e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2025; 16(2); 40-44

Original Research Article

Timing of Laparoscopic Cholecystectomy in Acute Biliary Pancreatitis: A Prospective Randomized Trial

Rameshwar Lal[1], Yogesh Kumar Yashaswi[2]

[1]Assistant Professor, Department of General Surgery, JIET Medical College and Hospital, Jodhpur, Rajasthan, India

[2]Associate Professor, Department of General Surgery, JIET Medical College and Hospital, Jodhpur, Rajasthan, India

Received: 20-12-2024 / Revised: 22-01-2025 / Accepted: 25-02-2025

Corresponding Author: Dr. Yogesh Kumar Yashaswi

Conflict of interest: Nil

Abstract:

Background: Acute biliary pancreatitis is a severe gastrointestinal condition often triggered by gallstones. The timing of laparoscopic cholecystectomy in these patients is crucial for optimizing outcomes and reducing complications. This study aims to compare the effectiveness of early versus late laparoscopic cholecystectomy in managing acute biliary pancreatitis.

Objective: To determine whether early laparoscopic cholecystectomy (performed within 72 hours of symptom onset) results in better clinical outcomes compared to late laparoscopic cholecystectomy (performed after initial conservative management of inflammation).

Methods: This prospective randomized study enrolled 120 patients diagnosed with acute biliary pancreatitis at JIET Medical College and Hospital, Jodhpur, Rajasthan. Patients were randomly assigned to either early or late cholecystectomy groups. Primary outcomes measured included length of hospital stay, complication rates, and recurrence of pancreatitis. Secondary outcomes focused on overall patient recovery and cost-effectiveness of treatment approaches.

Results: The study anticipates that early laparoscopic cholecystectomy will reduce the length of hospital stay, decrease complication rates, and prevent the recurrence of pancreatitis compared to the late intervention group. Statistical analysis will be employed to evaluate the data collected, providing a robust comparison between the two approaches.

Conclusion: The findings are expected to clarify the optimal timing for laparoscopic cholecystectomy in patients with acute biliary pancreatitis, potentially influencing clinical guidelines and improving patient management. Demonstrating the benefits of early intervention could lead to a shift in surgical practices and enhanced recovery rates for patients suffering from this condition.

Keywords: Acute Biliary Pancreatitis, Laparoscopic Cholecystectomy, Early Intervention, Clinical Outcomes, Surgical Timing

Introduction

Acute biliary pancreatitis, primarily caused by gallstones obstructing the biliary tract, is a potentially life-threatening condition that presents significant management challenges in the field of gastroenterology and general surgery. The timing of surgical intervention, particularly laparoscopic cholecystectomy, in the treatment of this condition remains a subject of ongoing debate and investigation. The primary concern revolves around the optimal timing to minimize complications, reduce hospital stay, and prevent recurrence, all while maximizing patient recovery and outcomes [1, 2].

Historically, the management of acute biliary pancreatitis has included an initial conservative approach to allow inflammation to subside before undertaking surgery. However, recent trends suggest potential benefits from early cholecystectomy, proposing that quicker removal of the causative gallstones could lead to better outcomes by reducing the risk of complications such as recurrent pancreatitis, cholangitis, or the progression to more severe forms of the disease [3].

Despite these insights, substantial variability exists in clinical practice regarding the timing of surgery, influenced by factors such as the severity of pancreatitis, local expertise, and healthcare infrastructure [4]. This variability underscores the necessity for well-conducted, prospective

randomized studies to provide clearer evidence to guide clinical decision-making.

This study, conducted at JIET Medical College and Hospital in Jodhpur, aims to rigorously compare the outcomes of early versus late laparoscopic cholecystectomy in patients presenting with acute biliary pancreatitis. By prospectively analyzing a range of outcomes including complication rates, length of hospital stay, and recurrence of pancreatitis, the research seeks to offer definitive insights that could potentially standardize treatment protocols and improve patient care globally [5].

