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Optimal Timing to Perform Cholecystectomy in Patients with Acute Biliary Pancreatitis

Sohail Akram[1], Hira Khalid[1], Zahoor[1], Muhammad Imran[1], Fahad[1], Fawad[1]

Correspondence
Sohail Akram
sohailakram@cmhkohat.pk
Affiliations
1 Combined Military Hospital (CMH), Kohat, Pakistan

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ABSTRACT

Background: Acute biliary pancreatitis accounts for nearly 50% of acute pancreatitis cases, primarily caused by gallstones and biliary sludge. Cholecystectomy remains the definitive treatment to prevent recurrent biliary events, but the optimal timing of surgery remains debated.

Objective: This study aimed to evaluate the optimal timing of cholecystectomy in patients with mild to moderate acute biliary pancreatitis, comparing early cholecystectomy during index admission to delayed cholecystectomy.

Methods: A prospective cohort study was conducted over 24 months at Combined Military Hospital, Kohat, Pakistan. A total of 126 patients aged 18 years and older, diagnosed with mild to moderate acute biliary pancreatitis, were included. Patients with severe pancreatitis, ICU admissions, or requiring ERCP were excluded. Patients were divided into two groups: index admission cholecystectomy and delayed cholecystectomy. Data were analyzed using SPSS 25 with chi-square tests applied. A p-value of <0.05 was considered statistically significant.

Results: Recurrent pancreatitis occurred in 0 patients in the early group versus 41 patients in the delayed group ($p < 0.001$). The mean hospital stay was significantly shorter in the early group (5.92 vs 12.31 days, $p < 0.001$).

Conclusion: Early cholecystectomy significantly reduced recurrent biliary events and shortened hospital stay in patients with mild to moderate acute biliary pancreatitis without increasing complications.

INTRODUCTION

Acute biliary pancreatitis is a significant cause of acute pancreatitis, accounting for nearly 50% of cases, with gallstones and biliary sludge being the predominant etiological factors (1, 2). While most patients present with mild to moderate forms of the disease, a minority progress to severe complications, increasing the burden on healthcare systems (1, 2). A key therapeutic intervention for acute biliary pancreatitis is cholecystectomy, which aims to prevent recurrent biliary events, such as pancreatitis, common bile duct obstruction, cholangitis, or biliary colic (3). Failure to perform timely cholecystectomy has been linked to a recurrence rate of up to 33%, highlighting the importance of addressing this condition promptly (4). However, the optimal timing of cholecystectomy remains a topic of debate, particularly in cases of mild to moderate biliary pancreatitis. Several studies have presented contradictory findings regarding whether cholecystectomy should be performed during the index admission or delayed until after the acute episode has resolved (5–9).

Recent evidence from the PONCHO randomized clinical trial supports the performance of cholecystectomy during the index admission for mild cases of acute biliary pancreatitis, demonstrating a reduction in recurrent biliary complaints without increasing the risk of postoperative complications (10). Despite these findings, the timing of surgery in moderate to severe cases remains controversial. Some data suggest that early surgery in more severe cases is associated with increased morbidity and mortality (10). The MANCTRA-1 dataset also raised concerns about the outcomes in patients with moderate to severe pancreatitis, prompting recommendations for further comparative studies to address potential confounding factors (11).

Given the absence of local data on this subject, the present study aimed to evaluate the optimal timing for cholecystectomy in patients with mild to moderate acute biliary pancreatitis. By comparing outcomes of index admission versus delayed cholecystectomy, we sought to provide evidence on length of hospital stay and postoperative complications to guide clinical decision-making. Our study adds to the ongoing discourse by offering insights into the impact of early surgical intervention in a single-center cohort from a resource-limited setting.

MATERIAL AND METHODS

The study was conducted as a prospective cohort study over a 24-month period, from April 2022 to April 2024, at the Combined Military Hospital, Kohat. A convenience sampling technique was employed, and all patients aged 18 years or older, diagnosed with mild to moderate acute biliary pancreatitis (ABP), were included. The diagnosis of acute pancreatitis was made based on the presence of at least two of the following criteria: clinical signs of pancreatitis (epigastric pain, nausea, and vomiting), an elevated serum amylase level of at least three times the upper limit of

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normal, or characteristic findings of acute pancreatitis on abdominal imaging. Biliary pancreatitis was confirmed by the presence of gallstones on ultrasonography (USG). Mild to moderate pancreatitis was defined by the absence of pancreatic necrosis or peripancreatic collections, no persistent organ failure (>48 hours), clinical stability without the need for ICU or HDU care, and the absence of concomitant acute cholangitis.

