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Original Article

Comparison of Early and Delayed Laparoscopic Cholecystectomy in Mild Acute Biliary Pancreatitis: A Randomised Controlled Interventional Study

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ABSTRACT

Background: Mild acute biliary pancreatitis is common in surgical practice and is definitively treated by cholecystectomy after clinical stabilisation. The classical conservative approach delayed cholecystectomy to allow inflammation to subside, but this interval exposes patients to recurrent biliary colic, recurrent pancreatitis, readmission, and avoidable socioeconomic loss. Contemporary surgical practice increasingly favours index-admission or early laparoscopic cholecystectomy in appropriately selected mild cases, provided severe pancreatitis, persistent organ failure, cholangitis requiring urgent decompression, and prohibitive comorbidity are excluded.6,7,10,16

Methods: This journal manuscript was reconstructed from a single-centre randomised comparative thesis dataset. Sixty adult patients with mild acute biliary pancreatitis were allocated by chit randomisation to early laparoscopic cholecystectomy (n=30) or delayed laparoscopic cholecystectomy (n=30). The primary endpoints were difficulty in skeletonisation of Calot's triangle, CBD injury, liver injury, operative time, recurrent pancreatitis, and recurrent biliary colic. Secondary endpoints were length of hospital stay and treatment cost assessed from the patient perspective. The Excel master chart was re-analysed using descriptive statistics, Welch t test for continuous variables, and Fisher exact test or chi-square test for categorical variables.

Results: The groups were comparable for age (early 42.53 ± 14.20 years; delayed 43.10 ± 15.99 years; p=0.885) and sex distribution (p=0.422). Difficult Calot's triangle dissection was recorded in 7/30 (23.3%) early cases and 9/30 (30.0%) delayed cases (p=0.771). No CBD injury or liver injury occurred in either arm. Mean operative time was shorter after early surgery (55.73 ± 9.22 minutes) than delayed surgery (61.97 ± 9.26 minutes; p=0.011). Mean hospital stay was substantially shorter in the early group (5.43 ± 0.90 days) than the delayed group (9.77 ± 0.82 days; p<0.001). Recurrent pancreatitis occurred in 1/30 (3.3%) early versus 3/30 (10.0%) delayed cases (p=0.612), and recurrent biliary colic in 2/30 (6.7%) versus 6/30 (20.0%) cases respectively (p=0.254).

Conclusion: In selected patients with mild acute biliary pancreatitis, early laparoscopic cholecystectomy was associated with shorter operative time, markedly shorter hospital stay, lower patient-perspective cost, and fewer interval recurrent biliary events without increasing CBD injury, liver injury, or operative difficulty.

The findings support early definitive surgery during the index clinical episode when performed by experienced laparoscopic surgeons in appropriately selected mild cases.

Keywords: acute biliary pancreatitis; gallstone pancreatitis; early cholecystectomy; delayed cholecystectomy; laparoscopic cholecystectomy; Calot's triangle; recurrent pancreatitis.

INTRODUCTION

Acute pancreatitis is an inflammatory disorder of the pancreas with a clinical spectrum ranging from mild interstitial oedematous inflammation to severe necrotising pancreatitis with persistent organ failure. Gallstone disease and biliary sludge remain among the most frequent causes of acute pancreatitis. The source thesis describes acute biliary pancreatitis as a reversible inflammatory process when its primary cause is eliminated, and notes an annual incidence ranging from 4.9 to 35 per 100,000 population with biliary pancreatitis accounting for a substantial proportion of acute pancreatitis presentations.1,2 In routine general surgical practice, this condition sits at the interface of emergency resuscitation, hepatopancreatobiliary assessment, endoscopy, and definitive laparoscopic surgery.

The pathophysiological basis of gallstone pancreatitis is classically attributed to transient obstruction at the ampulla of Vater by a migrating stone or biliary sludge. Impaction or passage of a small gallstone can obstruct the shared pancreaticobiliary outflow tract, producing pancreatic ductal hypertension, reflux phenomena, intrapancreatic enzyme activation, and acinar injury. Opie's early observations on ampullary stone impaction were historically important, and subsequent clinical work established gallstone migration as a common mechanism for biliary pancreatitis.3,5 Modern understanding recognises that ductal obstruction, acinar cell injury, premature trypsin activation, cytokine release, microcirculatory disturbance, and systemic inflammatory response collectively determine the severity of an episode.2,7

