



Original Article

Intraoperative and Postoperative Outcomes of Elective Laparoscopic Cholecystectomy in Patients with Prior Biliary Pancreatitis Versus Uncomplicated Cholelithiasis: A Prospective Comparative Study

Dr. Priyal Tatiya¹, Dr. Vipul Sangal², Dr. Akhil Kumar. Gupta³

¹Postgraduate Resident (3rd Year), Department of General Surgery, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India.

²Associate Professor, Department of General Surgery, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India.

³Professor and Head, Department of General Surgery, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India.

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Corresponding Author:

Dr. Priyal Tatiya

Postgraduate Resident (3rd Year),
Department of General Surgery,
Muzaffarnagar Medical College,
Muzaffarnagar, Uttar Pradesh,
India.

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ABSTRACT

Contemporary guidelines endorse same-admission laparoscopic cholecystectomy (LC) for mild acute biliary pancreatitis, yet delayed interval cholecystectomy performed 4–6 weeks after clinical resolution remains common in resource-limited settings, with limited data directly comparing its operative and recovery outcomes against LC for uncomplicated cholelithiasis. This prospective comparative study, conducted over 18 months, compared intraoperative findings and postoperative recovery between 30 patients undergoing elective interval LC after resolved biliary pancreatitis (Group A) and 30 patients undergoing LC for uncomplicated cholelithiasis (Group B). Intraoperative parameters (adhesions, cystic duct anomalies, Calot's triangle dissection difficulty, operative duration, conversion to open surgery) and postoperative parameters (Visual Analog Scale pain scores, analgesic and opioid requirement, time to oral feeding, hospital stay, ICU admission) were compared using Student's t-test and chi-square test, with $p < 0.05$ taken as significant. Groups were comparable for age and sex. Group A showed significantly greater difficulty in Calot's triangle dissection (46.7% vs 13.3%, $p = 0.0048$), longer operative duration (43.63 ± 9.47 vs 33.53 ± 6.07 minutes, $p < 0.0001$), and higher conversion to open surgery (23.3% vs 3.3%, $p = 0.0226$). Postoperatively, Group A had significantly higher pain scores at all time points, greater analgesic and opioid requirement, delayed oral feeding, and longer hospital stay (5.97 ± 2.24 vs 4.27 ± 1.21 days, $p < 0.0001$). Adhesions, cystic duct anomalies, and ICU admission were more frequent in Group A but did not reach statistical significance. Elective interval LC after resolved biliary pancreatitis is safe and feasible but is technically more demanding and associated with greater postoperative morbidity than LC for uncomplicated cholelithiasis, supporting careful preoperative planning and consideration of earlier, index-admission surgery where feasible.

Keywords: biliary pancreatitis; laparoscopic cholecystectomy; interval cholecystectomy; Calot's triangle; conversion to open surgery.

INTRODUCTION

Gallstone disease is among the most prevalent disorders of the hepatobiliary system, affecting up to 10–20% of the adult population worldwide, with rising prevalence linked to obesity and metabolic risk factors (Krupa et al., 2025; Lammert et al., 2016). A substantial subset of symptomatic gallstone disease progresses to acute biliary pancreatitis (ABP) when a migrating stone transiently obstructs the ampulla of Vater; gallstones account for nearly three-quarters of acute pancreatitis cases in developed nations, and up to 20% of episodes progress to severe disease (Cucher et al., 2014).

Laparoscopic cholecystectomy (LC) is the definitive treatment for gallstone disease and prevents recurrent biliary colic, cholangitis, and recurrent pancreatitis. However, the optimal timing of cholecystectomy after an episode of ABP remains debated. Contemporary guidelines strongly endorse same-admission LC for mild ABP, but real-world practice frequently diverges because of patient instability, resource constraints, and surgeon preference (Fugazzola et al., 2024). Delayed-interval cholecystectomy, typically performed 4–6 weeks after clinical resolution, remains common in many centers on the assumption that allowing inflammation to subside reduces operative difficulty. Emerging evidence increasingly challenges this assumption: several recent series report longer operative times, higher conversion rates, and prolonged hospitalization with delayed surgery compared with early or index-admission LC (Sakthivel et al., 2023; Sharma et al., 2021).

Despite this evidence, few prospective studies have directly compared the intraoperative technical difficulty and postoperative recovery of interval LC performed after resolved pancreatitis with LC performed for uncomplicated cholelithiasis in the same surgical unit. Establishing this comparison is clinically relevant, as it quantifies the added burden that a prior pancreatitis episode places on subsequent elective surgery and informs decisions on timing, resource allocation, and the level of surgical expertise required. This study was therefore undertaken to prospectively compare intraoperative findings and postoperative outcomes of elective LC in patients with a resolved episode of biliary pancreatitis against those undergoing LC for uncomplicated gallstone disease.

AIM

To compare the intraoperative and postoperative outcomes of elective laparoscopic cholecystectomy in patients with a prior episode of biliary pancreatitis versus patients with uncomplicated cholelithiasis.

