Original Article

Comparison of Outcomes Between Early and Delayed Cholecystectomy in Acute Biliary Pancreatitis Patients

Ihtisham ul Haq, Naveed Ahmad, Muhammad Attaullah Khan, Muhammad Uzair, Muhammad Daud and Sara Rahman

ABSTRACT

Objective: To compare the outcomes of early versus delayed cholecystectomy in patients with ABP to guide clinical decision-making.

Study Design: Prospective comparative study

Place and Duration of Study: This study was conducted at the Department of General Surgery, Lady Reading Hospital, Peshawar, from August 2022 to February 2023.

Methods: A total of 120 patients were included, divided into two groups: early cholecystectomy (n=60) and delayed cholecystectomy (n=60). Data on demographics, clinical outcomes, and complications were collected and analyzed using SPSS version 26.

Results: The groups were comparable in baseline characteristics. 'The early cholecystectomy group had a significantly shorter hospital stay' (5.09 ± 0.90 vs. 8.89 ± 1.79 days; p<0.001). ICU admissions were higher in the early group (81.7% vs. 43.3%; p<0.001), but mortality and recurrence rates were similar between groups. Postoperative complications, bile leaks (71.7% vs. 46.7%; p=0.005), and surgical site infections (65.0% vs. 33.3%; p=0.001) were more common in the early group.

Conclusion: Early cholecystectomy reduces hospital stay and prevents recurrent pancreatitis but is associated with higher postoperative complications. Careful patient selection and perioperative management are essential. Delayed cholecystectomy remains an option for patients with severe inflammation or high surgical risk. These findings contribute to optimizing ABP management strategies.

Key Words: Acute Biliary Pancreatitis, Cholecystectomy Timing, Early Vs. Delayed Surgery, and Outcomes, Complication

Citation of article: Haq I, Ahmad N, Khan MA, Uzair M, Daud M, Rahman S. Comparison of Outcomes Between Early and Delayed Cholecystectomy in Acute Biliary Pancreatitis Patients. Med Forum 2025;36(5): 46-50. doi:10.60110/medforum.360510.

INTRODUCTION

Acute biliary pancreatitis (ABP) is a leading cause of acute pancreatitis, constituting 30–60% of cases globally, with its incidence closely linked to the prevalence of gallstone disease. The gallstones blocking the bile duct can lead to pancreatic inflammation, with risk factors of advanced age, obesity, female gender, and diabetes serving as a significant factor[1,2]. It's not only the leading cause of morbidity but a significant contributor to healthcare resource utilization globally, highlighting the importance of effective management strategies. The cholecystectomy, that is the surgical removal of the gallbladder, serves as a definitive treatment for ABP, aiming to prevent recurrent episodes by resolving underlying cause[3,4]. However, the timing of this intervention whether performed early during the same hospital admission or delayed until after the resolution of acute symptoms remains an ongoing debate Early cholecystectomy has the advantage of preventing recurrence during the waiting period, but is often considered riskier due to potential complications associated with operating in the presence of unresolved inflammation[5,6]. Contrariwise, delaying surgery lead to resolution of the acute inflammatory process, but it may lead patients to recurrent episodes of pancreatitis, prolonged hospital stays, and increased healthcare costs[7].

Despite numerous researches exploring the timing of cholecystectomy in ABP, a clear consensus remains mysterious. While early cholecystectomy was reported to reduce recurrence rates and hospital readmissions, it has also been linked with concerns regarding higher complication rates. On the other hand, delayed cholecystectomy, though potentially safer in some

Department of General Surgery, Lady Reading Hospital, Peshawar.

Correspondence: Muhammad Attaullah Khan, Assistant Professor of General Surgery, Lady Reading Hospital, Peshawar.
Contact No: 00923139480002
Email: drkhanpak@gmail.com

Received: December, 2024
Reviewed: January, 2025
Accepted: February, 2025

cases, the risk of recurrent pancreatitis and may lead to longer cumulative hospital stays. Existing literature often focuses on isolated clinical outcomes, lacking comprehensive evaluations of both the surgical and systemic complications related to timing.