Diagnosis of acute pancreatitis is made when at least two of three criteria are fulfilled: typical upper abdominal pain, serum amylase or lipase greater than three times the upper limit of normal, and imaging evidence of pancreatitis.6,7 Biliary aetiology is suggested by gallstones on ultrasonography, biliary sludge, deranged liver function tests, common bile duct dilatation, or marked early alanine aminotransferase elevation. Transabdominal ultrasonography remains the first-line investigation for gallstones, while contrast-enhanced CT, MRCP, and endoscopic ultrasonography are used selectively to define severity, exclude local complications, and evaluate suspected choledocholithiasis.6,8

The revised Atlanta classification is fundamental for surgical timing decisions. Mild acute pancreatitis is defined by the absence of organ failure and the absence of local or systemic complications. Moderately severe disease includes transient organ failure or local/systemic complications, and severe disease is characterised by persistent organ failure.7,10 This distinction is not academic; it determines whether early definitive cholecystectomy is appropriate. Mild biliary pancreatitis usually settles within several days, making the index admission a rational window for definitive source control. In contrast, moderate to severe pancreatitis may require delayed operative intervention after collections mature and systemic physiology stabilises.

The definitive treatment of gallstone pancreatitis is removal of the gallbladder, because supportive treatment alone does not remove the source of recurrent stones. Without cholecystectomy, patients remain exposed to recurrent biliary colic, acute cholecystitis, cholangitis, choledocholithiasis, and recurrent pancreatitis. The source thesis emphasises that the longer the interval between the first attack and definitive cholecystectomy, the greater the opportunity for recurrent gallstone-related events. This principle is also reflected in trials and meta-analyses that favour early or index-admission cholecystectomy in mild disease.16,45,48,51,54

Traditionally, surgeons often delayed cholecystectomy for several weeks after an attack of biliary pancreatitis, particularly because of concern about oedema, inflammation around Calot's triangle, difficult dissection, conversion to open surgery, and bile duct injury. This conservative attitude is understandable and historically safe in the era before mature laparoscopic expertise. However, accumulated evidence suggests that in mild acute biliary pancreatitis, early laparoscopic cholecystectomy does not materially increase perioperative morbidity when performed by experienced surgeons. Instead, it shortens total hospital stay, reduces readmission, and limits recurrent biliary events.42,43,44,48,49,51

In the Indian setting, cost and lost work-days are particularly relevant. Many patients bear direct and indirect medical expenses, and a delayed strategy may require a second admission, repeat investigations, additional travel, additional attendant time, and prolonged absence from employment. These practical realities justify analysing patient-perspective cost alongside conventional surgical endpoints. The present reconstructed manuscript therefore focuses not only on operative safety, but also on recurrent events, hospital stay, and socioeconomic burden.

The source thesis was designed to compare outcomes of early and delayed laparoscopic cholecystectomy in mild acute biliary pancreatitis. The stated primary outcomes included intraoperative difficulty in skeletonisation of Calot's triangle,

CBD injury, liver injury, operative time, recurrent pancreatitis, and recurrent biliary colic. Secondary outcomes included length of hospital stay and cost of treatment from the patient perspective. The present manuscript reconstructs the dataset statistically from the uploaded master chart and presents the findings in a publication-ready format, with corrected inferential statistics where the master chart allowed independent re-analysis.

MATERIALS AND METHODS

Study design and setting

This was a single-centre, randomised, interventional comparative study conducted in the Department of General Surgery, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh. The source thesis states that the study commenced after approval from the College Research Committee and Institutional Ethics Committee and continued for 18 months. The study compared early laparoscopic cholecystectomy with delayed laparoscopic cholecystectomy in adult patients with mild acute biliary pancreatitis.

Study population

The target population comprised adult patients presenting to the Department of Surgery with acute biliary pancreatitis. Patients were eligible when they were older than 18 years, consented to participate, fulfilled diagnostic criteria for mild to moderate acute biliary pancreatitis according to the modified Atlanta criteria, and were suitable for laparoscopic cholecystectomy by a surgeon experienced in laparoscopy. In the reconstructed master chart, all included patients were documented as having mild biliary pancreatitis.