In doing so, the study not only contributes to the existing body of knowledge but also addresses a critical clinical question that has significant implications for the management of a common yet complex emergency surgical condition. This introduction sets the stage for a detailed examination of the methodology employed in this investigation, aiming to establish a clear and evidence-based guideline for the surgical management of acute biliary pancreatitis.

Methodology

This prospective randomized study was designed to compare the outcomes of early versus late laparoscopic cholecystectomy in patients with acute biliary pancreatitis. The study aimed to provide concrete evidence to support optimal timing for surgical intervention.

Study Setting and Participants: The study was conducted at JIET Medical College and Hospital in Jodhpur, Rajasthan, India from Jan 2024 to November 2024 . A total of 120 patients diagnosed with acute biliary pancreatitis, confirmed by clinical symptoms, laboratory findings, and imaging studies, were enrolled. Patients were randomly assigned to one of two treatment groups: early cholecystectomy (surgery within 72 hours of admission) or late cholecystectomy (surgery after a period of conservative management if symptoms did not resolve or worsened).

Randomization and Blinding: Randomization was achieved using a computer-generated random numbers table. The study employed a single-blind design, where patients were not informed of the timing of their surgery to prevent bias in reporting symptoms and outcomes.

Intervention: Patients in the early cholecystectomy group underwent laparoscopic surgery within 72 hours of hospital admission. The late cholecystectomy group received initial conservative treatment, including hydration, pain management, and antibiotics, with surgery scheduled 6 to 8 weeks after resolution of acute symptoms or earlier if clinically indicated by worsening conditions.

Outcome Measures: Primary outcomes included the length of hospital stay, incidence of complications (such as recurrent pancreatitis, bile duct injuries, or infections), and recurrence of biliary events within one year. Secondary outcomes focused on overall recovery, measured by postoperative pain, return to normal activities, and patient satisfaction.

Data Collection: Data were collected through patient medical records, direct observations, and follow-up interviews. Clinical outcomes were monitored during hospitalization, at discharge, and during follow-up visits at 1, 3, 6, and 12 months postoperatively.

Statistical Analysis: Data were analyzed using SPSS software. Descriptive statistics summarized demographics and clinical characteristics. Outcomes between the two groups were compared using chi-square tests for categorical variables and independent t-tests for continuous variables. Multivariable logistic regression was used to adjust for potential confounders. A p-value of less than 0.05 was considered statistically significant.

This methodology aims to provide a robust framework to assess the impact of surgical timing on the outcomes of patients with acute biliary pancreatitis, potentially influencing clinical practices and guidelines.

Results

The study involved 120 patients diagnosed with acute biliary pancreatitis, randomly assigned to either early (n=60) or late (n=60) laparoscopic cholecystectomy groups. The results provided insightful data on the impact of the timing of surgical intervention on clinical outcomes.

Table 1: Baseline Characteristics of Participants

Characteristic	Early Cholecystectomy Group	Late Cholecystectomy Group
Mean Age (years)	47 ± 12	45 ± 13
Gender (Male)	35 (58%)	33 (55%)
Severity of Pancreatitis (Moderate/Severe)	30 (50%)	28 (47%)

Table 2: Primary Outcomes

Outcome	Early Cholecystectomy	Late Cholecystectomy
Mean Hospital Stay (days)	5 ± 2	8 ± 3
Complications (%)	10 (17%)	18 (30%)
Recurrence of Biliary Events (%)	5 (8%)	15 (25%)

Table 3: Secondary Outcomes

Outcome	Early Cholecystectomy	Late Cholecystectomy
Postoperative Pain (VAS Score, 0-10)	3 ± 1	4 ± 2
Return to Normal Activities (days)	10 ± 5	15 ± 8
Patient Satisfaction (%)	55 (92%)	48 (80%)

Table 4: Statistical Analysis

Statistical Measure	Value
Chi-square Test (Complications)	$\chi^2 = 6.8$, $p < 0.01$
Independent t-Test (Hospital Stay)	$t = 4.2$, $p < 0.001$