Patients with severe pancreatitis, defined by a Ranson score of three or more at admission, those admitted to ICU or HDU, those with suspected concomitant acute cholangitis, or severe preexisting comorbidities contraindicating surgery, as well as pregnant women, were excluded from the study. Patients requiring endoscopic retrograde cholangiopancreatography (ERCP) were also excluded.

Ethical approval was obtained from the hospital's ethical review committee, and all patients provided informed consent before inclusion in the study, adhering to the principles outlined in the Declaration of Helsinki. Patient confidentiality was maintained throughout the study.

Preoperative, intraoperative, and postoperative data were collected prospectively for all participants. Data collected included demographic information (age, gender), clinical presentation, laboratory findings, radiological imaging, and perioperative details such as the duration of surgery, operative blood loss, operative difficulty, and any intraoperative complications. Postoperative data included complications, the length of hospital stay (LOS), and any recurrence of biliary symptoms. Patients were divided into two groups: those who underwent laparoscopic cholecystectomy (LC) during the index admission and those who underwent delayed cholecystectomy after resolution of the acute episode.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were calculated for all variables, including mean and standard deviation for continuous variables and frequencies for categorical data. The chi-square (χ^2) test was used to evaluate the correlation between categorical variables, and a p-value of less than 0.05 was considered statistically significant. In terms of operative outcomes, the duration of surgery, conversion to open cholecystectomy, and postoperative complications were compared between the two groups. Postoperative complications were classified according to the Clavien-Dindo classification. Length of hospital stay and recurrent biliary complaints were also assessed.

RESULTS

A total of 126 patients diagnosed with acute biliary pancreatitis (68 males, 58 females) underwent laparoscopic cholecystectomy (LC) between April 2022 and April 2024. Of these, 65 patients underwent cholecystectomy during the index admission (Group 1), while 61 underwent delayed cholecystectomy after the resolution of the acute episode (Group 2). The mean age of the patients was 51.5 years ± 9.8 years (range 29–75 years), and the groups were similar with respect to demographic and clinical characteristics. There were no significant differences in mean age, gender distribution, or main laboratory data between the two groups ($p > 0.05$). The mean BISAP score was 0.97 in Group 1 and 1.10 in Group 2 ($p = 0.23$). Logistic regression analysis showed that undergoing delayed cholecystectomy significantly increased the odds of developing recurrent pancreatitis (OR: 0.12, 95% CI: 0.03–0.44, $p < 0.001$). Similarly, delayed surgery was associated with a significantly longer length of hospital stay (OR: 1.45, 95% CI: 1.24–1.69, $p < 0.001$).

Table 1: Demographic and Clinical Data of Patients in Both Groups

Parameter	Group 1 (n = 65)	Group 2 (n = 61)	p-value
Age > 60 years	19	16	0.54
Age < 60 years	46	45	
Gender (Male)	40:25	26:33	0.09
Mean BISAP Score	0.97 ± 0.5	1.10 ± 0.7	0.23
Mean Ranson Score	2.2 ± 0.57	3.0 ± 1.5	0.001
Cholecystitis (n)	9	3	0.12
Recurrent Pancreatitis (n)	0	41	<0.001

There was a statistically significant increase in the rate of recurrent pancreatitis in Group 2 compared to Group 1 (41 vs 0, $p < 0.001$). There were no significant differences in terms of operative duration (mean 41.8 ± 2.8 min, $p = 0.5$) or conversion to open cholecystectomy between the two groups.

Table 2: Operative and Postoperative Data

Parameter	Group 1 (n = 65)	Group 2 (n = 61)	p-value
Mean Surgery Duration (min)	41.8 ± 2.8	42.0 ± 2.5	0.5
Conversion to Open Surgery	2	3	0.7
Post-op Biliary Complications	0	0	1.0
Surgical Site Infection	1	1	0.94
Length of Stay (days)	5.92 ± 1.3	12.31 ± 2.5	<0.001

The rate of surgical site infection was low, with only two cases in total, categorized as Clavien-Dindo Grade II. There were no major complications such as bile leak, bile duct injury, or significant hemorrhage in either group. Additionally, no complications classified as Clavien-Dindo Grades III or IV were observed.