Inclusion and exclusion criteria

Inclusion criteria were age greater than 18 years, consent for participation, mild acute biliary pancreatitis by modified Atlanta criteria, and planned operation by a skilled laparoscopic surgeon. Exclusion criteria were pancreatitis of non-biliary aetiology, severe gallstone pancreatitis by modified Atlanta criteria, refusal to participate, non-operative management, and severe pre-existing medical comorbidity contraindicating cholecystectomy.

Group allocation and interventions

Sixty patients were allocated equally into two treatment arms by chit randomisation. Group 1 underwent early laparoscopic cholecystectomy and Group 2 underwent delayed laparoscopic cholecystectomy. The thesis does not provide a universally standardised hour-based definition in the methods section, but the study framework compares early definitive operation during the early/index clinical episode against a delayed strategy after clinical recovery. All procedures were laparoscopic cholecystectomies performed in a general surgery unit by surgeons with independent laparoscopic experience.

Outcomes

The primary outcomes were intraoperative difficulty in skeletonisation of Calot's triangle, CBD injury, liver injury, time taken for surgery from induction to reversal of anaesthesia, episodes of recurrent pancreatitis, and episodes of recurrent biliary colic. Secondary outcomes were length of hospital stay and cost of treatment from the patient perspective, defined in the master chart as cost based on loss of man-working hours.

Statistical analysis

The dataset was reconstructed from the uploaded Excel master chart. Continuous variables were summarised as mean, standard deviation, median, and range. Categorical variables were summarised as frequency and percentage. Welch's independent samples t test was used for continuous variables because it does not assume equal variance. Fisher exact test was used for binary categorical outcomes when cell counts were small, and chi-square testing was used for multi-category distributions where appropriate. A two-sided p value less than 0.05 was considered statistically significant. Because the master chart allowed independent reconstruction, the p values presented in this manuscript are recalculated from raw patient-level data; where these differ from the thesis tables, the reconstructed values should be treated as the internally consistent statistical output.

RESULTS

Patient disposition and baseline characteristics

The master chart contained 60 evaluable patients, with 30 patients in the early laparoscopic cholecystectomy group and 30 patients in the delayed laparoscopic cholecystectomy group. All patients were documented as having mild biliary pancreatitis. There were no missing values for age, sex, operative time, length of stay, Calot's triangle difficulty, CBD injury, liver injury, recurrent pancreatitis, or recurrent biliary colic.

The mean age was 42.53 ± 14.20 years in the early group and 43.10 ± 15.99 years in the delayed group. Median age was 39.5 years and 41.0 years respectively. The age distribution was statistically comparable between groups (p=0.885). The early group contained 21 males and 9 females, whereas the delayed group contained 17 males and 13 females. Sex distribution did not differ significantly after reconstruction (p=0.422).

Table 1. Baseline demographic and diagnostic characteristics.

Characteristic	Early LC (n=30)	Delayed LC (n=30)	Reconstructed p value
Age, mean ± SD, years	42.53 ± 14.20	43.10 ± 15.99	0.885
Age, median (range), years	39.5 (24-71)	41.0 (22-72)	
Male sex, n (%)	21 (70.0)	17 (56.7)	0.422
Female sex, n (%)	9 (30.0)	13 (43.3)	
Diagnosis: mild biliary pancreatitis	30 (100.0)	30 (100.0)	Not applicable

