

## Comparison of Outcomes in Early versus Delayed Cholecystectomy in Patients of Acute Biliary Pancreatitis

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### Abstract

**Objective:** to compare the outcomes of early versus delayed cholecystectomy in patients of mild to moderate acute biliary pancreatitis. **Study Design:** Randomized controlled trial. **Place and duration:** study was conducted in general surgery department of Lahore General Hospital Lahore, Services Hospital Lahore and Holy Family Hospital Rawalpindi from January 2017 to January 2018. **Methodology:** All the patients who were diagnosed as mild to moderate acute biliary pancreatitis and selected for cholecystectomy. Data collection was done via non probability consecutive sampling included patients' demographics, conversion to open surgery, hospital stay and complications were assessed. **Results:** The mean duration of surgery and mean length of stay of early group was 90.00±3.55 minutes and 9.06±1.16 days, respectively. Conversion to open, overall complications, preoperative and postoperative was noted as 18%, 12%, 2% and 10%, respectively. Mortality was observed as 2%. While, the mean duration of surgery and mean length of stay of delayed group was 91.14±2.15 minutes and 9.88±2.24 days, respectively. Conversion to open, overall complications, preoperative and postoperative was noted as 14%, 14%, 6% and n=4 (8%), respectively. Mortality was observed as 6%. The differences were statistically significant for duration of surgery and length of stay (p=0.005) and (p=0.001), respectively. **Conclusion:** Results of our study reveal that patients of acute biliary pancreatitis treated with cholecystectomy at the index day have shorter hospital stay and less biliary events as compare to delayed cholecystectomy. Similarly conversion to open surgery, duration of surgery and complications are also less in early cholecystectomy.

**Keywords:** acute biliary pancreatitis, early cholecystectomy, delayed cholecystectomy, hospital stay, conversion to open surgery.

### Introduction

Gallstone disease is a main cause of acute pancreatitis in developed countries accounting approximately 75% of cases annually<sup>1</sup>. A retrospective study was conducted in Malaysia over a period of 7 years and reported that about 45.1% of cases admitted in hospital for acute pancreatitis, the main etiology was biliary calculi and 19.7% was alcohol consumption<sup>2</sup>. Once biliary pancreatitis occurred patients may suffer some recurrent episodes, cholangitis, bile duct obstruction and biliary colics<sup>3</sup>. Recurrent biliary occurrence can be prevented by clearing the stones from biliary tree and cholecystectomy are the main treatment options<sup>4</sup>.

Mostly cases of the biliary pancreatitis are mild and acute in nature which is self limiting but 10 to 20% of patients suffer from severe pancreatitis which leads to high rate of morbidity and mortality<sup>5</sup>. Cholecystectomy timing deliberately delayed in patients with severe pancreatitis, local complications like pancreatic necrosis and failure of organs till the time of local complications settlement, It will take six weeks approximately<sup>6</sup>. According to international guidelines cholecystectomy should be performed as early as possible after acute biliary pancreatitis<sup>7</sup>.

Early cholecystectomy have different definitions, in International association of pancreatology guidelines cholecystectomy should be performed immediately after recovery from attack<sup>8</sup>. According to British society of gastroenterology guided that cholecystectomy was performed within hospital admission or after the two weeks of discharge will be labelled as early cholecystectomy<sup>9</sup>. American gastroenterologist described that cholecystectomy should be performed within two to four weeks after discharge. The difference between these guidelines may be due to practice experience and due to deficiency of evidences from randomized controlled trials on timing and safety of early surgeries<sup>10</sup>.

Purpose of our study was to compare outcomes of early cholecystectomy and delayed cholecystectomy in patients who were presented with mild to moderate acute biliary pancreatitis. Our study may be a reference gate for further research on this topic.

### Methodology

This randomized controlled trial study was conducted in general surgery department Lahore General Hospital Lahore, Services Hospital Lahore and Holy Family Hospital Rawalpindi from January 2017 to January 2018 on patients who were diagnosed as mild to moderate acute biliary pancreatitis. Informed consent was obtained from patients before inclusion in the study and ethical approval was obtained from ethical board of hospital before the start of study. Patients were divided into two groups by using lottery method. One group treated as early

cholecystectomy in which patients were performed cholecystectomy within index admission when patients recover from attack and no need of further opioid analgesic and patients tolerate normal oral diet. Patient's C reactive protein is less than 100 mg per liter. In other group patients were treated as delayed cholecystectomy in which patients were performed cholecystectomy after discharge from hospital and almost six weeks after episode of pancreatitis. Laproscopic cholecystectomy was performed on all patients.

