



## Original Article



## Acute Biliary Stone-Induced Pancreatitis: The Outcomes of Early vs. Delayed Laparoscopic Cholecystectomy

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## ARTICLE INFO

## Keywords:

Acute Biliary Pancreatitis, Laparoscopic Cholecystectomy, Postoperative Complications, Recurrence Rate, Recovery Time

## How to Cite:

Ahmad, M. S., Mehmood, S., Karimullah, M., Rashid, M., Hameed, B., Imran, H. M., & Hamad Ullah, R. (2024). Acute Biliary Stone-Induced Pancreatitis: The Outcomes of Early vs. Delayed Laparoscopic Cholecystectomy : Early Versus Delayed Cholecystectomy. *Pakistan Journal of Health Sciences*, 5(09). <https://doi.org/10.54393/pjhs.v5i09.2110>

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## ABSTRACT

Gallstones often lead to biliary pancreatitis. While the majority of individuals may only have minor symptoms, a small percentage (around 20%) will develop severe pancreatitis, which can lead to catastrophic problems if it occurs again. **Objective:** To determine patients who have acute pancreatitis caused by biliary stones and evaluate the results of laparoscopic cholecystectomy performed early versus delayed. **Methods:** Total 390 patients with acute biliary stone-induced pancreatitis were presented in this study. After getting informed written consent detailed demographics of enrolled cases were recorded. In the group I, laparoscopic cholecystectomy was done within 72 hours; in the group II, it was done later after 72 hours. Post-operative outcomes were compared by using t-test and chi square test among both groups. **Results:** Among all, 216 (55.4%) were males and 174 (44.6%) were females. Majority of the cases 140 (35.9%) had age 41-50 years. Most common complication was abdomen pain in 340 (87.2%) cases. Compared to delayed surgery, early laparoscopic cholecystectomy had a lesser complication rate ( $p < 0.04$ ), a shorter inpatient stay ( $p < 0.003$ ), and a faster recovery time. The mortality rates of the two groups were comparable ( $p = 0.001$ ). Less recurrence rate was experienced with early laparoscopic cholecystectomy ( $p < 0.002$ ). **Conclusions:** Compared to a late cholecystectomy, an early one greatly reduces the likelihood of postoperative complications, recurrent biliary events, the length of operation, and the length of time the patient must remain in the hospital for treatment of acute biliary pancreatitis.

## INTRODUCTION

One of the most prevalent gastrointestinal disorders requiring hospitalization globally is acute pancreatitis. One common cause of acute pancreatitis is alcohol consumption or gallstones. The prevalence of gallstones ranges from 10% to 20% of the population. The risk of biliary pancreatitis is 14-35 times greater in males and 12-25 times higher in women [1-3]. After reviewing the causes, symptoms, and outcomes of acute pancreatitis, researchers have concluded that biliary pancreatitis is far worse than alcoholic acute pancreatitis. The condition is modest in 80% of people presenting with biliary

pancreatitis, nevertheless. In order to reduce the risk of gallstone-related complications, same-admission cholecystectomy is performed after hydration and pain management are administered as the first lines of treatment for biliary pancreatitis [4]. A major worry with post-discharge cholecystectomy is the possibility of recurrence, which has been documented in as many as 63% of patients in the scientific literature. There is currently no substitute for laparoscopic cholecystectomy when it comes to treating gallstone pancreatitis. Reports indicate that the likelihood of recurrence without cholecystectomy