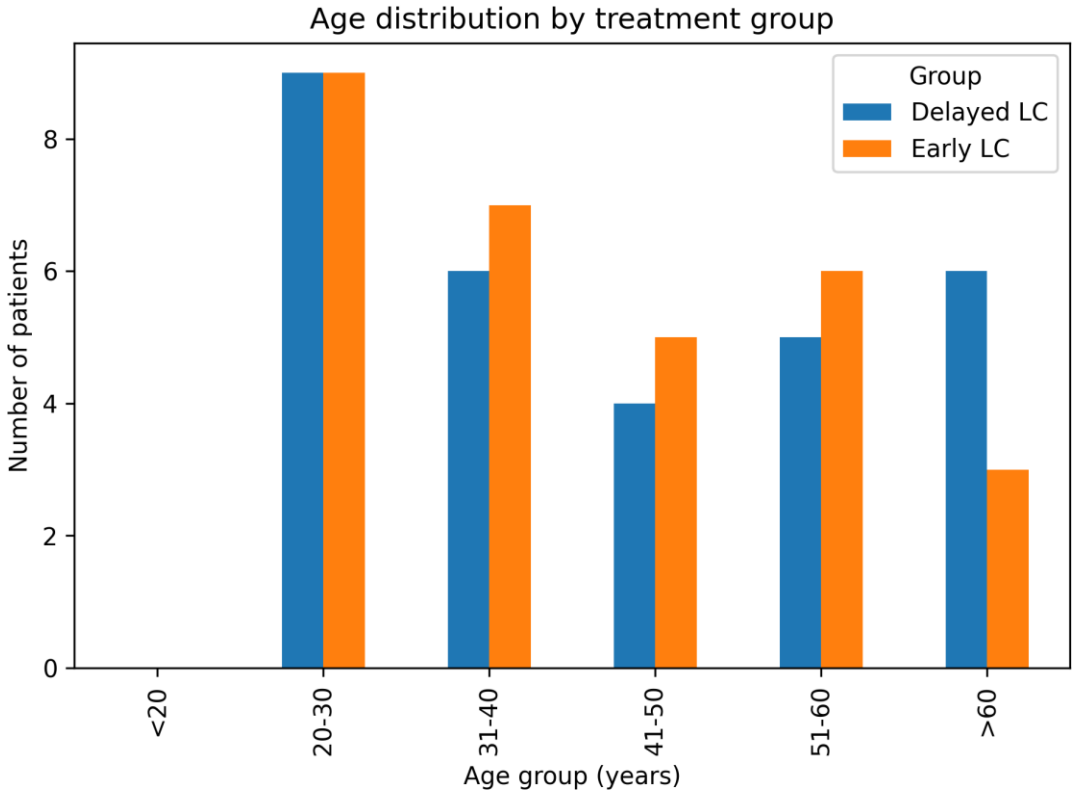

Figure 1. Age distribution in early and delayed laparoscopic cholecystectomy groups.

Intraoperative outcomes

Difficulty in skeletonisation of Calot's triangle was recorded in 7 of 30 patients (23.3%) in the early group and 9 of 30 patients (30.0%) in the delayed group. This difference was not statistically significant on reconstructed testing (p=0.771). No CBD injury occurred in either group. No liver injury occurred in either group. These findings indicate that early surgery did not increase major intraoperative hepatobiliary injury in this selected mild pancreatitis cohort.

Mean operative time was 55.73 ±9.22 minutes in the early group compared with 61.97 ±9.26 minutes in the delayed group. The reconstructed mean difference was approximately 6.23 minutes in favour of early surgery, and this difference was statistically significant (p=0.011). The operative time signal suggests that delay did not simplify surgery in this dataset; rather, the delayed arm had a modestly longer operative duration, potentially reflecting recurrent inflammation or adhesions during the waiting interval.

Table 2. Intraoperative outcomes.

Outcome	Early LC (n=30)	Delayed LC (n=30)	Reconstructed p value
Difficult Calot's triangle, n (%)	7 (23.3)	9 (30.0)	0.771
Easy Calot's triangle, n (%)	23 (76.7)	21 (70.0)	

CBD injury, n (%)	0 (0.0)	0 (0.0)	Not applicable
Liver injury, n (%)	0 (0.0)	0 (0.0)	Not applicable
Operative time, mean ± SD, min	55.73 ± 9.22	61.97 ± 9.26	0.011