Non probability consecutive sampling was used. Patients of age more than 18 years diagnosed as mild to moderate acute biliary pancreatitis and who were given consent were included in the study. Patients having two of the following characteristics: i upper abdominal pain, nausea, vomiting and epigastric tenderness. ii elevated serum amylase three times above the normal limits. iii Radiological evidences of biliary pancreatitis also included in the study. Patients with severe pancreatitis, admission in ICU or HDU suspected cases of acute cholangitis, previous gastric surgery and pregnant women were excluded from the study.

Collected data was entered and analyzed by using computer software SPSS version 24. Quantitative variables were presented as mean and standard deviation like age. Qualitative data was presented as frequency and percentages like sex, groups, conversion to open surgery, hospital stay and complications. Student t-test and chi square test was applied to see association among variables. P value less than or equal to 0.05 was considered as significant.

### Results

One hundred patients were included in this study, both genders. The patients were divided into two groups; n= 50 in Early Group and n=50 in Delayed Group. The mean age and Time to cholecystectomy of the Early Group was 40.14±1.63 years and 6.04±1.29 days, respectively. There were n=33 (66%) males and n=17 (34%) females. While, the mean age and Time to cholecystectomy of the Delayed Group was 39.44±2.11 years and 46.42±3.13 days, respectively. There were n=34 (68%) males and n=16 (32%) females. The differences were statistically insignificant except time to cholecystectomy (p=0.000). (Table. I).

The mean duration of surgery and mean length of stay of Early Group was 90.00±3.55 minutes and 9.06±1.16 days, respectively. Conversion to open, overall complications, preoperative and postoperative was noted as n=9 (18%), n=6 (12%), n=1 (2%) and n=5 (10%), respectively. Mortality was observed as n=1 (2%). While, the mean duration of surgery and mean length of stay of Delayed Group was 91.14±2.15 minutes and 9.88±2.24 days, respectively. Conversion to open, overall complications, preoperative and postoperative was noted as n=7 (14%), n=1 (14%), n=3 (6%) and n=4 (8%), respectively. Mortality was observed as n=3 (6%). The differences were statistically significant for duration of surgery and length of stay (p=0.005) and (p=0.001), respectively. (Table. II).

The mean time after discharge of the Delayed Group was 22.32±2.27 days. Number of recurrent biliary events was noted as n=32 (64%). While, biliary colic was observed as n=12 (24%). Acute cholecystitis and recurrent biliary pancreatitis were revealed as n=6 (12%) and n=4 (8%), respectively. Time of onset of recurrent biliary events after discharge within 2 weeks, within 4 weeks and after 4 weeks was observed as n=13 (26%), n=36 (72%) and n=21 (42%), respectively. (Table. III).

ES was executed in n=45 (45%) of the hundred patients. Biliary events, recurrent pancreatitis, cholecystitis and biliary colic were found as n=9 (20%), n=2 (4.4%), n=4 (8.8%) and n=6 (13.3%), respectively. While, the patients who had not ES biliary events, recurrent pancreatitis, cholecystitis and biliary colic were noted as n=11 (20.0%), n=4 (7.3%), n=5 (9.1%) and n=8 (14.5%), respectively. The differences were not significant among the patients had ES and had not ES.

**Table-I:  
Demographic Characteristics**

Variable	Early Group n=50	Delayed Group n=50	P-value
<b>Gender</b>			
<b>Male</b>	n=33 (66%)	n=34 (68%)	0.832
<b>Female</b>	n=17 (34%)	n=16 (32%)	
<b>Age (Years)</b>	40.14±1.63	39.44±2.11	0.106
<b>Time to cholecystectomy (days)</b>	6.04±1.29	46.42±3.13	0.000

**Table-II**

Variable	Early Group n=50	Delayed Group n=50	P-value
Duration of surgery (Minutes)	90.00±3.55	91.14±2.15	0.005
Length of stay (days)	9.06±1.16	9.88±2.24	0.001
Conversion to open	n=9 (18%)	n=7 (14%)	0.585
Overall complications	n=6 (12%)	n=1 (14%)	0.766
Preoperative	n=1 (2%)	n=3 (6%)	0.315
Postoperative	n=5 (10%)	n=4 (8%)	0.727
Mortality	n=1 (2%)	n=3 (6%)	0.307