might reach 30%, and there is an accompanying rise in healthcare expenses [5]. The best time to have a cholecystectomy is still up for dispute, however some organizations recommend doing it early to reduce the likelihood of recurrence. On the other hand, there are those who believe that, because of the acute inflammatory condition that is characteristic of early pancreatitis, the risks of complications from surgery are higher if performed too soon [6]. Late cholecystectomy is no longer recommended by the majority of worldwide organizations. "Early" might mean different things to different people. It is recommended by the International Society of Pancreatology to do a cholecystectomy with index admission. Along with index admission, the American Gastroenterology Society suggests cholecystectomy [6]. The incidence of cholecystectomy at index admission is still quite low, with only around 10% of patients reporting obtaining definitive therapy within the first two weeks, even though these recommendations have been made [7]. Early cholecystectomy is more common in Latin America than any other location in the world. Almost 60% of patients admitted with biliary pancreatitis in Latin America had the procedure done during their first visit [8]. Almost half of all patients in North America and Europe had cholecystectomy procedures performed during initial hospitalization, while just a fifth of all patients in India had this procedure done [8]. The removal of the gallbladder is recommended by many recent nonrandomized trials that were released at the same time as the index admission for ABP. According to [9, 10], the reasoning behind doing the cholecystectomy during the same hospitalization rather than at intervals is that it reduces the occurrence of biliary events like biliary colic, symptomatic choledocholithiasis, acute cholecystitis, recurrent biliary pancreatitis, and cholecystitis. According to Ito et al., recurrence is more likely to occur between two and four weeks following discharge. Recurrent acute pancreatitis occurred in 13.4% of patients who did not get cholecystectomy on their first hospitalization. Half of the recurrences were within four weeks of discharge, 12.5% within one week, and 31.3% within two weeks. The severity and potential mortality of biliary pancreatitis episodes make this discovery all the more important. However, cholecystectomy performed simultaneously with admission is still uncommon, despite the existence of such recommendations and literature [11]. One research found that just 14.7% of the more than 25,000 patients treated to English hospitals for acute gallstone-related illness actually had a cholecystectomy performed during their stay. Half of the individuals treated for ABP in another US research also had cholecystectomy performed during admission. Initial cholecystectomy for ABP was less common among patients referred to facilities with lower cholecystectomy volumes or greater acute pancreatitis admission volumes per year. [12, 13] The median time between hospital release and cholecystectomy was six weeks, according to a Dutch countrywide research that

found 75% of patients treated with moderate biliary pancreatitis had the procedure done [12]. Fearing for their patients' safety and the effectiveness of an early cholecystectomy, most experts opt for interval cholecystectomy instead. Maybe it's because there isn't enough data from randomized controlled studies that look at the long-term effects. Potential barriers to early cholecystectomy compliance include shortages of surgeons, operating room time, and postoperative critical care unit beds, all of which are resources that hospitals struggle to meet. It should be noted that a considerable number of patients in this group have postoperative nausea and vomiting. [13, 14]. Whether a laparoscopic cholecystectomy performed late would be more beneficial for certain individuals than an early procedure is still up for debate. The local community also does not provide enough information on the procedure's outcomes and their effects on patients.

Patients undergoing laparoscopic cholecystectomy for acute pancreatitis were the focus of the current study, which aimed to evaluate the clinical impact.

## METHODS

This comparative analytical study was conducted at Lahore General Hospital, Lahore after getting approval from the ethical review board with reference number 340/23. The sample size was calculated by using the recurrence of biliary pancreatitis in early and delayed Laparoscopic Cholecystectomy was 0% Vs 50% with a power of 80% and a 95% confidence interval, with a 10% expected drop-out rate, was 195 in each group [15]. This included all patients over the age of 16 who had confirmed lithiasis AP and had a SIRS < 1 either at admission or at the 48th hour, a CTSI (CT severity score) ≤ 3, and a CRP. Exclusion criteria included cholangitis linked to AP, severe AP, and significant comorbidities (ASA 4 and 5). After getting informed written consent detailed demographics of enrolled cases were recorded. The diagnosis of gallstone pancreatitis was made possible by the technique employed by our institution. Bile duct stones were detected using an abdominal ultrasound examination. Researchers included patients with epigastric discomfort and cholelithiasis on ultrasound imaging after doing clinical evaluations. This comprised cases with and without common bile duct (CBD) stones. Individuals who fulfilled the inclusion criteria and had mild to moderate biliary AP were then divided into two groups: In the group I, laparoscopic cholecystectomy was done within 72 hours; in the group II, it was done later after 72 hours. Cholecystectomy with Intraoperative Cholecystokinase (IOC) was carried out in patients assigned to the early group during the index hospitalization when they were able to accept a regular oral diet, no longer needed narcotic analgesics, and their blood C-reactive protein