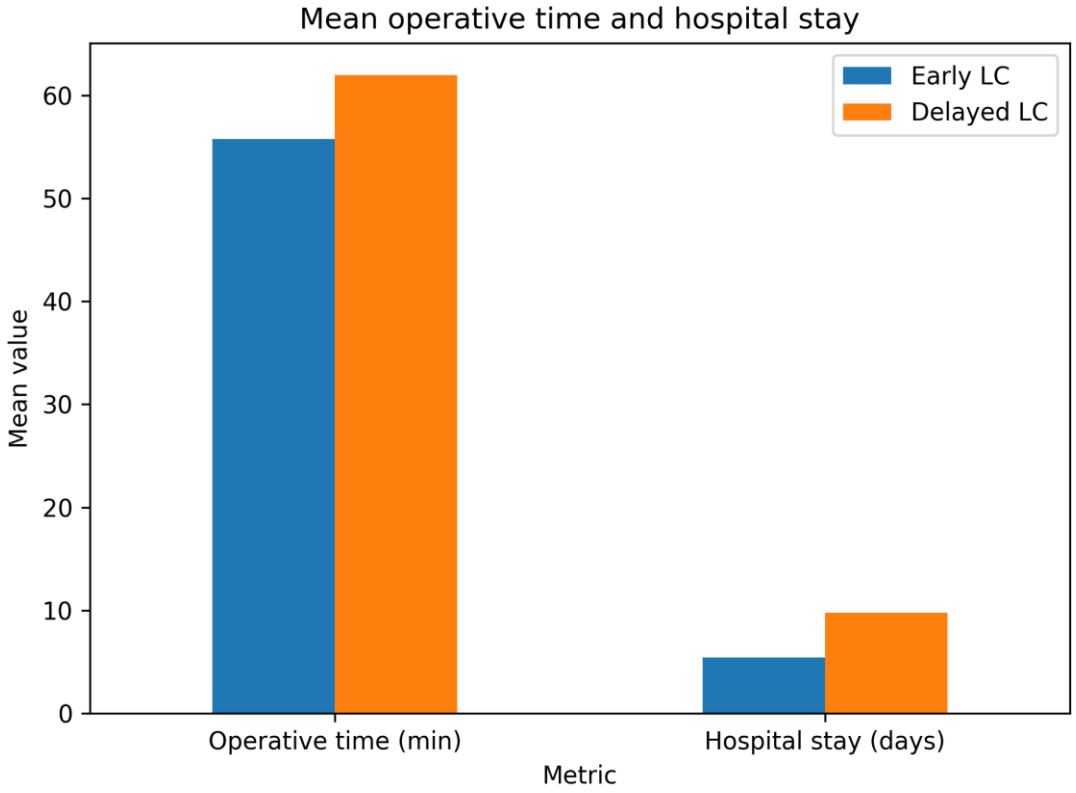

Figure 2. Mean operative time and length of hospital stay by treatment group.

Hospital stay and cost

Length of hospital stay showed the strongest effect in the reconstructed analysis. Mean stay was 5.43 ±0.90 days in the early group and 9.77 ±0.82 days in the delayed group. The mean difference was 4.33 days, favouring early surgery, with $p<0.001$. The delayed strategy therefore nearly doubled inpatient stay in this dataset. From the patient perspective, all early-group cases were classified as lower cost and all delayed-group cases as higher cost based on loss of man-working hours, again favouring early definitive surgery.

Table 3. Secondary outcomes: hospital stay and patient-perspective cost.

Outcome	Early LC (n=30)	Delayed LC (n=30)	Reconstructed p value
Length of hospital stay, mean ± SD, days	5.43 ± 0.90	9.77 ± 0.82	<0.001
Length of hospital stay, median (range), days	5.0 (4-7)	10.0 (9-12)	
Lower patient-perspective cost, n (%)	30 (100.0)	0 (0.0)	<0.001
Higher patient-perspective cost, n (%)	0 (0.0)	30 (100.0)	

Recurrent biliary events

Recurrent pancreatitis occurred in 1 patient (3.3%) in the early group and 3 patients (10.0%) in the delayed group. The absolute risk difference was 6.7 percentage points. Although the direction favoured early surgery, reconstructed Fisher exact testing did not reach statistical significance ($p=0.612$), which is expected with only four total events. Recurrent biliary

colic occurred in 2 patients (6.7%) in the early group and 6 patients (20.0%) in the delayed group. This represented an absolute risk difference of 13.3 percentage points favouring early surgery, but did not reach conventional statistical significance after exact testing (p=0.254). Clinically, the recurrent-event pattern is consistent with the expected risk of leaving the gallbladder in situ after biliary pancreatitis.

Table 4. Recurrent biliary events.

Outcome	Early LC (n=30)	Delayed LC (n=30)	Absolute risk difference	Reconstructed p value
Recurrent pancreatitis, n (%)	1 (3.3)	3 (10.0)	6.7 percentage points	0.612
No recurrent pancreatitis, n (%)	29 (96.7)	27 (90.0)		
Recurrent biliary colic, n (%)	2 (6.7)	6 (20.0)	13.3 percentage points	0.254
No recurrent biliary colic, n (%)	28 (93.3)	24 (80.0)		