This study fills the knowledge gap by conducting a comprehensive comparative analysis of early versus delayed cholecystectomy in ABP. It examines the demographic characteristics, clinical outcomes, and complications, and provides a well-rounded perspective of the advantages and risks associated with each approach. By addressing this gap, the research aims to guide clinical decision-making and supports the development of standardized guidelines for managing ABP effectively. The primary objective of this study was to evaluate and compare the outcomes of early versus delayed cholecystectomy in patients with acute biliary pancreatitis (ABP).

The finding of this investigation is expected to enhance understanding of the timing's impact on surgical and patient outcomes. Furthermore, they aim to guide for optimizing care, reduce morbidity, and improve resource allocation in healthcare settings.

METHODS

The study design was a prospective, comparative study conducted at Lady Reading Hospital, Peshawar, for 6 months, from (August 2022 to February 2023). The objective was to evaluate the outcomes of early versus delayed cholecystectomy in patients diagnosed with ABP. The study adhered to the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the hospital's ethics committee (Ref. No. 459/LRH/MTI). 'Written informed consent was obtained from participants, ensuring confidentiality' and the right to withdraw at any stage of the study without repercussions.

The study was designed as a prospective analysis, carried out in the surgical and gastroenterology departments of Lady Reading Hospital. It included patients presenting with ABP, confirmed through clinical, biochemical, and radiological findings, who were candidates for elective cholecystectomy.

A total sample size of 120 patients was determined using the World Health Organization (WHO) sample size calculator, assuming a confidence level of 95%, a power of 80%, and an expected difference in key outcomes between early and delayed cholecystectomy groups. The patients were divided equally into two groups, with 60 patients undergoing early cholecystectomy (within the same hospital admission) and 60 undergoing delayed cholecystectomy (after resolution of the acute phase). Participants were selected using a non-probability consecutive sampling technique, ensuring all eligible patients during the study period were included.

Inclusion were adult patients aged 18–70 years, diagnosed cases of mild to moderate acute biliary pancreatitis based on Atlanta classification and patients fit for elective surgery as determined by preoperative evaluation.

Exclusion criteria severe pancreatitis requiring prolonged ICU stay or intervention, patients with contraindications to surgery, and those with previous biliary surgery or non-gallstone-related pancreatitis.

After obtaining informed consent, eligible participants were assigned to either the early or delayed cholecystectomy group based on the timing of surgical intervention. Early Cholecystectomy Group: Patients underwent laparoscopic cholecystectomy during the same hospitalization for ABP, typically within 7 days of symptom onset. Delayed Cholecystectomy Group: Patients were discharged after resolution of acute symptoms and underwent laparoscopic cholecystectomy 4–6 weeks later. All surgeries were performed by experienced surgeons, and patients were managed according to standard perioperative protocols.

Data collection baseline demographic and clinical data, including age, gender, BMI, comorbidities, and severity of pancreatitis, were recorded. Outcomes assessed included: Clinical Outcomes: Length of hospital stay, ICU admissions, recurrence of pancreatitis, and mortality. Postoperative Outcomes: Conversion to open surgery, bile leaks, surgical site infections, intra-abdominal abscesses, wound dehiscence, and readmissions.

Data were analyzed using SPSS (Statistical Package for the Social Sciences) version 26. 'Continuous variables were expressed as mean ± standard deviation (SD) and compared using the independent t-test'. 'Categorical variables were presented as frequencies and percentages and analyzed using the chi-square or Fisher's exact test'. A p-value < 0.05 was considered statistically significant.

RESULTS

This 'prospective comparison between early and delayed cholecystectomy' in patients with ABP. A total of 120 patients were equally divided into two groups: early cholecystectomy, performed within the same hospital admission, and delayed cholecystectomy, performed 4–6 weeks after the resolution of acute symptoms. The outcomes assessed included demographic and baseline characteristics, clinical outcomes, and complications.

