 / Revised: 15-06-2026 / Accepted: 25-07-2026

Corresponding author: Dr. Shailesh Haribhai Barmeda

Conflict of interest: Nil

Abstract

Background: Acute cholecystitis is one of the most common surgical emergencies worldwide, with cholecystectomy serving as the definitive treatment. Laparoscopic cholecystectomy has largely replaced open cholecystectomy because of its minimally invasive nature and favorable postoperative outcomes. However, open cholecystectomy remains an important option in patients with complicated gallbladder disease or difficult surgical anatomy. The present study was undertaken to compare laparoscopic cholecystectomy and open cholecystectomy in patients with cholecystitis.

Methods: A hospital-based comparative observational study was conducted among 150 patients diagnosed with cholecystitis at a tertiary care teaching hospital. Patients were divided into two groups based on the surgical procedure performed: 75 patients underwent laparoscopic cholecystectomy and 75 underwent open cholecystectomy. Demographic characteristics, clinical findings, operative details, postoperative complications, duration of hospital stay, and surgical outcomes were recorded using a structured proforma. Data were analyzed using SPSS version 26.0, and a p-value <0.05 was considered statistically significant.

Results: Among the 150 study participants, 61.33% were males and 38.67% were females. The majority of patients (72.00%) belonged to rural areas. Laparoscopic cholecystectomy demonstrated favorable perioperative outcomes, including reduced postoperative pain, shorter hospital stay, faster recovery, and earlier return to routine activities compared with open cholecystectomy. Open cholecystectomy was performed mainly in patients with complicated gallbladder disease, severe inflammation, or difficult intraoperative anatomy. Overall, both procedures were safe and effective, with acceptable postoperative outcomes when appropriate patient selection and surgical expertise were ensured.

Conclusion: Laparoscopic cholecystectomy remains the preferred surgical treatment for uncomplicated cholecystitis because of its minimal invasiveness, quicker postoperative recovery, and shorter hospitalization. Open cholecystectomy continues to play a vital role in managing complicated cases and should be considered whenever laparoscopic surgery is contraindicated or conversion is required. Appropriate patient selection, timely surgical intervention, and adherence to established surgical guidelines are essential for achieving optimal clinical outcomes.

Keywords: Cholecystitis; Laparoscopic Cholecystectomy; Open Cholecystectomy; Gallstone Disease; Minimally Invasive Surgery; Surgical Outcomes; Comparative Study.

DOI: 10.25258/ijcpr.18.8.44

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Acute cholecystitis is one of the most common surgical conditions encountered worldwide and is primarily caused by gallstone obstruction of the cystic duct, resulting in inflammation of the gallbladder [1,2]. Cholecystectomy remains the definitive treatment for symptomatic gallstone disease and acute cholecystitis. Over the past three decades, laparoscopic cholecystectomy has become the standard surgical procedure because of its minimally invasive nature, reduced postoperative

pain, shorter hospital stay, faster recovery, and improved cosmetic outcomes compared to conventional open cholecystectomy [3,4]. Despite these advantages, open cholecystectomy continues to play an important role in patients with complicated gallbladder disease, severe inflammation, dense adhesions, previous upper abdominal surgery, or when laparoscopic surgery is contraindicated or requires conversion [5,6]. Several randomized controlled trials and systematic

reviews have compared laparoscopic and open cholecystectomy with respect to operative duration, postoperative complications, recovery period, hospital stay, and overall patient outcomes [5–10]. Most studies have demonstrated that laparoscopic cholecystectomy is associated with lower postoperative morbidity, earlier return to normal activities, and higher patient satisfaction, while maintaining comparable safety and efficacy [7–10]. However, open cholecystectomy remains a valuable surgical option in selected patients, particularly those with advanced inflammation or difficult anatomy. Therefore, the present study was undertaken to compare laparoscopic cholecystectomy and open cholecystectomy in patients with cholecystitis with regard to operative findings, postoperative complications, duration of hospital stay, and overall surgical outcomes.

Material and Methods

This hospital-based comparative observational study was conducted in the Department of General Surgery at a tertiary care teaching hospital over a period of 18 months after obtaining approval from the Institutional Ethics Committee. The study included 150 patients diagnosed with acute or chronic calculous cholecystitis who underwent surgical management during the study period.

Patients aged 18 years and above with symptomatic cholecystitis who were planned for either laparoscopic cholecystectomy or open cholecystectomy and provided written informed consent were included in the study. Patients with gallbladder malignancy, acalculous cholecystitis, severe cardiopulmonary disease precluding surgery, pregnancy, bleeding disorders, or incomplete clinical records were excluded.

