

Original Research Article

A novel method of extracting gallbladder specimen in acute cholecystitis: cutting the gallbladder into strips

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Received: 02 March 2026

Revised: 19 May 2026

Accepted: 01 July 2026

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ABSTRACT

Background: Acute cholecystitis is a common surgical condition. Laparoscopic cholecystectomy is the standard treatment, but the optimal method for specimen retrieval remains debated. This study evaluates the safety and efficacy of a novel technique involving cutting the gallbladder into strips compared to conventional endobag retrieval.

Methods: A retrospective study was conducted at Citizens Specialty Hospital, Hyderabad, from February 2025 to December 2025. A total of 100 patients with acute cholecystitis undergoing laparoscopic cholecystectomy were included. The gallbladder specimen was extracted by cutting it into strips. Data were analyzed using SPSS version 25.0. Patients were followed for two months.

Results: No intraoperative or postoperative complications were observed. There were no cases of port-site infection, bile leak, or intra-abdominal abscess. The mean hospital stay was 1.3 ± 0.5 days. Patients reported good postoperative comfort.

Conclusions: The technique of cutting the gallbladder into strips is a safe, effective, and cost-efficient alternative to conventional endobag retrieval in laparoscopic cholecystectomy.

Keywords: Acute cholecystitis, Cutting the gallbladder into strips, Endobag, Specimen extraction

INTRODUCTION

Acute cholecystitis, the inflammation of the gallbladder commonly due to cholelithiasis, remains a common and potentially serious condition encountered in general surgical practice.¹ This inflammation results from obstruction of the cystic duct by gallstones, leading to bile stasis, inflammation, and, if untreated, possible infection, gangrene, or perforation of the gallbladder.² The standard treatment for acute cholecystitis has evolved significantly over the past few decades, with Laparoscopic cholecystectomy (LC) becoming the gold standard for gallbladder removal.³ LC offers several advantages over open cholecystectomy, including reduced postoperative pain, shorter hospital stay, quicker recovery time, and improved cosmetic outcomes.⁴

Despite the well-established technique of laparoscopic cholecystectomy, specimen retrieval remains an area of ongoing debate. Several studies have evaluated different methods of gallbladder extraction, particularly focusing on preventing contamination and port-site infection.⁵ The use of an endobag is widely recommended to minimize bile spillage and reduce wound infection rates.⁶ However, clinically reported studies have highlighted certain limitations associated with endobag use, including increased operative time, technical difficulty in handling distended or friable gallbladders, and additional procedural costs.⁷ Few studies have also questioned the routine necessity of endobag use, suggesting that alternative techniques may be equally safe in selected cases.⁸ In cases of acute cholecystitis, the gallbladder is often inflamed, thick-walled, and difficult to extract

intact through standard port sites. This has led to the exploration of simpler and more efficient extraction techniques that can maintain safety while improving surgical ease and reducing costs.⁹

The present study introduces a novel technique involving cutting the gallbladder into strips prior to extraction. The aim of this study is to evaluate the safety and clinical outcomes of this method and to compare its effectiveness with conventional specimen retrieval techniques.¹⁰

METHODS

This retrospective study was conducted in the Department of General Surgery at Citizens Specialty Hospital, Hyderabad, between February 2025 and December 2025. The study included 100 consecutive patients diagnosed with acute cholecystitis who underwent laparoscopic cholecystectomy.

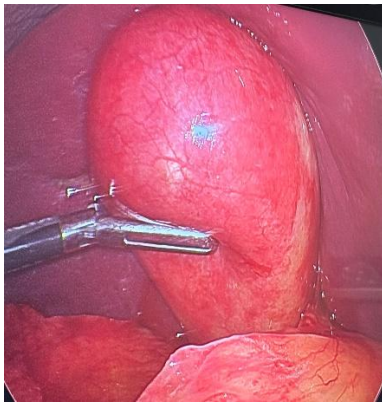


Figure 1: Acute inflamed gallbladder.

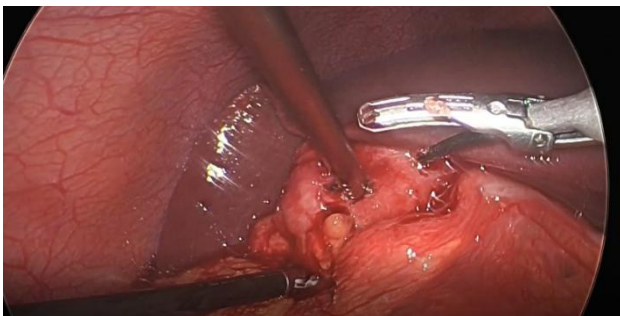


Figure 2: Decompressing the gallbladder.