OBJECTIVES

(1) To compare intraoperative parameters — presence of adhesions, cystic duct anomalies, difficulty of Calot's triangle dissection, operative duration, and conversion to open surgery — between the two groups. (2) To compare postoperative parameters — pain scores, analgesic and opioid requirement, time to resumption of oral feeding, length of hospital stay, and need for ICU admission — between the two groups.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective comparative study conducted in the Department of General Surgery at Muzaffarnagar Medical College, over 18 months (12 months of data collection and 6 months of compilation/analysis).

Study Population and Sample Size

All patients aged 18–60 years of either sex undergoing elective LC for gallstone disease who fulfilled eligibility criteria and provided written informed consent were enrolled. A total of 60 patients were included and allocated to two groups of 30 each: Group A comprised patients with cholelithiasis and a documented clinical, biochemical, and radiological history of biliary pancreatitis at least 6 weeks prior to surgery; Group B comprised patients with cholelithiasis without a prior history of biliary pancreatitis.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Age 18–60 years
- Documented cholelithiasis or gallbladder sludge on ultrasonography
- For Group A: a prior episode of biliary pancreatitis ≥ 6 weeks before surgery

Exclusion Criteria:

- Diabetes mellitus
- Hypothyroidism
- Unfitness for general anesthesia
- Deranged liver function tests
- Pancreatic pseudocyst
- Jaundice
- Significant peripancreatic collections on current imaging

Surgical and Perioperative Protocol

A standard four-port technique was used for LC in all patients under institutional protocol. All patients received intravenous cefuroxime 1.5 g (one preoperative and two postoperative doses) and intraoperative port-site local anesthetic infiltration. Postoperative pain was assessed with the Visual Analog Scale (VAS); intravenous diclofenac 75 mg was

given as a stat dose on the day of surgery, with further doses on an SOS basis for VAS ≥ 4 , and opioid consumption was recorded when required.

Study Parameters

Intraoperative parameters recorded were: duration of surgery (skin incision to closure), presence and location of adhesions, cystic duct anomalies, difficulty of Calot's triangle dissection (assessed subjectively by the operating surgeon based on obscured anatomy, fibrosis, inflammation, or bleeding), and conversion to open cholecystectomy. Postoperative parameters were: VAS pain scores on postoperative days 1, 3, 7 and 14; number of analgesic doses and opioid requirement; time to resumption of oral feeding; duration of hospital stay; and need for ICU admission.

Statistical Analysis

Data were recorded on a pre-designed proforma and analyzed using SPSS version 26. Continuous variables were expressed as mean $\pm$ standard deviation and compared using Student's t-test; categorical variables were expressed as frequencies and percentages and compared using the chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

The two groups were comparable in baseline demographics. The mean age was 44.10 ± 9.64 years in Group A and 39.03 ± 9.67 years in Group B ($p=0.3189$), and both groups showed marked female predominance (86.7% and 83.3% respectively, $p=0.9852$).

Table 1. Baseline Demographics

Parameter	Group A (Pancreatitis) n=30	Group B (No Pancreatitis) n=30	p-value
Mean age (years)	44.10 ± 9.64	39.03 ± 9.67	0.3189
Female sex, n (%)	26 (86.67%)	25 (83.33%)	0.9852
Male sex, n (%)	4 (13.33%)	5 (16.67%)	0.9852

Table 1 shows that the two groups were well matched at baseline, with no significant difference in mean age or sex distribution. This balance indicates that any subsequent intraoperative or postoperative differences between the groups are unlikely to be explained by demographic imbalance.

Table 2. Intraoperative Findings

Parameter	Group A n (%)	Group B n (%)	p-value
Adhesions present	9 (30.00%)	4 (13.33%)	0.1171
Cystic duct anomaly	1 (3.33%)	0 (0.00%)	0.3132
Difficult Calot's triangle dissection	14 (46.67%)	4 (13.33%)	0.0048*
Conversion to open surgery	7 (23.33%)	1 (3.33%)	0.0226*

*Statistically significant ($p<0.05$).

Table 2 shows that while the frequency of adhesions and cystic duct anomalies was similar between the groups, Group A had a significantly higher rate of difficult Calot's triangle dissection and conversion to open surgery. This suggests that a prior episode of biliary pancreatitis leaves behind local anatomical distortion that makes the subsequent dissection technically more demanding.

Table 3. Operative Duration and Postoperative Recovery

Parameter	Group A (mean $\pm$ SD)	Group B (mean $\pm$ SD)	p-value
Duration of surgery (min)	43.63 ± 9.47	33.53 ± 6.07	$<0.0001^*$
Time to oral feeding (hrs)	17.43 ± 5.90	11.30 ± 3.05	$<0.0001^*$
Hospital stay (days)	5.97 ± 2.24	4.27 ± 1.21	$<0.0001^*$
Analgesic doses (number)	5.53 ± 1.87	3.50 ± 0.99	$<0.0001^*$
Opioid doses (number)	1.53 ± 0.97	0.43 ± 0.62	$<0.0001^*$

*Statistically significant ($p<0.05$).