**Table-III**

Variable	n=50	No. of admission
Time after discharge (days)	22.32±2.27	
No. Of recurrent biliary events	n=32 (64%)	n=17 (53.1%)
Biliary colic	n=12 (24%)	n=8 (25%)
Acute cholecystitis	n=6 (12%)	n=9 (28.1%)
Recurrent biliary pancreatitis	n=4 (8%)	n=4 (12.5%)
<b>Time of onset of recurrent biliary events after discharge</b>		
Within 2 weeks	n=13 (26%)	
Within 4 weeks	n=36 (72%)	
After 4 weeks	n=21 (42%)	

**Table-IV**

Variable	ES n=45	No ES n=55	P-value
Biliary events	n=9 (20%)	n=11 (20.0%)	0.786
Recurrent pancreatitis	n=2 (4.4%)	n=4 (7.3%)	0.564
Cholecystitis	n=4 (8.8%)	n=5 (9.1%)	0.897
Biliary colic	n=6 (13.3%)	n=8 (14.5%)	0.923

## Discussion

Our study shows that early cholecystectomy after biliary pancreatitis reduce the duration of hospital stay and also reduce duration of surgery, no need of conversion in open surgery and complications are also equal to delayed cholecystectomy. A study conducted by Sanjay et al<sup>11</sup> reported that early cholecystectomy associated with minimum readmission and morbidity. In many previous studies optimal timing of cholecystectomy was recommended but limited data about comparison of early and delayed cholecystectomy available. This study is similar to our study about outcome variables.

Another study was conducted by Ito et al<sup>12</sup> on this topic and suggested that time duration of 2 weeks between cholecystectomy and discharge from hospital is too long. About 31% of recurrence occurred within 2 weeks of hospital discharge. In another study by Uhl W et al<sup>13</sup> reported recurrence rate 27% in his study and recommended early cholecystectomy as an standard time for treatment of acute biliary pancreatitis. This variable of recurrence rate is also evaluated in our study and our study can be compared with our study.

It was Aboulian et al<sup>14</sup> who compared early cholecystectomy within 48 hours and delayed cholecystectomy after relief of symptoms and reported that there was no significant difference between perioperative complications and conversion of cholecystectomy into open surgery. But in early cholecystectomy shorter hospital stay is advantage over delayed cholecystectomy. In accordance with results of this study our study gives similar findings and can be compared with our conclusion.

Another similar study was conducted by Rosing et al<sup>15</sup> compared both early and delayed cholecystectomy and reported that early cholecystectomy significantly reduce the length of stay of patients which is a plus point for patients and hospital as compared to delayed cholecystectomy method. He also concluded that complications and mortality rate is too short in early cholecystectomy. This study is also similar in results and conclusion to previous studies given in discussion of our study. Similar results of different regions show that culture and regional environmental status does not effects procedural outcomes.

In another study conducted by Moretti et al<sup>16</sup> compared mild pancreatitis and its conservative management with severe pancreatitis and its management with early cholecystectomy and concluded that no one have

advantage over other. Another similar study was conducted by Chang et al<sup>17</sup> and compared acute gallstone pancreatitis without cholangitis and its treatment with preoperative ERCP and postoperative ERCP and concluded identical results that postoperative complications are less but time and space saving technique is early cholecystectomy.

In a study by Bugnell et al<sup>18</sup> reported that patients treated with ERCP and ES have not given any type of complication and recurrence of pancreatitis. He also report another complication that although recurrence is minimal after ERCP and ES but patients are at the risk of Gallbladder problems. It was considered that acute pancreatitis should be managed with ERCP and ES instead of cholecystectomy<sup>19</sup>.

Jee SL et al<sup>20</sup> also conducted a study on early and delayed cholecystectomy and compared their outcomes in terms of complications and hospital stay and reported that mild to moderate acute biliary pancreatitis reduce the recurrence rate of pancreatitis and also decrease the hospital stay when managed with early cholecystectomy procedures. Results of this study are also comparable with our results.

## Conclusion

Results of our study reveal that patients of acute biliary pancreatitis treated with cholecystectomy at the index day have shorter hospital stay and less biliary events as compare to delayed cholecystectomy. Similarly conversion to open surgery, duration of surgery and complications are also less in early cholecystectomy.

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