The sample size was determined based on convenience sampling, including all eligible patients during the study period. Patients with suspected gallbladder malignancy were excluded. All procedures were performed under general anesthesia using a standard four-port technique. After achieving the critical view of safety, the gallbladder was dissected from the liver bed. The specimen was decompressed by aspirating bile and removing stones, larger stones are crushed inside the gallbladder and removed. The gallbladder wall was then cut into strips of less than 1 cm and extracted through the epigastric port.

A thorough peritoneal wash was performed. Data including demographic details, intraoperative findings, and postoperative outcomes were collected from medical records. Statistical analysis was performed using SPSS version 25.0. Continuous variables were expressed as mean±standard deviation, and categorical variables as frequencies and percentages. Patients were followed up for two months to assess complications.

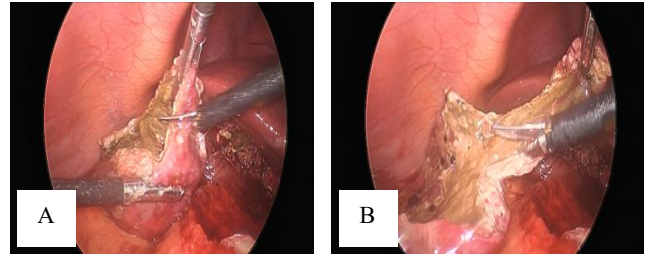


Figure 3 (A and B): Cutting the gallbladder strips into <1 cm strips.

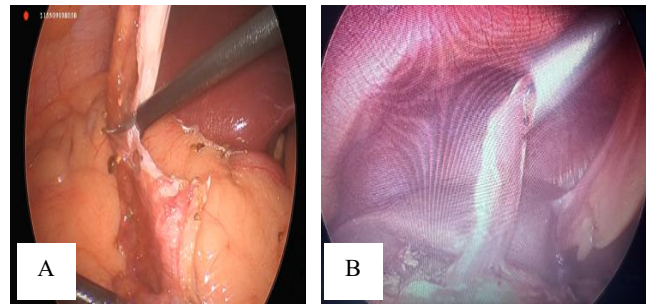


Figure 4 (A and B): Extracting the specimen out.



Figure 5: Gallbladder strips <1 cm.

RESULTS

The study included 100 patients diagnosed with acute cholecystitis who underwent laparoscopic cholecystectomy using the cutting the gallbladder into <1 cm strips technique for gallbladder specimen extraction.

The mean age of the study population was 42.5 ± 12.3 years, indicating that acute cholecystitis was more commonly observed in middle-aged individuals. Female patients constituted the majority of the study population (62%), which is consistent with the known higher prevalence of gallstone disease among females. Post-ERCP patients accounted for 12% of cases, reflecting the coexistence of biliary tract pathology requiring prior endoscopic intervention.

Table 1: Demographic and clinical characteristics.

Variables	Values
Total patients	100
Mean age (years)	42.5 ± 12.3
Gender (male/female)	38/62
Post-ERCP patients	12%

Clinical outcomes

No intraoperative or postoperative complications were encountered in the present study. There were no cases of bile leak, port-site infection, or intra-abdominal abscess formation, suggesting that cutting the gallbladder into <1 cm strips provide safe specimen retrieval even in inflamed gallbladders. The mean hospital stay was 1.3 ± 0.5 days, indicating rapid postoperative recovery and early discharge. All patients reported satisfactory postoperative comfort during follow-up.

Table 2: Clinical outcomes.