The demographic and baseline data in Table 2 showed no significant differences between the early and delayed cholecystectomy groups in terms of age, BMI, and gender distribution. Comorbidities like diabetes were slightly more prevalent in the delayed group (83.3% vs. 66.7%; $p = 0.090$), but the difference was not significant. Severity analysis revealed more severe cases in the early group (21.7% vs. 6.7%; $p = 0.059$),

although this difference also lacked statistical significance.

Table No.1: Demographic and Baseline Characteristics

Characteristic	Early Cholecys-tectomy (n = 60)	Delayed Cholecystecto my (n = 60)	p-value
Age (mean ± SD)	49.78 ± 5.57	49.63 ± 5.33	0.880
BMI (mean ± SD)	24.57 ± 3.09	24.67 ± 2.93	0.856
Gender			0.855
- Male (%)	30 (50.0%)	31 (51.7%)	
- Female (%)	30 (50.0%)	29 (48.3%)	
Comorbidities(%)			
- Diabetes	40 (66.7%)	50 (83.3%)	0.090
- Hypertension	23 (46.0%)	27 (54.0%)	0.459
Severity (Mild/ Moderate/Severe)	30 / 17 / 13	34 / 22 / 4	0.059

Table 2: Clinical outcomes significant differences were observed in the length of hospital stay, which was shorter in the early group (5.09 vs. 8.89 days; $p < 0.001$), and ICU admissions, which were more frequent in the early group (81.7% vs. 43.3%; $p < 0.001$). Mortality rates and recurrence of pancreatitis were similar between groups, with no statistical significance ($p = 1.000$ and $p = 0.822$, respectively). Postoperative complications, conversion to open surgery, and readmissions were comparable and did not show significant differences.

Table No.2: Clinical Outcomes Between Early Cholecystectomy and Delayed Cholecystectomy

Outcome	Early Cholecys-tectomy (n = 60)	Delayed Cholecys-tectomy (n = 60)	p-value
'Length of hospital stay (days)'	5.09 ± 0.90	8.89 ± 1.79	<0.001
ICU admission (%)	49 (81.7%)	26 (43.3%)	<0.001
Mortality (%)	48 (80.0%)	48 (80.0%)	1.000
Recurrence of pancreatitis (%)	47 (78.3%)	48 (80.0%)	0.822
Postoperative complications (%)	33 (55.0%)	26 (43.3%)	0.201
Conversion to open surgery (%)	32 (53.3%)	29 (48.3%)	0.584
Readmission (%)	44 (73.3%)	39 (65.0%)	0.323

Table 3: Complications of bile leaks (71.7% vs. 46.7%; $p = 0.005$) and surgical site infections (65.0% vs. 33.3%; $p = 0.001$) were significantly more common in the early group. Intra-abdominal abscesses and wound dehiscence were more frequent in the delayed group but did not reach statistical significance ($p = 0.075$ and $p = 0.093$, respectively).

Table No.3: Complications Between Early Cholecystectomy and Delayed Cholecystectomy

Complication	Early Cholecys-tectomy (n = 60)	Delayed Cholecys-tectomy (n = 60)	p-value
Bile leak (%)	43 (71.7%)	28 (46.7%)	0.005
Surgical site infection (%)	39 (65.0%)	20 (33.3%)	0.001
Intra-abdominal abscess (%)	37 (61.7%)	46 (76.7%)	0.075
Wound dehiscence (%)	46 (76.7%)	53 (88.3%)	0.093