concentration was less than 100 mg/L. Approximately six weeks following the pancreatitis episode, patients in the delayed group had interval cholecystectomy with intraocular pressure (IOC) as an elective procedure following hospital release from the original stay. In most cases, a laparoscopic cholecystectomy was carried out. However, if there were any contraindications, an open cholecystectomy would be conducted instead. Just one consultant hepatobiliary surgeon was involved in every procedure. Proper antibiotic prophylaxis was administered to all patients prior to surgery. The severity of AP (CRP) was determined using the Systemic Inflammatory Response Syndrome Score (SISS), computed tomography images (CTSI), and the strength of the inflammatory reaction. Mortality and recurrence rate were crucial outcomes. Recovery, hospitalization, and postoperative discomfort were secondary outcomes. SPSS version 22.0 was used for statistical analysis; chi-square and t-tests were applied to analyzed data. Continuous variables were presented as Mean  $\pm$  SD (standard deviation), while categorical variables were conveyed as frequencies and percentages. To compare categorical variables, the Chi-square test was employed. For continuous variables, the independent t-test was conducted, with statistical significance set at  $p < 0.05$ .

## RESULTS

Among all, 216 (55.4%) were males and 174 (44.6%) were females. Majority of the cases 140 (35.9%) had age 41-50 years. Most common complication was abdomen pain in 340 (87.2%) cases. Majority of the cases had ASA1 score. CTSI score was lower in group I as compared to group II (table 1).

**Table 1:** Demographics of the Included Cases (n=195)

| Variables            | Group I N (%) | Group II N (%) |
|----------------------|---------------|----------------|
| <b>Gender</b>        |               |                |
| Male                 | 121 (31.03%)  | 95 (24.4%)     |
| Female               | 74 (18.97%)   | 100 (25.6%)    |
| <b>Age (Years)</b>   |               |                |
| 17-30                | 45 (11.5%)    | 30 (15.4%)     |
| 31-40                | 40 (10.3%)    | 50 (12.85)     |
| 41-50                | 80 (20.5%)    | 70 (17.9%)     |
| >50                  | 30 (15.4%)    | 45 (11.5%)     |
| <b>Complications</b> |               |                |
| Abdomen Pain         | 160 (41.03%)  | 180 (46.2%)    |
| Fever                | 5 (1.3%)      | 4 (1.03%)      |
| Other                | 30 (7.7%)     | 11 (2.8%)      |
| <b>ASA Score</b>     |               |                |
| I                    | 130 (33.3%)   | 140 (35.9%)    |
| II                   | 65 (16.7%)    | 55 (14.1%)     |
| <b>CTSI</b>          |               |                |
| 1                    | 160 (41.03%)  | 100 (24.4%)    |

|   |            |            |
|---|------------|------------|
| 2 | 35 (8.97%) | 95 (25.6%) |
|---|------------|------------|

Mean operative time in group I was 35.3 minutes and in group II mean time was 43.8 minutes. Compared to delayed surgery, early laparoscopic cholecystectomy had a lesser complication rate ( $p < 0.004$ ), a shorter inpatient stay ( $p < 0.003$ ), and a faster recovery time (table 2).

**Table 2:** Operative Time and Post-Surgery Outcomes (n=195)

| Variables                   | Group I N (%) | Group II N (%) | p-Value |
|-----------------------------|---------------|----------------|---------|
| Mean Surgery Time (Minutes) | 35.3          | 43.8           | 0.002   |
| <b>Complication</b>         |               |                |         |
| Yes                         | 2 (1.03%)     | 8 (4.1%)       | <0.004  |
| No                          | 193 (98.97%)  | 187 (95.9%)    |         |
| <b>Hospital Stay</b>        |               |                |         |
| <5 Days                     | 170 (87.2%)   | 35 (17.9%)     | <0.03   |
| >5 Days                     | 25 (12.8%)    | 160 (82.1%)    |         |
| <b>Fast Recovery Time</b>   |               |                |         |
| Yes                         | 186 (95.4%)   | 120 (61.5%)    | <0.005  |
| No                          | 9 (4.6%)      | 75 (38.5%)     |         |

The mortality rates of the two groups were comparable ( $p = 0.001$ ). Less recurrence rate was experienced with early laparoscopic cholecystectomy ( $p < 0.002$ ) (table 3).