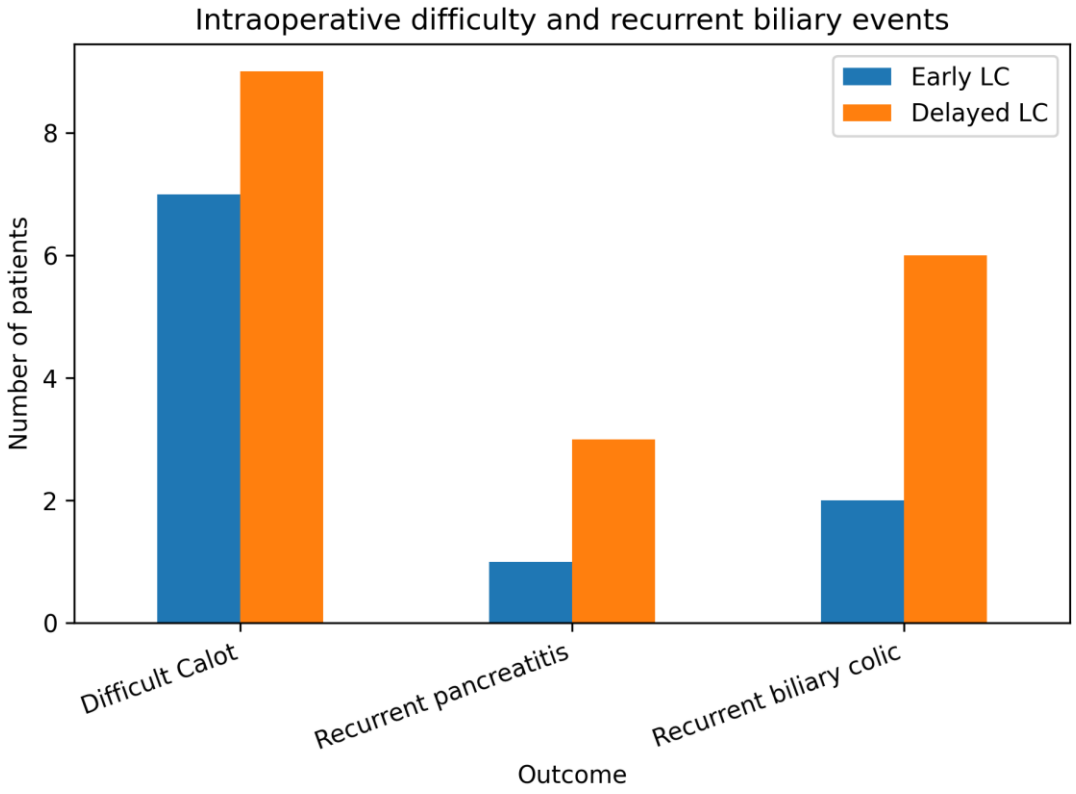

Figure 3. Intraoperative difficulty and recurrent biliary events.

Data audit: comparison with thesis tables

The extracted thesis tables and the patient-level master chart were generally concordant for frequencies, means, and standard deviations. However, several p values in the thesis tables appear inconsistent with the patient-level data. For example, reconstructed testing showed no statistically significant difference in sex distribution, recurrent pancreatitis, or recurrent biliary colic, whereas the thesis tables labelled these as statistically significant. Conversely, reconstructed operative time was statistically different between groups, whereas the thesis table labelled it non-significant. The manuscript therefore reports recalculated p values from the master chart and interprets recurrent events cautiously as clinically directional but statistically underpowered.

DISCUSSION

This reconstructed study demonstrates that early laparoscopic cholecystectomy in selected mild acute biliary pancreatitis is safe and operationally advantageous. Early surgery was not associated with increased difficult Calot's triangle dissection,

CBD injury, or liver injury. Instead, it was associated with shorter operative time, substantially shorter hospital stay, lower patient-perspective cost, and fewer recurrent biliary events. These findings are clinically coherent and align with the direction of modern evidence favouring index-admission cholecystectomy for mild gallstone pancreatitis.16,45,48,49,51,54

The central concern against early surgery has always been technical safety. Surgeons fear that peripancreatic inflammation, gallbladder oedema, inflamed hepatocystic anatomy, and friability may obscure Calot's triangle and increase the risk of bile duct injury. In the present dataset, difficult skeletonisation was actually numerically higher in the delayed arm, although not statistically significant. This suggests that delaying surgery did not eliminate operative difficulty. Recurrent low-grade inflammation, interval cholecystitis, adhesions, or repeated biliary events during the waiting period may counterbalance any benefit gained by allowing the initial pancreatitis episode to settle.