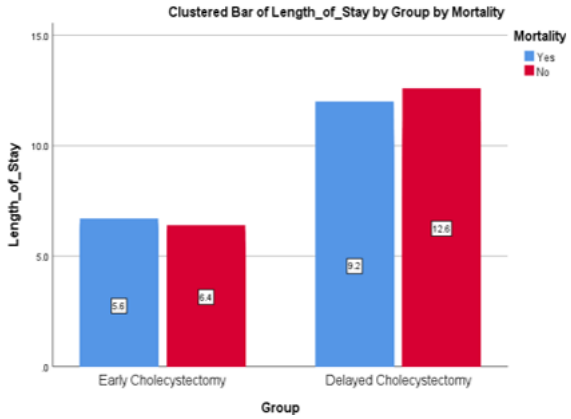

Figure No.1: shows that delayed cholecystectomy results in longer hospital stays than early cholecystectomy, especially for patients without mortality (12.6 vs. 6.4 days). Mortality cases in both groups have shorter stays, highlighting the potential advantage of early intervention in reducing hospitalization duration.

DISCUSSION

The management of ABP remains the topic of ongoing debate, especially regarding the optimal timing of cholecystectomy. This study presented a comparative analysis of early and delayed cholecystectomy in patients with ABP, examining outcomes hospital stay length, complications, and recurrence rates. The findings provide valuable insights that were consistent with and added to the existing body of literature.

One of the key findings in this study was the significantly shorter hospital stay associated with early cholecystectomy compared to delayed cholecystectomy. This finding aligns with study conducted by Cho et al. (2023), which reported reduced hospitalization durations in early cholecystectomy groups[8]. By promptly addressing the source of obstruction, early cholecystectomy minimizes the need for readmissions and prolonged inpatient care, emphasizing its cost-effectiveness and practicality.

The study also found that ICU admissions were more common in the 'early cholecystectomy' group likely due to the inclusion of more severe cases in this cohort, as indicated by the baseline severity data. However, it is noteworthy that despite higher ICU utilization, early intervention did not result in increased mortality or recurrence rates, this finding was consistent with the studies, with similar reported 'no significant differences in mortality between early and delayed groups'[9-11].

Complication rates, including bile leaks and surgical site infections, were notably higher in the early group, this finding aligns with the concerns raised in earlier studies by Bagepally (2021) Nzenwa et al. (2021) and Haider et al (2023)[12-14]. Operating during active or recently resolved inflammation may increase the technical challenges of surgery, leading to higher complication rates. However, these risks must be weighed against the benefit of preventing recurrent pancreatitis, which remains a significant concern in delayed cholecystectomy, as observed in other studies such as those by Hallensleben et al. (2022)[15].

Interestingly, the recurrence of pancreatitis in the delayed group was not significantly different in this study, a finding that contrasts with the prevailing view in the literature. Studies by Coelho et al. (2023) and Hussain et al (2023) have demonstrated higher recurrence rates in delayed cholecystectomy due to the prolonged waiting period, during which gallstone migration remains a risk[16,17]. This discrepancy may reflect variations in patient selection or management protocols across different healthcare settings.

CONCLUSION

This study supports the growing evidence favoring early cholecystectomy for ABP due to its shorter hospital stays and prevention of recurrent episodes. However, the higher complication rates observed necessitate careful patient selection and perioperative planning. Delayed cholecystectomy remains a viable option for select patients, particularly those with severe inflammation or comorbidities. Balancing the benefits and risks of each approach remains pivotal in tailoring management to individual patient needs. By contributing to this ongoing discussion, the findings provide a foundation for optimizing ABP management strategies in clinical practice.

Limitation: Despite these insights, it is crucial to address the limitations inherent in this study. The relatively small sample size may limit the generalizability of the findings, and the non-randomized design could introduce selection bias. Future randomized controlled trials with larger populations are essential to validate these results and refine clinical guidelines.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Ihtisham ul Haq, Naveed Ahmad, Muhammad Attaullah Khan
Drafting or Revising Critically:	Muhammad Uzair, Muhammad Daud, Sara Rahman
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.976/2022 Dated 22.04.2022.