**Table 3:** Post-Operative Recurrence and Mortality among Both Groups (n=195)

| Variables              | Group I N (%) | Group II N (%) | p-Value |
|------------------------|---------------|----------------|---------|
| <b>Mortality</b>       |               |                |         |
| Yes                    | 1 (0.5%)      | 4 (2.04%)      | 0.001   |
| No                     | 194 (99.5%)   | 191 (93.96%)   |         |
| <b>Recurrence Rate</b> |               |                |         |
| Yes                    | 6 (3.1%)      | 23 (11.8%)     | <0.002  |
| No                     | 189 (96.9%)   | 172 (88.2%)    |         |

## DISCUSSION

Biliary pancreatitis is often not severe, and the first line of defense is supportive care. To avoid recurrent pancreatitis and lower readmission rates, cholecystectomy should be performed thereafter [15]. Patients without a cholecystectomy are three to six times more likely to require readmission, and patients with recurring episodes have a greater risk of death and longer hospital stays [16]. For mild biliary pancreatitis, cholecystectomy should be performed during the index hospitalization, according to international standards [17]. While some sources recommend cholecystectomy as soon as possible (within 48 to 72 hours of admission), others recommend waiting a week or until pancreatitis symptoms go away before the procedure [18]. The optimal time to have a cholecystectomy following mild to severe biliary AP has long been debated. The inflammatory effects of the PA are known to the surgeon to be a source of operational problems. From 13% to 44% of patients experience a

gallstone-related problem while waiting for treatment (cholecystectomy) [19, 20]. A much longer hospital stay ( $p$ -value $<0.03$ ) is seen in DC. There was no correlation between early cholecystectomy and an increase in the 0.8% morbidity rate that we saw in these patients. None of the patients who had laparoscopic procedures had any sort of conversion. We still consider laparoscopic cholecystectomy as the best option for patients with acute pancreatitis. There is no correlation between an early cholecystectomy and a higher conversion rate. There seems to be an increase in operational complications in patients who have delayed cholecystectomy [17–20]. In this study, biliary events were avoided in patients who had an early cholecystectomy at 72nd hour. There is no rise in the time required for the operation or the frequency of laparotomy conversions. In all of the documented cases, the only cause of death was a hemorrhagic stroke (DC). Findings from prior research were consistent with the. [21, 22]. There is a larger risk of biliary problems after late cholecystectomy, according to all of the published research. Despite being compelled to quit, Da Costa et al [19]. discovered the highest percentage in the literature at 44%. A 33.3% ( $p=0.02$ ) increase in the incidence of biliary recurrence was seen in a large prospective and randomized multicenter trial (Da Costa) that showed delaying cholecystectomy. Even though the sample size was limited, a randomized prospective trial in Sweden reached the same result [20, 21]. Early laparoscopic cholecystectomy was associated with a longer operation time and a shorter hospital stay, according to an analysis of four clinical trials by Siddiqui et al. [22]. However, there was no statistically significant difference in conversion rates between the two groups. A best-evidence topic reviewed 92 articles, including systematic reviews, randomized control trials, prospective controlled studies, and retrospective cohort studies, and found that early laparoscopic cholecystectomy over acute cholecystitis is beneficial in terms of hospital stay length without increases in morbidity or mortality [23]. The mortality rates of the two groups were comparable ( $p=0.001$ ). Less recurrence rate was experienced with early laparoscopic cholecystectomy ( $p<0.002$ ). These results were in line with the previous researches [24, 25]. It took the time to insert the first port and close the skin incision in order to determine how long the procedure took. Significantly lengthier operation times were seen in the late group when contrasted with the early group. Possible explanations for this variation include the existence of thick adhesions in the latter group, gallbladder-related problems, and repeated biliary events, all of which significantly complicated the biliary architecture. Attack frequency increased and presentation times were longer for patients in this group

because treatment was postponed. Consistent with previous research, this study found that the late group had a longer duration than the early group [26, 27]. These results are consistent with those of the previous research, which found that the late group had more postoperative problems. For mild to severe pancreatitis, this suggests that early LC considerably lessens postoperative complications when contrasted with late LC [26–28].

## CONCLUSIONS

Compared to a late cholecystectomy, an early one greatly reduces the likelihood of postoperative complications, recurrent biliary events, the length of operation, and the length of time the patient must remain in the hospital for treatment of acute biliary pancreatitis.

## Authors Contribution

Conceptualization: MSA, SM, MK

Methodology: MR

Formal analysis: BH

Writing, review and editing: HMI, MK, RHU

All authors have read and agreed to the published version of the manuscript

## Conflicts of Interest

All the authors declare no conflict of interest.

## Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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