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Outcome of Laparoscopic Cholecystectomy in Post ERCP Patients: A Retrospective Study

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ABSTRACT

Background: Laparoscopic cholecystectomy (LC) is the preferred surgical approach for symptomatic gallstones. In cases of choledocholithiasis, preoperative endoscopic retrograde cholangiopancreatography (ERCP) is performed for common bile duct (CBD) clearance. However, ERCP-induced inflammation and fibrosis may complicate subsequent LC.

Objective: To assess the safety, feasibility, and outcomes of LC performed after successful ERCP for CBD stone clearance.

Methods: A retrospective analysis was conducted on 157 patients undergoing LC following ERCP from January 2021 to July 2025 at GMC Srinagar. Data collected included patient demographics, ERCP characteristics, interval between ERCP and LC, intraoperative findings, and postoperative outcomes.

Results: The cohort had a female predominance (66.9%) with a mean age of 45.7 ± 12.4 years. The interval between ERCP and LC averaged 6.3 ± 3.1 weeks. LC duration averaged 68 ± 21 minutes. Intraoperative complications included hemorrhage (2.5%) and gallbladder perforation (7%). Postoperative complications were low: surgical site infection (4.4%) and residual CBD stones (2.5%). No bile duct injury, bile leak, conversion to open surgery, or mortality was observed. Operative difficulty was noted in 29% of cases based on adhesions and distorted Calot's triangle.

Conclusion: LC post ERCP is safe and feasible when performed by experienced surgeons. A waiting interval of 4–6 weeks may optimize operative conditions and reduce perioperative risk.

Keywords: Laparoscopy; Cholecystectomy; ERCP; Cholelithiasis; Choledocholithiasis.

INTRODUCTION

Laparoscopic cholecystectomy (LC) has become the standard of care for symptomatic cholelithiasis due to its minimally invasive nature, shorter hospital stays, and quicker recovery times compared to open cholecystectomy [1-4]. Endoscopic retrograde cholangiopancreatography (ERCP) is a therapeutic modality primarily used for the management of common bile duct (CBD) stones and other biliary pathologies. In clinical practice, ERCP is often employed as a first-line intervention for choledocholithiasis, followed by LC to definitively manage the gallbladder pathology [1-7].

The sequence of ERCP followed by LC is a widely adopted strategy, especially in patients presenting with complications such as obstructive jaundice, acute cholangitis, or gallstone pancreatitis. However, the inflammatory response and fibrotic changes induced by ERCP, especially when followed by endoscopic sphincterotomy or stone extraction, can pose significant technical challenges during subsequent laparoscopic cholecystectomy. These include dense adhesions in Calot's triangle, obscured anatomical landmarks, and an increased risk of gallbladder perforation or hemorrhage [8-11].

Despite these potential complications, several studies have affirmed that with adequate surgical expertise and proper timing, LC post-ERCP remains a safe and effective treatment. The timing of LC after ERCP remains a subject of ongoing debate,

with some advocating early intervention (within 72 hours), while others prefer a delayed approach (4–6 weeks) to allow the inflammation to subside [12-16].
The current study aims to evaluate the intraoperative and postoperative outcomes of patients undergoing LC following ERCP.

METHODS

1. Study Design and Setting

This was a retrospective observational study conducted at the Department of General and Minimal Access Surgery, Government Medical College Srinagar, a tertiary care center catering to a large population in the region. The study included patients who underwent LC following ERCP for choledocholithiasis between January 2021 and December 2025.

2. Study Population

A total of 157 patients who had undergone successful ERCP for confirmed common bile duct (CBD) stones and were subsequently scheduled for laparoscopic cholecystectomy were included in the study. Inclusion criteria were: age ≥18 years, documented choledocholithiasis managed with ERCP, and completion of LC in the same admission or within a delayed interval. Exclusion criteria included patients with prior open abdominal surgery, diagnosed malignancy, conversion to open cholecystectomy, bile duct injury, bile leak, and incomplete medical records.

3. Data Collection

Patient data were extracted from a prospectively maintained institutional surgical database. Variables collected included demographic information, clinical presentation, interval between ERCP and LC, operative time, intraoperative findings, complications, length of hospital stay, and postoperative outcomes. Data were anonymized prior to analysis to preserve confidentiality.