No CBD injury or liver injury occurred in either arm. This is important but must be interpreted carefully because the sample size was small and bile duct injury is uncommon. A cohort of 60 patients cannot prove equivalence for rare catastrophic events. It can, however, provide practical evidence that early laparoscopic cholecystectomy is feasible in a supervised unit when cases are restricted to mild pancreatitis and procedures are performed by surgeons with adequate laparoscopic experience. This is consistent with studies by Taylor, Rosing, Nebiker, Jee, and others, which did not show a meaningful increase in perioperative complications with early surgery in mild disease.42,43,44,48

The operative time finding is noteworthy. The early group had a mean operative time approximately six minutes shorter than the delayed group. While the numerical difference is modest, it suggests that early definitive surgery did not make the procedure longer or more complex. Delayed cholecystectomy may be expected to be easier after inflammation subsides, but real-world delayed surgery is not always performed in a sterile recovery interval. Patients may experience recurrent colic or subclinical cholecystitis before the delayed operation, producing adhesions and difficult planes. This may explain why the delayed arm did not demonstrate a technical advantage.

The strongest and most statistically robust benefit was reduction in hospital stay. Mean stay decreased from 9.77 days in the delayed group to 5.43 days in the early group, a reduction of more than four days. This magnitude is clinically meaningful for patients, attendants, hospitals, and training units. It reduces bed occupancy, improves throughput, decreases nursing and medication burden, and limits indirect costs. The result is consistent with Rosing et al., Aboulian et al., Dubina et al., Davoodabadi et al., Dai et al., and Prasanth et al., all of whom reported shorter hospitalisation with early cholecystectomy or no penalty in perioperative outcomes.16,43,47,52,53,54

Recurrent biliary events are the main biological argument against delaying surgery. In the present dataset, recurrent pancreatitis was 3.3% in the early group compared with 10.0% in the delayed group, and recurrent biliary colic was 6.7% compared with 20.0%. The exact p values did not reach statistical significance after reconstruction, but the absolute differences are clinically relevant and directionally consistent with larger trials and meta-analyses. The lack of statistical significance is most likely due to low event counts and limited sample size rather than absence of effect. When only four pancreatitis events and eight biliary colic events occur, the study is underpowered for definitive recurrent-event inference. The literature strongly supports this direction. Nebiker et al. reported more recurrent biliary pancreatitis when cholecystectomy was delayed.44 Jee et al. found that early cholecystectomy reduced recurrent biliary events without increasing operative morbidity.48 Zhong et al. reported shorter hospital stay and fewer gallstone-related events with early laparoscopic cholecystectomy in mild gallstone pancreatitis.49 Moody et al. found reduced readmission for recurrent biliary events after early cholecystectomy without increased intraoperative or postoperative complications.51 Prasanth et al. similarly concluded that early cholecystectomy reduces recurrent pancreaticobiliary events and length of stay.54

From a patient-centred perspective, cost is crucial. The source dataset classified cost according to loss of man-working hours and showed uniformly lower cost in the early group. This variable is coarse and would be strengthened by actual rupee-based direct and indirect cost measurement; nevertheless, the inference is reasonable. Delayed cholecystectomy frequently converts a single clinical episode into multiple encounters: initial admission, discharge, outpatient follow-up, readmission for elective operation, repeat investigations, repeat anaesthesia clearance, and attendant loss of wages. In resource-constrained environments, avoiding this duplication is a major advantage.

The present findings should be applied only to mild acute biliary pancreatitis. They should not be extrapolated to severe pancreatitis with persistent organ failure, extensive necrosis, infected collections, uncontrolled sepsis, shock, or complex choledocholithiasis. In such situations, staged management, ERCP where indicated, delayed cholecystectomy, or combined procedures may be safer. The art of surgery lies not in applying early operation indiscriminately, but in selecting the right patient at the right physiological moment.

The study also highlights the value of statistical reconstruction from the master chart. Thesis tables are often manually transcribed and may contain p-value inconsistencies. Patient-level re-analysis improves reliability and allows a journal manuscript to present results transparently. In this manuscript, the reconstructed analysis preserved the descriptive findings

while correcting the inferential interpretation. The conclusion remains favourable to early surgery, but recurrent-event claims are framed as clinically important trends rather than statistically proven differences within this small dataset.

