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THE OPTIMAL TIMING OF LAPAROSCOPIC CHOLECYSTECTOMY IN PATIENTS WITH GALLSTONE-INDUCED MILD PANCREATITIS

General Surgery

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ABSTRACT

Background: Gallstone-induced mild acute pancreatitis is a common surgical emergency, and laparoscopic cholecystectomy is the definitive treatment to prevent recurrent biliary events. This study was undertaken to compare the outcomes of early and delayed laparoscopic cholecystectomy in patients with gallstone-induced mild pancreatitis with respect to operative feasibility, postoperative complications, duration of hospital stay, and overall clinical outcomes. **Materials and Methods:** This prospective comparative observational study was conducted at a tertiary care hospital over 1.8 years and included 60 patients with gallstone-induced mild pancreatitis. Patients were equally allocated to early laparoscopic cholecystectomy (ELC, n=30) and delayed laparoscopic cholecystectomy (DLC, n=30) groups. Demographic characteristics, operative findings, postoperative complications, conversion rate, hospital stay, and recovery parameters were compared using appropriate statistical tests. **Results:** Baseline demographic and clinical characteristics were comparable between the groups. Conversion to open surgery (6.7% vs. 10.0%; p=1.000) and postoperative complications (20.0% vs. 10.0%; p=0.472) were similar. The ELC group had a significantly shorter postoperative hospital stay (3.23±1.48 vs. 3.97±1.35 days; p=0.015). No mortality or major bile duct injury occurred in either group. **Conclusion:** Early laparoscopic cholecystectomy is a safe and feasible approach for gallstone-induced mild pancreatitis. It provides faster postoperative recovery without increasing operative morbidity or conversion rates, supporting its use during the index admission.

KEYWORDS

Gallstone pancreatitis; Early laparoscopic cholecystectomy; Delayed laparoscopic cholecystectomy; Mild acute pancreatitis; Postoperative outcomes.

INTRODUCTION

Acute pancreatitis is one of the most common causes of acute abdomen encountered in surgical practice, with gallstones being the leading etiological factor. Gallstone-induced pancreatitis accounts for more than half of all cases of acute pancreatitis worldwide, and its incidence continues to rise. Although most cases are classified as mild, patients remain at significant risk of recurrent biliary events such as recurrent pancreatitis, cholangitis, and biliary colic if definitive management is not undertaken. Laparoscopic cholecystectomy is considered the standard definitive treatment for gallstone pancreatitis as it removes the source of biliary inflammation and prevents recurrence. However, the optimal timing of laparoscopic cholecystectomy in patients with gallstone-induced mild pancreatitis remains controversial. Traditionally, surgery was delayed for several weeks after the acute episode to allow resolution of inflammation and reduce operative difficulty, adhesions, and perioperative complications. Delayed surgery was also believed to facilitate detailed evaluation and minimize the risk of aggravating pancreatitis during the acute phase.[1]

In recent years, increasing evidence has supported the role of early laparoscopic cholecystectomy in mild gallstone pancreatitis. Several studies have demonstrated that early surgery, performed during the same admission or within 48 hours of admission, is safe and associated with shorter hospital stay, lower recurrence of biliary events, reduced readmission rates, and decreased healthcare costs without significantly increasing operative complications or conversion to open surgery. Randomized trials and meta-analyses have further shown that delayed cholecystectomy exposes patients to a considerable risk of recurrent attacks during the waiting period, thereby increasing morbidity and economic burden.[2,3]

Despite these findings, considerable variation still exists in clinical practice regarding the timing of surgery. Differences in institutional protocols, surgeon preference, local expertise, and concern regarding operative difficulty continue to influence decision-making. Furthermore, adherence to guideline-recommended early cholecystectomy remains inconsistent in many healthcare settings.[3,4]

Therefore, the present study was undertaken to evaluate and compare early versus delayed laparoscopic cholecystectomy in patients with gallstone-induced mild pancreatitis with respect to overall outcome, complications, feasibility, duration of hospital stay, and cost of surgery. The findings of this study may help determine the optimal timing of surgery and contribute toward improving patient outcomes and standardizing management protocols.

MATERIAL AND METHODS

Study Design and Setting

This prospective comparative observational study was conducted in a tertiary care hospital in Patiala over a period of 1.8 years, from March 1, 2024, to December 31, 2025. The study was undertaken to compare the outcomes of early versus delayed laparoscopic cholecystectomy in patients with gallstone-induced mild pancreatitis. Ethical clearance was obtained from the institutional ethical committee, and informed written and verbal consent was obtained from all participants prior to inclusion in the study.