Outcomes	Values
Intraoperative complications	0 (0%)
Postoperative complications	0 (0%)
Port-site infection	0 (0%)
Bile leak	0 (0%)
Mean hospital stay (days)	1.3 ± 0.5

DISCUSSION

The present study evaluated a novel technique of gallbladder specimen retrieval by cutting the gallbladder into strips during laparoscopic cholecystectomy for acute cholecystitis. The findings of the present study demonstrate that this method is safe, feasible, and cost-effective, with excellent postoperative outcomes and no observed intraoperative or postoperative complications.¹⁰

In the present study, the mean age of patients was 42.5 ± 12.3 years. Similar age distribution has been reported in previous studies evaluating laparoscopic cholecystectomy in acute cholecystitis. Kirshtein et al reported that acute cholecystitis commonly affects middle-aged and elderly patients undergoing laparoscopic management.¹ The female predominance observed in the current study (62%) is also consistent with previous literature demonstrating a higher incidence of gallstone disease among women due to hormonal and metabolic

factors.³ One of the major findings of the present study was the absence of intraoperative complications. This finding is comparable to the results reported by Memon et al who demonstrated that careful decompression and controlled extraction techniques significantly reduce the risk of gallbladder perforation and bile spillage during specimen retrieval.¹⁰ Similarly, Gelmini et al reported low complication rates during laparoscopic cholecystectomy when meticulous surgical techniques were followed.³

No postoperative complications were observed in the current study. Specifically, there were no cases of bile leak, intra-abdominal abscess, or port-site infection. These findings are comparable to studies by Singh et al and Comajuncosas et al who demonstrated that direct extraction techniques without mandatory endobag use did not significantly increase postoperative infectious complications.^{5,15} La Regina et al in a meta-analysis, reported that retrieval bags may reduce wound infection in selected cases; however, the overall incidence of port-site infection remained low irrespective of retrieval technique when adequate precautions were taken.¹²

The present study demonstrated zero incidence of port-site infection. Similar findings were reported by Narayanswamy et al who concluded that routine endobag use may not be essential in all laparoscopic cholecystectomy cases, especially when proper decompression and controlled specimen handling are performed.^{8,13} The careful aspiration of bile, removal of stones, and extraction of gallbladder strips less than 1 cm in size in the current study may have contributed to the absence of wound contamination.

Another important finding of the present study was the absence of bile leak. Sato et al also reported that adherence to standard laparoscopic principles and cautious handling of the gallbladder significantly minimizes postoperative biliary complications.¹⁶ In the present technique, decompression prior to extraction and controlled removal of gallbladder strips likely reduced intraperitoneal bile spillage.

The mean hospital stay in the present study was 1.3 ± 0.5 days, indicating early postoperative recovery. Similar durations of hospital stay have been reported in previous laparoscopic cholecystectomy studies. Bonjer emphasized that minimally invasive surgical techniques are associated with shorter hospitalization and faster return to normal activities.⁴ Reduced operative manipulation and avoidance of fascial extension during specimen retrieval in the current study may have further contributed to early discharge and improved patient comfort.

Cost-effectiveness is another important advantage of the stripping technique. Disposable retrieval bags add additional procedural expense, particularly in resource-limited healthcare settings. Begum et al demonstrated that

glove endobags and alternative retrieval methods can significantly reduce operative costs while maintaining patient safety.^{7,17} The present technique eliminates the need for commercially available endobags, thereby reducing overall surgical expenditure without compromising clinical outcomes.

The stripping technique also facilitates easier extraction of distended and inflamed gallbladders through standard port sites without the need for enlargement of the incision. Goetze and Paolucci highlighted that retrieval difficulty is common in acutely inflamed gallbladders and may increase operative time and wound trauma.⁶ By reducing the specimen bulk through strip formation, the present technique simplifies retrieval and minimizes tissue handling.

Overall, the findings of the present study are comparable to previous studies evaluating alternative gallbladder retrieval techniques. The absence of complications, shorter hospital stay, satisfactory postoperative recovery, and reduced procedural cost support the safety and feasibility of the stripping technique as an effective alternative to conventional endobag retrieval methods.

Limitations

This study is limited by its retrospective design and lack of a comparative control group using endobag retrieval. The sample size is relatively small, and the follow-up period is limited to two months. No other articles are published on this study. Larger prospective randomized studies are required to validate these findings.

CONCLUSION

The technique of cutting the gallbladder into strips is a safe, feasible, and cost-effective method for specimen retrieval in laparoscopic cholecystectomy for acute cholecystitis. It simplifies extraction, reduces operative difficulty, and avoids the need for additional consumables while maintaining excellent clinical outcomes. This method has the potential to improve surgical efficiency and patient recovery.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kiran SS, Guduru SCH, Sharma D, Kore P, Bandaru SK. A novel method of extracting gallbladder specimen in acute cholecystitis: cutting the gallbladder into strips. Int Surg J 2026;13:1343-6.