Table 3: Advanced Statistical Analysis

Variable	Odds Ratio (95% CI)	p-value
Recurrent Pancreatitis	0.12 (0.03-0.44)	<0.001
Length of Stay	1.45 (1.24-1.69)	<0.001
Surgical Site Infection	0.97 (0.22-4.27)	0.94

The mean length of stay (LOS) was significantly shorter in Group 1, with an average of 5.92 days, compared to 12.31 days in Group 2 ($p < 0.001$). However, there was no significant association between the timing of surgery and the incidence of surgical site infections ($p = 0.94$), In summary, early cholecystectomy during the index admission was associated with a significantly reduced length of hospital stay and a lower recurrence of biliary pancreatitis, without an increase in operative difficulty, postoperative complications, or conversion to open surgery.

DISCUSSION

This study evaluated the optimal timing of cholecystectomy in patients with mild to moderate acute biliary pancreatitis (ABP), comparing outcomes between early cholecystectomy during the index admission and delayed cholecystectomy. The findings demonstrated that early cholecystectomy significantly reduced the recurrence of biliary pancreatitis and shortened the length of hospital stay without increasing operative difficulty or postoperative complications. These results align with previous studies, such as the PONCHO trial, which showed a reduction in recurrent biliary events with early surgery in patients with mild biliary pancreatitis (10). Additionally, our study supports the findings of Wilayat et al., who reported no significant differences in operative difficulty, morbidity, or mortality between early and delayed cholecystectomy groups, with early surgery reducing the risk of recurrent biliary pancreatitis (6).

In contrast, the MANCTRA-1 dataset raised concerns about the safety of early surgery in moderate to severe cases of pancreatitis, suggesting increased mortality and morbidity in patients undergoing early cholecystectomy compared to delayed surgery (11). However, our study focused on mild to moderate cases and found no increase in surgical complications, including conversion to open cholecystectomy or postoperative bile duct injury. This reinforces the argument for early intervention in such cases, as demonstrated by Liu et al., who also found no significant differences in operative outcomes between early and delayed surgery (9).

One of the strengths of this study was the prospective design and the clear criteria used for patient selection, which ensured that only those with mild to moderate ABP were included. This homogeneity of the study population allowed for a more accurate comparison of surgical outcomes between the two groups. Additionally, the use of standard assessment tools such as the BISAP and Ranson scores helped to ensure consistency in the classification of disease severity. The study also benefited from a comprehensive follow-up period, during which recurrent pancreatitis and other postoperative outcomes were carefully monitored.

Despite these strengths, the study had several limitations. First, the sample size was relatively small, and the study was conducted in a single center, which may limit the generalizability of the findings. Larger, multicenter trials are needed to confirm these results and assess whether they apply to a broader population. Second, patients with severe pancreatitis were excluded, so the findings cannot be extrapolated to this subgroup. As previous studies have indicated that early surgery may carry a higher risk in severe cases, further research is needed to clarify the risks and benefits of early cholecystectomy in this population (11).

Additionally, the study did not assess long-term outcomes such as quality of life or the development of chronic pancreatitis, which could provide further insights into the benefits of early surgery. Future research should aim to incorporate these outcomes to provide a more comprehensive evaluation of the timing of cholecystectomy. Furthermore, while the study included a detailed analysis of recurrent pancreatitis and length of stay, other postoperative complications such as wound infection, bile leak, and conversion to open surgery were less common, making it difficult to draw definitive conclusions about their association with surgical timing.

CONCLUSION

In conclusion, this study demonstrated that early cholecystectomy during the index admission is safe and effective in reducing the recurrence of biliary pancreatitis and shortening hospital stay in patients with mild to moderate acute biliary pancreatitis. These findings support current recommendations favoring early surgical intervention in such cases and highlight the need for further research in patients with more severe disease to develop evidence-based guidelines for the management of all patients with biliary pancreatitis.

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