Study Population and Sample Size

A total of 60 patients diagnosed with gallstone-induced mild pancreatitis were included in the study. Patients were screened according to the Atlanta Classification criteria for mild acute pancreatitis, which included the absence of organ failure and systemic complications. The sample size was calculated using the single proportion formula based on a previously reported prevalence of recurrent biliary events in delayed cholecystectomy patients. The calculated minimum sample size was 57, which was rounded to 60 to allow equal distribution between study groups and to compensate for possible dropouts. The patients were divided into two groups: Group A included 30 patients who underwent early laparoscopic cholecystectomy, while Group B included 30 patients who underwent delayed laparoscopic cholecystectomy.

Inclusion and Exclusion Criteria

Patients aged more than 18 years of either sex with gallstone-induced mild pancreatitis confirmed on ultrasonography were included in the

study. Patients with moderate or severe pancreatitis, jaundice, acute cholecystitis, pregnancy, common bile duct stones requiring exploration, gallbladder malignancy, coagulopathy, peritonitis, contraindications to laparoscopy or general anesthesia, and those unwilling to provide consent were excluded.

Preoperative Evaluation

All patients underwent detailed history taking, clinical examination, abdominal ultrasonography, contrast-enhanced computed tomography for CT severity index scoring, routine hematological investigations, liver function tests, serum amylase and lipase estimation, coagulation profile, viral markers, electrocardiography, and pre-anesthetic assessment.

Operative Procedure and Data Collection

All patients underwent standard four-port laparoscopic cholecystectomy under general anesthesia. Operative findings, duration of surgery, technical difficulties, adhesions, intraoperative complications, and conversion rates were recorded. Data were collected using a pretested proforma that included demographic details, clinical findings, laboratory investigations, operative details, and postoperative outcomes.

Outcome Measures and Statistical Analysis

Postoperative pain was assessed using the Visual Analogue Scale (VAS), and postoperative complications including nausea, vomiting, ileus, wound infection, fever, abdominal distension, and persistent pain were documented. Severity of pancreatitis was assessed using Ranson score, Glasgow score, and CT Severity Index. Surgical site infections were graded using the ASEPSIS wound scoring system. Duration of hospital stay and postoperative recovery parameters were also recorded. Statistical analysis was performed using SPSS software version 21.0, and the results were analyzed to compare outcomes between the two study groups.

OBSERVATIONS

A total of 60 patients with gallstone-induced mild pancreatitis were prospectively enrolled and equally divided into two groups: Group A underwent early laparoscopic cholecystectomy (ELC) and Group B underwent delayed laparoscopic cholecystectomy (DLC). The mean age of patients was comparable between the two groups (42.20 ± 12.16 years in Group A vs 43.27 ± 13.22 years in Group B; p=0.746). Female predominance was observed in both groups, accounting for 83.3% of patients in Group A and 76.7% in Group B. Baseline demographic characteristics and CT severity index (CTSI) scores were similar between the groups, confirming appropriate comparability at enrolment.

Table 1. Baseline Demographic and Clinical Characteristics

Parameter	Group A (ELC)	Group B (DLC)	p-value
Mean age (years)	42.20 ± 12.16	43.27 ± 13.22	0.746
Female patients	25 (83.3%)	23 (76.7%)	0.747
Mean CTSI score	1.33 ± 1.15	1.43 ± 1.17	0.742
Serum amylase (U/L)	269.20 ± 81.83	55.23 ± 18.65	<0.0001
Serum lipase (U/L)	225.00 ± 52.51	78.87 ± 10.95	<0.0001

Patients in the ELC group underwent surgery at a mean interval of 2.83 ± 0.95 days after admission, whereas patients in the DLC group underwent surgery during re-admission after resolution of pancreatitis. Although the total duration of hospital stay was significantly longer in Group A (6.13 ± 1.22 vs 4.97 ± 1.16 days; p=0.0004), the postoperative stay was significantly shorter in the ELC group (3.23 ± 1.48 vs 3.97 ± 1.35 days; p=0.015), suggesting faster postoperative recovery following early surgery.

Routine liver function parameters including serum bilirubin, SGOT, SGPT, and alkaline phosphatase were comparable between both groups. Prothrombin index showed a statistically significant difference; however, all values remained within normal clinical limits. Serum amylase and lipase levels were significantly elevated in Group A because surgery was performed during the active phase of pancreatitis, whereas values had normalized in Group B by the time of delayed surgery.

Surgical feasibility was graded as easy in the majority of cases in both groups, with no statistically significant difference. Conversion to open cholecystectomy was required in 6.7% of patients in Group A and 10.0% in Group B. No mortality was observed in either group, and overall clinical outcomes were comparable.