A detailed clinical history, including age, sex, presenting symptoms, duration of illness, previous episodes of biliary colic, associated comorbidities, and previous abdominal surgery, was obtained from all participants. General physical examination and abdominal examination were performed. Routine laboratory investigations including complete blood count, liver function tests, renal function tests, blood glucose, coagulation profile, and viral markers were carried out preoperatively. Ultrasonography of the abdomen was performed in all patients to confirm the diagnosis and evaluate gallstones, gallbladder wall thickness,

pericholecystic fluid, and common bile duct diameter. Additional imaging such as magnetic resonance cholangiopancreatography (MRCP) was performed in selected patients whenever choledocholithiasis was suspected.

Patients were allocated into two groups based on the surgical procedure performed. Group A consisted of 75 patients who underwent laparoscopic cholecystectomy, while Group B included 75 patients who underwent open cholecystectomy. The choice of surgical approach depended on the patient's clinical condition, surgeon's assessment, intraoperative findings, and patient preference.

Operative duration, intraoperative findings, blood loss, conversion to open surgery, postoperative pain, wound infection, bile leakage, duration of hospital stay, and postoperative complications were recorded using a structured proforma. All patients were followed until discharge and during scheduled postoperative outpatient visits.

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation, whereas categorical variables were presented as frequencies and percentages. Comparisons between the two groups were performed using the Student's t-test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. A p-value <0.05 was considered statistically significant.

Results

Table 1 shows the gender-wise distribution of the study participants. Among the 150 patients included in the study, 92 (61.33%) were males, while 58 (38.67%) were females. The findings indicate a higher proportion of male patients undergoing cholecystectomy for cholecystitis compared to female patients.

Table 2 presents the area-wise distribution of the study participants. The majority of patients belonged to rural areas (72.00%), accounting for 108 cases, whereas 42 (28.00%) patients were from urban areas. This distribution suggests that most patients seeking surgical management for cholecystitis in the present study were from rural populations.

Table 1: Gender-wise Distribution of Study Participants (N = 150)

Gender	Number (n)	Percentage (%)
Male	92	61.33
Female	58	38.67
Total	150	100

Table 2: Area-wise Distribution of Study Participants (N = 150)

Area	Number (n)	Percentage (%)
Rural	108	72.00
Urban	42	28.00
Total	150	100

Discussion

The present study compared the outcomes of laparoscopic cholecystectomy and open cholecystectomy in patients with cholecystitis. Although laparoscopic cholecystectomy has become the preferred treatment for symptomatic gallstone disease, open cholecystectomy continues to play an important role in selected patients with severe inflammation, difficult anatomy, or contraindications to laparoscopic surgery. The findings of the present study support the growing evidence that laparoscopic cholecystectomy offers favorable perioperative and postoperative outcomes while maintaining surgical safety.

In the present study, a greater proportion of patients were males, and the majority belonged to rural areas. The higher representation of rural patients may reflect delayed healthcare access, limited awareness, and referral patterns commonly observed in developing regions. Similar demographic variations have been reported in previous studies evaluating the surgical management of gallbladder disease, emphasizing the influence of healthcare accessibility on treatment outcomes [11].

Laparoscopic cholecystectomy remains the preferred surgical approach because it is associated with smaller incisions, reduced tissue trauma, decreased postoperative pain, earlier ambulation, and faster recovery. Previous systematic reviews and clinical guidelines have consistently demonstrated that patients undergoing laparoscopic surgery experience shorter hospital stays and earlier return to normal daily activities compared with those undergoing open cholecystectomy [11,12].

These advantages have contributed to the widespread adoption of laparoscopic techniques as the standard of care for uncomplicated cholecystitis.

Open cholecystectomy, however, continues to be indispensable in complicated cases, including severe acute inflammation, dense adhesions, gangrenous gallbladder, perforation, uncontrolled bleeding, or difficult biliary anatomy. International guidelines recommend timely conversion from laparoscopic to open surgery whenever patient safety is compromised rather than persisting with technically difficult laparoscopic dissection [12–14]. Therefore, conversion should be regarded as a sound surgical judgment rather than a surgical failure.

Postoperative complications remain an important determinant of surgical success. Previous studies have shown that laparoscopic cholecystectomy is associated with lower rates of wound infection, postoperative pain, respiratory complications, and shorter hospitalization, whereas open cholecystectomy may be associated with increased postoperative morbidity because of larger abdominal incisions [13,14]. Nevertheless, both procedures are considered safe when performed by experienced surgeons with appropriate patient selection.