Table 3 shows that every recovery parameter measured — operative duration, time to oral feeding, hospital stay, and analgesic and opioid requirement — was significantly higher in Group A. Taken together, these findings indicate that the technically more difficult dissection in patients with prior pancreatitis translates into a longer, more resource-intensive postoperative recovery.

Table 4. Postoperative VAS Pain Scores

Postoperative Day	Group A (mean ± SD)	Group B (mean ± SD)	p-value
Day 1	8.10 ± 1.12	6.53 ± 0.92	<0.0001*
Day 3	5.40 ± 1.28	3.90 ± 0.65	<0.0001*
Day 7	3.20 ± 0.96	2.23 ± 0.50	<0.0001*
Day 14	1.20 ± 0.48	1.00 ± 0.00	<0.0001*

*Statistically significant ($p < 0.05$). ICU admission was required in 2 patients (6.67%) in Group A and none in Group B; this difference did not reach statistical significance ($p = 0.1503$).

Table 4 shows that Group A reported significantly higher pain scores than Group B at every postoperative time point. The gap between the groups narrowed progressively from day 1 to day 14, indicating that although early postoperative pain was more severe after prior pancreatitis, both groups converged toward comparable comfort levels by the second postoperative week.

Overall, patients with a prior episode of biliary pancreatitis demonstrated significantly greater intraoperative technical difficulty — reflected in higher rates of difficult Calot's triangle dissection, longer operative duration, and higher conversion to open surgery — along with a more prolonged and painful postoperative recovery, compared with patients undergoing LC for uncomplicated cholelithiasis. Serious complications and ICU admissions, however, remained infrequent in both groups.

DISCUSSION

This prospective study shows that elective LC after resolved biliary pancreatitis is technically more demanding and is followed by a harder postoperative recovery than LC for uncomplicated cholelithiasis, with longer operative time, greater Calot's triangle dissection difficulty, higher conversion, more pain, greater analgesic and opioid requirement, delayed oral intake, and longer hospital stay. These findings align with a growing body of literature questioning the assumption that interval delay simplifies subsequent surgery: Sakthivel et al. (2023) and Sharma et al. (2021) similarly reported longer operative duration, hospital stay, and higher morbidity with delayed versus early cholecystectomy, while Vithayathil et al. (2025), Rupareliya and Boda (2025), and Qureshi et al. (2025) found higher recurrence/readmission or shorter stay with early surgery. Some series, however — Bisht and Rehmani (2018) and Dubey and Yamini (2017) — found no significant intraoperative differences between early and delayed groups, though both noted higher recurrent symptoms or readmission during the waiting interval. The greater intraoperative difficulty in Group A likely reflects residual peri-cholecystic inflammation and fibrosis persisting beyond the 6-week interval, altering tissue planes and obscuring Calot's triangle anatomy despite clinical resolution of pancreatitis; the higher postoperative pain, analgesic requirement, and delayed oral intake likely follow from this greater intraoperative tissue handling.

Importantly, serious adverse outcomes — ICU admission, bile duct injury, or mortality — remained uncommon in both groups, supporting the overall safety of interval LC when performed by experienced surgeons with appropriate planning. Taken together, these findings lend indirect support to current guidance (ACG, IAP/APA, WSES) favoring same-admission cholecystectomy for mild ABP, reserving planned delay for moderate-to-severe disease with peripancreatic collections (Hughes & Morris-Stiff, 2020). Where interval surgery is unavoidable, operating teams should anticipate longer operative times, a lower threshold for conversion, and a more intensive postoperative analgesic strategy.

Limitations

This study was conducted at a single center with a modest sample size ($n=60$), which may limit generalizability and the power to detect differences in less common outcomes such as ICU admission and cystic duct anomalies. Difficulty of Calot's triangle dissection was assessed subjectively by the operating surgeon rather than through a validated intraoperative grading scale. The study did not stratify Group A patients by pancreatitis severity or the precise interval to surgery, both of which may independently influence operative difficulty. Larger multicentric studies incorporating standardized difficulty scoring and severity stratification are warranted to confirm these findings.

CONCLUSION

Elective laparoscopic cholecystectomy following a resolved episode of biliary pancreatitis is safe and feasible but is associated with significantly greater intraoperative technical difficulty and postoperative morbidity compared with cholecystectomy for uncomplicated cholelithiasis, including longer operative time, more difficult Calot's triangle dissection, higher conversion to open surgery, greater postoperative pain and analgesic requirement, delayed oral feeding, and longer hospital stay. Serious complications remain uncommon, and interval cholecystectomy can be performed safely with appropriate patient selection and surgical expertise. These findings underscore the importance of careful preoperative planning and adequately experienced surgical teams when operating on this subgroup, and add prospective comparative evidence supporting a preference for earlier, index-admission cholecystectomy where clinically feasible.

DECLARATIONS

Ethics approval and consent to participate: This study was approved by the Institutional Ethics Committee of Muzaffarnagar Medical College. Written informed consent was obtained from all participants.

Conflict of interest: The authors declare no conflict of interest.

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