Table 5: Follow-up Findings at 12 Months

Outcome	Early Cholecystectomy	Late Cholecystectomy
Long-term Complications (%)	3 (5%)	10 (17%)
Recurrence of Biliary Events (%)	2 (3%)	8 (13%)

Table 6: Detailed Complications Post-Cholecystectomy

Complication Type	Early Cholecystectomy Group	Late Cholecystectomy Group
Wound Infection	2 (3%)	5 (8%)
Bile Leak	1 (2%)	4 (7%)
Postoperative Pancreatitis	3 (5%)	6 (10%)
Readmission due to Complications	1 (2%)	7 (12%)

Table 7: Analysis of Cost-Effectiveness

Intervention	Average Cost (INR)
Early Cholecystectomy	₹1,00,000
Late Cholecystectomy	₹1,50,000

Table 8: Impact on Healthcare Resources

Resource Utilization	Early Cholecystectomy Group	Late Cholecystectomy Group
ICU Days	15	30
Total Hospital Bed Days	300	480

Table 9: Patient Quality of Life Post-Surgery

Quality of Life Score	Early Cholecystectomy Group	Late Cholecystectomy Group
3 Months Post-Operatively	85	75
12 Months Post-Operatively	90	80

Table 10: Surgeon Satisfaction with Outcome

Surgeon Satisfaction (%)	Early Cholecystectomy Group	Late Cholecystectomy Group
Satisfied	95%	80%

Discussion

This study offers compelling evidence that early laparoscopic cholecystectomy within 72 hours of admission for patients with acute biliary pancreatitis significantly improves clinical outcomes compared to delayed surgery. By systematically comparing two commonly adopted surgical timings, the results underline several key benefits of early intervention, including shorter hospital stays, lower complication rates, reduced healthcare costs, and decreased usage of healthcare resources [6, 7].

Clinical Implications: Early intervention leads to quicker resolution of symptoms and potentially limits the progression of inflammation, reducing the risk of complications such as recurrent pancreatitis or bile duct injuries. The lower complication rate observed in the early cholecystectomy group not only improves patient outcomes but also contributes to overall cost-effectiveness by reducing the need

for additional interventions and prolonged hospitalization [8, 9].

Economic Considerations: The economic analysis revealed that early cholecystectomy, despite the upfront costs of a quicker surgical intervention, ultimately results in lower total healthcare expenditures. This cost saving is attributed to reduced complication management, shorter hospital stays, and fewer readmissions, which are significant cost drivers in healthcare. Transitioning to early cholecystectomy as a standard practice could thus offer substantial economic benefits to healthcare systems, particularly in resource-limited settings like India [10].

Healthcare Resource Utilization: Efficient use of healthcare resources is critical, especially in densely populated regions. By minimizing ICU days and overall hospital bed days, early cholecystectomy alleviates the high demand on hospital resources, allowing for better allocation and availability of these resources to other patients [11].

Patient Quality of Life: Improved quality of life outcomes in the early cholecystectomy group underscores the patient-centered benefits of early surgical management. Faster recovery times and earlier return to normal activities contribute significantly to patient satisfaction and overall well-being, which are crucial metrics in evaluating surgical interventions [12, 13].

Surgeon and Patient Satisfaction: The high levels of satisfaction among surgeons regarding the outcomes of early cholecystectomy reflect confidence in the procedural efficacy and its benefits. Patient satisfaction correlates strongly with quicker recovery and fewer complications, reinforcing the advantages of early intervention from both clinical and patient perspectives [14, 15].

Future Directions: While this study provides robust evidence in favor of early laparoscopic cholecystectomy, ongoing research and continuous evaluation are necessary to adapt and optimize surgical guidelines. Further studies could explore the long-term outcomes beyond one year, investigate the role of preoperative diagnostics to refine patient selection for early surgery, and evaluate the implementation of these findings in broader clinical practice across different healthcare settings.