The findings of the present study are consistent with current international recommendations that advocate laparoscopic cholecystectomy as the first-line surgical treatment for most patients with cholecystitis while reserving open cholecystectomy for selected complex cases [12–15]. Appropriate patient evaluation, surgeon expertise, and timely operative intervention remain essential for achieving optimal clinical outcomes and minimizing perioperative complications.

The present study is limited by its single-center design and the absence of long-term follow-up for quality of life, postoperative recurrence of biliary symptoms, and late complications. Multicenter prospective studies with larger sample sizes and longer follow-up are recommended to further compare the long-term outcomes of laparoscopic and open cholecystectomy.

Conclusion

Laparoscopic cholecystectomy is an effective and safe surgical procedure for the management of cholecystitis and offers several advantages over open cholecystectomy, including reduced postoperative pain, shorter hospital stay, faster recovery, and earlier return to routine activities. However, open cholecystectomy remains an important surgical option for patients with complicated gallbladder disease, difficult anatomy, or when laparoscopic surgery is contraindicated or requires conversion. Careful patient selection, adherence to established surgical guidelines, and timely operative management are essential for optimizing surgical outcomes and minimizing postoperative complications. Both techniques remain valuable, with the choice of procedure depending on individual patient characteristics, intraoperative findings, and the surgeon's clinical judgment.

References

1. Strasberg SM. Clinical practice. Acute calculous cholecystitis. *N Engl J Med*. 2008;358(26):2804-11.
2. Lillemoe KD, Yeo CJ, Talamini MA. Open cholecystectomy. In: Townsend CM Jr, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery*. 21st ed. Philadelphia: Elsevier; 2022.
3. Brunicki FC, Andersen DK, Billiar TR, Dunn DL, Kao LS, Hunter JG, Matthews JB, Pollock RE, editors. *Schwartz's Principles of Surgery*. 12th ed. New York: McGraw-Hill Education; 2022.
4. Reynolds W Jr. The first laparoscopic cholecystectomy. *JLS*. 2001;5(1):89-94.
5. Keus F, Gooszen HG, van Laarhoven CJHM. Open, small-incision, or laparoscopic cholecystectomy for patients with symptomatic cholelithiasis: a systematic review. *BMC Surg*. 2007;7:8.
6. Shea JA, Healey MJ, Berlin JA, Clarke JR, Malet PF, Starosik RN, Mazzuca SA, et al. Mortality and complications associated with laparoscopic cholecystectomy: a meta-analysis. *Ann Surg*. 1996;224(5):609-20.
7. Keus F, de Jong JAF, Gooszen HG, van Laarhoven CJHM. Laparoscopic versus open cholecystectomy for patients with symptomatic cholelithiasis. *Cochrane Database Syst Rev*. 2006;(4):CD006231.
8. Johansson M, Thune A, Nelvin L, Stiernstam M, Westman B, Lundell L. Randomized clinical trial of open versus laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg*. 2005;92(1):44-49.
9. Lo CM, Liu CL, Fan ST, Lai ECS, Wong J. Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Ann Surg*. 1998;227(4):461-467.
10. Gutt CN, Encke J, Königer J, Harnoss JC, Weigand K, Kipfmüller K, Büchler MW, et al. Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC Study). *Ann Surg*. 2013;258(3):385-393.
11. Gurusamy KS, Samraj K. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Cochrane Database Syst Rev*. 2013;(6):CD005440.
12. Pisano M, Allievi N, Gurusamy K, Borzellino G, Cimbanassi S, Boerna D, Cocolini F, et al. 2020 World Society of Emergency Surgery updated guidelines for the diagnosis and treatment of acute calculus cholecystitis. *World J Emerg Surg*. 2020;15:61.
13. Yokoe M, Hata J, Takada T, Strasberg SM, Asbun HJ, Wakabayashi G, Mori Y, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis. *J Hepatobiliary Pancreat Sci*. 2018;25(1):41-54.
14. Wakabayashi G, Iwashita Y, Hibi T, Takada T, Strasberg SM, Asbun HJ, Endo I, et al. Tokyo Guidelines 2018: surgical management of acute cholecystitis. *J Hepatobiliary Pancreat Sci*. 2018;25(1):89-96.
15. Litynski GS. Erich Mühe and the rejection of laparoscopic cholecystectomy (1985): a surgeon ahead of his time. *JLS*. 1998;2(4):341-346.