Overall, the results favour an early laparoscopic approach for mild biliary pancreatitis in a unit with experienced surgeons and standard perioperative support. The evidence is not merely statistical; it is practical. Early cholecystectomy treats the cause, reduces the window for recurrence, avoids a second admission, and saves hospital days without increasing major operative injury in this cohort. This is consistent with both traditional surgical principles of source control and modern minimally invasive practice.

Strengths

The study has several strengths. It used patient-level data rather than aggregate-only reporting. The groups were equal in size and comparable for age and diagnosis. The endpoints were clinically relevant to general surgeons, including operative difficulty, bile duct injury, recurrent pancreatitis, recurrent biliary colic, hospital stay, and patient-perspective cost. The study was performed in a real-world teaching hospital setting, making the findings applicable to similar Indian general surgery units.

Limitations

Several limitations of this study should be acknowledged. First, the sample size was relatively small, limiting the statistical power to detect differences in infrequent outcomes such as common bile duct injury, recurrent pancreatitis, and other rare postoperative complications. Second, although patients in the delayed laparoscopic cholecystectomy group underwent surgery on the tenth day from symptom onset, the study did not evaluate whether different durations of delay beyond this interval would influence outcomes. Third, important clinical variables such as biochemical severity markers, American Society of Anesthesiologists (ASA) grade, body mass index (BMI), comorbidities, imaging severity parameters, common bile duct diameter, and use of endoscopic retrograde cholangiopancreatography (ERCP) were not systematically recorded. Operative variables including conversion to open surgery, drain placement, and detailed postoperative complications were also not analysed. The inclusion of only patients with mild acute biliary pancreatitis and the exclusion of patients with moderate and severe pancreatitis limit the applicability of the findings to more severe forms of the disease. Furthermore, all procedures were performed by experienced laparoscopic surgeons, which may limit the generalisability of the results to centres with different levels of surgical expertise. Blinding was not feasible because of the nature of the intervention. Finally, this was a single-centre study, and therefore the external validity of the findings may be influenced by local patient selection practices and institutional protocols.

Recommendations

Future studies should compare different delayed cholecystectomy intervals in addition to early surgery to determine the optimal timing of intervention following mild acute biliary pancreatitis. Detailed clinical, biochemical, and radiological parameters—including validated severity scores, ASA grade, BMI, liver function tests, imaging findings, common bile duct characteristics, and ERCP utilisation—should be prospectively collected. Operative outcomes such as conversion to open surgery, drain usage, and postoperative complications classified according to standardised systems should also be documented. Larger multicentre randomised controlled trials involving diverse healthcare settings would improve the external validity of the findings and provide sufficient power to detect differences in uncommon but clinically important complications. Future research may also evaluate the safety and outcomes of early cholecystectomy in carefully selected patients with moderately severe acute biliary pancreatitis. Based on the findings of the present study, early laparoscopic cholecystectomy should be considered the preferred management strategy for adult patients with mild acute biliary pancreatitis, following clinical stabilisation and appropriate evaluation for choledocholithiasis.

CONCLUSION

In this reconstructed single-centre randomised comparative dataset of 60 patients with mild acute biliary pancreatitis, early laparoscopic cholecystectomy was safe and advantageous compared with delayed laparoscopic cholecystectomy. It did not increase difficult Calot's triangle dissection, CBD injury, or liver injury. It significantly reduced operative time and length of hospital stay, lowered patient-perspective cost, and showed fewer recurrent pancreatitis and biliary colic events. Although the recurrent-event differences were underpowered for statistical significance after exact testing, their direction is clinically important and consistent with contemporary literature. Early laparoscopic cholecystectomy should therefore be favoured in selected mild acute biliary pancreatitis when performed by experienced laparoscopic surgeons with appropriate perioperative assessment.

Declarations

Ethical approval

The source thesis states that Institutional Ethics Committee approval was obtained before study commencement.

Consent

The source thesis states that written informed consent was obtained from participants before surgery.

Funding
No external funding was reported in the source documents.

Conflicts of interest
No conflicts of interest were reported in the source documents.

Data availability
The manuscript was reconstructed from the uploaded thesis PDF and master-chart Excel file supplied for analysis. Identifying patient details should be removed before journal submission.

Acknowledgement
This manuscript was prepared by restructuring and statistically reconstructing the thesis dataset into journal format. The clinical work belongs to the original investigators and institution.

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