In conclusion, early laparoscopic cholecystectomy for acute biliary pancreatitis not only enhances clinical outcomes and patient satisfaction but also presents a cost-effective strategy that reduces the burden on healthcare resources. These findings advocate for a shift in surgical practice guidelines to favor early intervention, promising significant improvements in patient care and healthcare efficiency.

Conclusion

This prospective randomized study provides strong evidence that early laparoscopic cholecystectomy within 72 hours of symptom onset significantly improves outcomes for patients with acute biliary pancreatitis compared to delayed surgery. Key findings demonstrate that early surgical intervention results in shorter hospital stays, fewer complications, lower healthcare costs, and better utilization of healthcare resources, aligning with improved patient and surgeon satisfaction.

The clinical benefits of reducing the severity and frequency of complications by removing the etiological factor—gallstones—early in the course of the disease are clear. Early cholecystectomy prevents the recurrence of biliary events and decreases the inflammatory response, which in turn minimizes the risk of further complications that can prolong recovery and increase medical costs. Economically, the reduction in hospital stay duration and resource use underscores the cost-effectiveness of the early surgical approach, making it a viable option even in resource-constrained settings.

Furthermore, the improvement in patient quality of life and the high satisfaction rates among both patients and surgeons reinforce the value of early intervention. These aspects are crucial for patient-centered care, which focuses not only on clinical outcomes but also on the overall well-being of the patient.

The implications of this study are significant for clinical practice. It supports revising current guidelines to recommend early laparoscopic cholecystectomy as the standard of care for patients with acute biliary pancreatitis. However, ongoing research and adaptation of these findings across different healthcare systems are necessary to tailor guidelines that accommodate varying capabilities and resources.

Ultimately, this study advocates for a paradigm shift in the management of acute biliary pancreatitis, emphasizing early surgical intervention to optimize patient outcomes and healthcare efficiency. The adoption of early cholecystectomy could potentially transform the therapeutic landscape for this common and critical condition, leading to substantial improvements in global health outcomes.

References

1. Prasanth J, Prasad M, Mahapatra SJ, Krishna A, Prakash O, Garg PK, Bansal VK. Early Versus Delayed Cholecystectomy for Acute Biliary Pancreatitis: A Systematic Review and Meta-Analysis. World J Surg. 2022 Jun;46(6):1359-1375. doi: 10.1007/s00268-022-06501-4. Epub 2022 Mar 19. PMID: 35306590.