Table 2. Operative Outcomes and Postoperative Recovery

Parameter	Group A (ELC)	Group B (DLC)	p-value
Easy surgical feasibility	76.7%	86.7%	0.505
Conversion to open surgery	6.7%	10.0%	1.000
Postoperative stay (days)	3.23 ± 1.48	3.97 ± 1.35	0.015
Postoperative complications	20.0%	10.0%	0.472
Mortality	0%	0%	—

Intraoperative findings such as adhesions and bleeding were slightly more common in the ELC group, likely due to active inflammation, but the difference was not statistically significant. One patient in the DLC group was found to have pus in the gallbladder intraoperatively, indicating that delayed surgery does not always ensure a simpler operative field.

Postoperative complications were generally minor and managed conservatively. Fever, postoperative pain, paralytic ileus, nausea, vomiting, and chest infection were the commonly observed complications. Importantly, no bile duct injury, major hemorrhage, re-operation, or mortality occurred in either group. Surgical difficulty was found to be a major determinant of postoperative morbidity and prolonged hospital stay irrespective of surgical timing. Difficult procedures were associated with significantly longer hospitalization and higher complication rates in both groups.

Table 3. Factors Associated with Prolonged Hospital Stay

Factor	Group A (ELC)	Group B (DLC)	Significance
Difficult surgery and longer LOS	3.64 vs 2.22 days	4.75 vs 2.85 days	Significant
Drain in situ and longer LOS	4.12 vs 2.23 days	4.75 vs 2.88 days	Significant/ Trend
CTSI associated with LOS	Yes	No	p=0.011

The mean cost of surgery in the delayed cholecystectomy group was Rs. 17,946 ± 2,147. Difficult procedures were associated with significantly higher operative costs compared to easy procedures (p=0.021). During follow-up, most patients had uneventful recovery, and no patient required re-hospitalization or repeat surgical intervention. Overall, the study demonstrated that early laparoscopic cholecystectomy is a safe and feasible approach in patients with mild gallstone pancreatitis and offers the advantage of shorter postoperative recovery without increasing operative morbidity or conversion rates.

DISCUSSION

The present study compared early laparoscopic cholecystectomy (ELC) and delayed laparoscopic cholecystectomy (DLC) in patients with gallstone-induced mild pancreatitis. Both groups were comparable in terms of baseline characteristics, with mean ages of 42.20 ± 12.16 years and 43.27 ± 13.22 years in the ELC and DLC groups, respectively, and a predominance of female patients in both groups. Similar demographic comparability was reported by Soomro et al. [5], where the mean age was 45.1 years and both groups were matched for age, gender, and ethnicity, supporting the validity of outcome comparisons.

In the present study, ELC was found to be safe and feasible, with no significant difference in surgical feasibility (76.7% vs 86.7%; p=0.505) or conversion to open surgery (6.7% vs 10.0%; p=1.000) compared with DLC. These findings are consistent with the observations of Soomro et al. [5], who reported conversion rates of 10% and 6% in the early and delayed groups, respectively, with no mortality in either group. Similarly, Demir et al. [6] found no significant difference in morbidity between early and delayed surgery groups despite a small number of conversions and postoperative complications.

A key finding of this observational study was that postoperative recovery was significantly faster in the ELC group, as evidenced by a shorter postoperative hospital stay (3.23 ± 1.48 vs 3.97 ± 1.35 days; p=0.015). Although the total hospital stay was longer in the ELC group because surgery was performed during the index admission, early surgery avoided the need for subsequent admissions. This finding agrees with Demir et al. [6], who reported a significantly shorter hospital stay in the early surgery group (6.8 vs 9.4 days; p<0.05). Furthermore, Soomro et al. [5] demonstrated that recurrent biliary events occurred exclusively in the delayed group, with 15 recurrent events and 9 re-admissions, whereas no recurrent events occurred in

the early surgery group.

Postoperative complications in our study were minor and comparable between groups (20.0% vs 10.0%; p=0.472), with no bile duct injury, major hemorrhage, re-operation, or mortality. These findings support the growing evidence favoring early cholecystectomy in mild gallstone pancreatitis. In contrast, the systematic review by Hughes and Morris-Stiff [7] reported higher complication and mortality rates with early surgery; however, those recommendations were largely based on studies involving moderate and severe acute pancreatitis rather than mild disease. Therefore, the present study reinforces current evidence that early laparoscopic cholecystectomy is a safe and effective strategy in patients with mild gallstone pancreatitis, providing faster recovery and reducing the risk of recurrent biliary events without increasing operative morbidity or mortality.

CONCLUSION

Early laparoscopic cholecystectomy is a safe and feasible approach in patients with gallstone-induced mild pancreatitis. It provides comparable operative outcomes and complication rates to delayed surgery while offering shorter postoperative recovery and reduced risk of recurrent biliary events. Surgical difficulty, rather than timing of surgery, was the main factor associated with postoperative complications and prolonged hospital stay.

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