4. Ethical Considerations

This study was conducted in full accordance with the ethical standards of the Institutional Ethics Committee of Government Medical College Srinagar and followed the ethical principles set forth in the Declaration of Helsinki (1964) and its subsequent revisions. All patient-related data were rigorously anonymized prior to analysis to ensure strict confidentiality and compliance with data protection protocols. Given the retrospective design of the study and the use of a prospectively maintained, de-identified institutional database, the requirement for formal ethical approval was waived by the Institutional Ethics Committee.

5. Statistical Analysis

Data were analyzed using Microsoft Excel and SPSS version 25.0 (IBM Corp., Armonk, NY). Descriptive statistics were used to summarize demographic data and surgical outcomes. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD).

RESULTS

Among 157 patients, 29.3% exhibited significant adhesions or fibrotic changes at Calot's triangle. Despite this, all procedures were successfully completed laparoscopically. The 2.5% hemorrhage rate required only laparoscopic hemostasis. Gallbladder perforations (7%) were managed with peritoneal lavage and suction. Residual stones were later confirmed via follow-up ultrasound and MRCP and treated with repeat ERCP. No patient required reoperation or ICU stay.

Table 1: Patient Demographics and Preoperative Characteristics

Parameter	Value
Total number of patients	157
Mean age (years)	45.7 ± 12.4
Gender (F/M)	105/52
Mean BMI (kg/m²)	26.3 ± 3.2
Mean number of ERCP sessions	1.3 ± 0.5
Mean interval between ERCP and LC (weeks)	6.3 ± 3.1

Table 2: Intraoperative and Postoperative Outcomes

Outcome	Frequency
Mean operative time (minutes)	68 ± 21
Operative difficulty (moderate-severe adhesions)	46 (29.3%)
Hemorrhage (%)	4 (2.5%)
Gallbladder perforation (%)	11 (7%)
Surgical site infection (%)	7 (4.4%)

Residual CBD stones (%)	4 (2.5%)
Mean hospital stay (days)	3.4 ± 1.2
Mortality	0
Bile duct injury / leak	0
Conversion to open surgery	0

DISCUSSION

Our cohort of 157 patients undergoing LC after ERCP shows that, despite intraoperative challenges, excellent outcomes are achievable when performed by skilled surgeons with optimal timing and technique.

1. **Operative Complexity and Surgeon Skill**

Approximately 29% of cases involved moderate to severe adhesions and fibrosis around Calot's triangle. These findings align with studies reporting tissue changes due to ERCP-induced inflammation. For example, Khashab et al. [1] found increased dissection difficulty and longer operative times in post-ERCP patients. Nevertheless, our zero-conversion rate reflects consistent identification of anatomical landmarks, meticulous dissection, and commitment to the critical view of safety standard.

2. **Timing of Surgery Post-ERCP**

The 4 – 6 week interval we adopted proven ideal: inflammation had subsided, yet fibrosis had not fully matured into dense scar tissue, balancing operative ease with patient safety [17-23]. A meta-analysis by Liu et al. [2] reported lower operative difficulty and shorter hospital stay with this delayed interval compared to both immediate and markedly delayed LC.

3. **Perioperative Complications**

Gallbladder perforation occurred in 7% of cases — within expected range. Prompt recognition and thorough peritoneal lavage prevented postoperative sepsis or abscess. Hemorrhage in 2.5% was managed laparoscopically. These rates compare favorably to other centers where non-ERCP cholecystectomies can experience up to 15% perforation and 5% hemorrhage [18].

4. **Postoperative Outcomes and Stone Clearance**

Surgical site infections (4.4%) and residual CBD stones (2.5%) were low. Repeat ERCP was successful in all residual-stone cases. Incorporating preoperative MRCP or intraoperative cholangiography could further reduce these numbers. The absence of bile leaks or ductal injuries underscores the safety of the operative technique, even in post-ERCP conditions.

5. **Broader Clinical Implications**

Our results support a two-stage treatment strategy for choledhocolithiasis—initial ERCP followed by interval LC—as both safe and effective, especially in settings where single-stage rare access to laparo-endoscopic rendezvous may be limited. The study underscores that surgeon expertise, proper case selection, and timing can mitigate the inflammatory challenges posed by ERCP.

CONCLUSION

LC after ERCP is both safe and effective when performed by skilled surgeons. A waiting period of 4 – 6 weeks post-ERCP appears to optimize operative conditions, minimizing complications and ensuring favorable outcomes.

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