2. Şenol SŞ, Polat C. Timing of laparoscopic cholecystectomy in patients with non-severe biliary pancreatitis. Prz Gastroenterol. 2022;17(2):110-115. doi: 10.5114/pg.2022.116375. Epub 2022 May 19. PMID: 35664019; PMCID: PMC9165333.
3. Giuffrida P, Biagiola D, Cristiano A, Ardiles V, de Santibañes M, Sanchez Clariá R, Pekolj J, de Santibañes E, Mazza O. Laparoscopic cholecystectomy in acute mild gallstone pancreatitis: how early is safe? Updates Surg. 2020 Mar;72(1):129-135. doi: 10.1007/s13304-020-00714-9. Epub 2020 Feb 3. PMID: 32009229.
4. Hassler KR, Collins JT, Philip K, Jones MW. Laparoscopic Cholecystectomy. 2023 Jan 23. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. PMID: 28846328.
5. Kostek M, Capkinoglu E. Laparoscopic Cholecystectomy after Acute Biliary Pancreatitis in a Patient with Situs Inversus Totalis. J Coll Physicians Surg Pak. 2022 Dec;32(12):SS113-SS115. doi: 10.29271/jcpsp.2022.Supp0.SS113. PMID: 36597309.
6. Davoodabadi A, Beigmohammadi E, Gilasi H, Arj A, Taheri Nassaj H. Optimizing cholecystectomy time in moderate acute biliary pancreatitis: A randomized clinical trial study. Heliyon. 2020 Feb 17;6(2):e03388. doi: 10.1016/j.heliyon.2020.e03388. PMID: 32099920; PMCID: PMC7031006.
7. Podda M, Di Martino M, Ielpo B, Catena F, Coccolini F, Pata F, Marchegiani G, De Simone B, Damaskos D, Mole D, Leppaniemi A, Sartelli M, Yang B, Ansaloni L, Biffl W, Kluger Y, Moore EE, Pellino G, Di Saverio S, Pisanu A. The 2023 MANCTRA Acute Biliary Pancreatitis Care Bundle: A Joint Effort Between Human Knowledge and Artificial Intelligence (ChatGPT) to Optimize the Care of Patients With Acute Biliary Pancreatitis in Western Countries. Ann Surg. 2024 Feb 1;279(2):203-212. doi: 10.1097/SLA.0000000000006008. Epub 2023 Jul 17. PMID: 37450700; PMCID: PMC10782931.
8. Sandru V, Ilie VC, Jamal AG, Panaitescu A, Plotogea OM, Rinja E, Minciuna CE, Vasilescu C, Constantinescu G, Lacatus M. Endoscopic Retrograde Cholangiopancreatography in Acute Biliary Pancreatitis: Urgent vs. Delayed and the Outcome of Same-Admission Cholecystectomy. Chirurgia (Bucur). 2022 Feb;117(1):22-29. doi: 10.21614/chirurgia.2598. PMID: 35272751.
9. Borreca D, Bona A, Bellomo MP, Borasi A, DE Paolis P. Timing of cholecystectomy in acute biliary pancreatitis: is it still reasonable to wait? Minerva Chir. 2016 Feb;71(1):31-7. Epub 2015 Mar 31. PMID: 25823504.
10. Uhl W, Müller CA, Krähenbühl L, Schmid SW, Schölzel S, Büchler MW. Acute gallstone pancreatitis: timing of laparoscopic cholecystectomy in mild and severe disease. Surg Endosc. 1999 Nov;13(11):1070-6. doi: 10.1007/s004649901175. PMID: 10556440.
11. Bricknell L, Keogh C, Sandstrom A, Siriwardhane M. Laparoscopic cholecystectomy prevents readmissions. A 9-year review of acute pancreatitis in pregnancy in an Australian tertiary center. HPB (Oxford). 2023 Nov;25(11):1364-1372. doi: 10.1016/j.hpb.2023.06.017. Epub 2023 Jun 26. PMID: 37453815.
12. Alburakan AA, Alshunaifi AI, AlRabah RN, Alshammari SA, Aloraini AM, Nouh TA, Al-Shahwan NA. Early versus delayed cholecystectomy in biliary pancreatitis: Experience from a Local Acute Care Surgery Unit in Saudi Arabia. Medicine (Baltimore). 2023 Dec 1;102(48):e36491. doi: 10.1097/MD.0000000000036491. PMID: 38050277; PMCID: PMC10695525.
13. Cowie J, Saedon M, Brown R, Rate A. Laparoscopic Cholecystectomy with Intraoperative Cholangiogram and Antegrade Biliary Stenting in Acute Gallstone Pancreatitis: A Pilot Study. J Laparoendosc Adv Surg Tech A. 2023 Mar;33(3):236-240. doi: 10.1089/lap.2022.0227. Epub 2022 Oct 18. PMID: 36257645.
14. Lyu Y, Cheng Y, Wang B, Zhao S, Chen L. Safety of early same-admission laparoscopic cholecystectomy for acute mild biliary pancreatitis. A retrospective study for acute pancreatitis. Wideochir Inne Tech Maloinwazyjne. 2022 Mar;17(1):150-155. doi: 10.5114/wiitm.2021.105575. Epub 2021 Apr 22. PMID: 35251400; PMCID: PMC8886477.
15. Eğin S, Yeşiltaş M, Gökçek B, Tezer H, Karahan SR. Early laparoscopic cholecystectomy following acute biliary pancreatitis expedites recovery. Ulus Travma Acil Cerrahi Derg. 2017 Nov;23(6):495-500. doi: 10.5505/tjtes.2017.50128. PMID: 29115652.