REFERENCES

1. Sun H, Warren J, Yip J, et al. Factors influencing gallstone formation: a review of the literature. Biomolecules 2022;12(4):550.
2. Lazarchuk I, Barzak B, Wozniak S, et al. Cholelithiasis–a particular threat to women. A review of risk factors. Med J Cell Biol 2023;11(1):20-27.
3. Zhang XL, Sun JH, Wu Y, et al. Therapeutic outcomes of early and delayed endoscopic retrograde cholangiopancreatography and percutaneous transhepatic cholangial drainage in patients with obstructive severe acute biliary pancreatitis. J Clin Translational Res 2023;9(3):160.
4. Fratantoni ME, Giuffrida P, Di Menno J, et al. Prevalence of persistent common bile duct stones in acute biliary pancreatitis remains stable within the first week of symptoms. J Gastrointestinal Surg 2021;25(12):3178-87.
5. Prasanth J, Prasad M, Mahapatra SJ, et al. Early versus delayed cholecystectomy for acute biliary pancreatitis: a systematic review and meta-analysis. World J Surg 2022;46(6):1359-75.
6. Michael Brunt L, Deziel DJ, Telem DA, et al. Safe cholecystectomy multi-society practice guideline and state-of-the-art consensus conference on prevention of bile duct injury during cholecystectomy. Surgical Endoscop 2020;34:2827-55.
7. Barreto SG. Epidemiology of Severe Acute Pancreatitis, Focusing on ANZ. ANZ J Surg 2023;93(S1):56-83.
8. Cho NY, Chervu NL, Sakowitz S, et al. Effect of surgical timing on outcomes after cholecystectomy for mild gallstone pancreatitis. Surg 2023; 174(3):660-65.
9. Lisotti A, Linguerri R, Bacchilega I, et al. EUS-guided gallbladder drainage in high-risk surgical patients with acute cholecystitis—procedure

outcomes and evaluation of mortality predictors. Surg Endoscop 2021;1-10.
10. Dai W, Zhao Y, Du GL, et al. Comparison of early and delayed cholecystectomy for biliary pancreatitis: a meta-analysis. The Surgeon 2021;19(5):257-62.
11. Lucocq J, Patil P, Scollay J. Acute cholecystitis: Delayed cholecystectomy has lesser perioperative morbidity compared to emergency cholecystectomy. Surg 2022;172(1):16-22.
12. Bagepally BS, Haridoss M, Sasidharan A, et al. Systematic review and meta-analysis of gallstone disease treatment outcomes in early cholecystectomy versus conservative management/delayed cholecystectomy. BMJ Open Gastroenterol 2021;8(1):e000675.
13. Nzenwa IC, Mesri M, Lunevicius R. Risks associated with subtotal cholecystectomy and the factors influencing them: A systematic review and meta-analysis of 85 studies published between 1985 and 2020. Surg 2021;170(4):1014-23.
14. Haider R, Butt MQ, Ullah JS, et al. Early Complications in Acute versus Elective Cases of Laparoscopic Cholecystectomy in Tertiary Hospitals: A Comparative Study. Pak Armed Forces Med J 2023;73(5):1338.
15. Hallensleben ND, Timmerhuis HC, Hollemans RA, et al. Optimal timing of cholecystectomy after necrotising biliary pancreatitis. Gut 2022; 71(5):974-82.
16. Coelho JCU, COSTA MARd, Enne M, et al. Acute cholecystitis in high-risk patients. Surgical, radiological, or endoscopic treatment? Brazilian College of Digestive Surgery position paper. ABCD Arquivos Brasileiros de Cirurgia Digestiva (São Paulo) 2023;36:e1749.
17. Hussain M, Alam J, Ullah M, et al. Outcomes of Early Vs. Delayed Laparoscopic Cholecystectomy in Acute Biliary Stone-Induced Pancreatitis a Prospective Observational Study. Pak J Med Health Sci 2023;17(01):704-04.