Results of Early Vs. Delayed Cholectectomy in Patients with Acute Gallstone Pancreatitis

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Abstract

Background: According to research studies, gallstone-related diseases are the cause of about 75% of acute pancreatitis cases in well-developed countries. When there is constant biliopancreatic obstruction, there is progressive inflammation of the pancreas. This is how we can explain the pathogenesis of Acute Gallstone Pancreatitis (AGP). There might be repeating events of common bile duct obstruction, acute pancreatitis, self-limiting biliary colic, or acute cholangitis. AGP episodes are typically moderate and self-limiting. Nevertheless, 10% - 20% of patients develop acute pancreatitis, which has a significant mortality and morbidity rate. Objective: For patients having an early or delayed cholecystectomy following an episode of mild to moderate acute AGP, this study compares the time duration of the operation, perioperative complications, conversion rate, time duration of hospital stay, and rate of gallstone-related recurring problems. Study design: A Randomized Controlled Trial Place and Duration: This study was conducted in Federal General Hospital Islamabad Pakistan from March 2022 to March 2023. Methodology: The participants in this research were those who were diagnosed with mild to moderate acute gallstone pancreatitis. Patient with complication (pancreatic necrosis, pseudocyst pancreatic abscess) following pancreatitis were excluded All the individuals were aged between 18 and 75 years. The participants were randomly put into either a delayed cholecystectomy group (DC) or an Early Cholecystectomy group (EC). Laparoscopic cholecystectomy was performed in both groups. A pre-designed form was used to collect data regarding progress before surgery, during surgery, and after surgery. Results: There were a total of 100 people who met the inclusion criteria of our research from the Department of Surgery. All the individuals were aged from 18 years to 75 years. The average age calculated was 45.01 years. The participants were randomly placed in both groups and were equally divided (50 people in each group). The median time duration from diagnosis of acute gallstone pancreatitis to Laparoscopic Cholecystectomy (LC) was 7 days in the early cholecystectomy (EC) group, while it was 28 days in the delayed cholecystectomy (DC) group. There were a total of 8 people who were converted to open surgery, 5 in the EC group and 3 in the DC group. There were a total of 15 recurrent biliary events. Conclusion: DC was associated with a higher likelihood of recurring biliary episodes and hospital readmissions. This leads to increased patient morbidity and healthcare expenses.

Keywords: Early cholecystectomy, Delayed cholecystectomy, gallstones, adults

1. Introduction

According to research studies, gallstone-related diseases are the cause of about 75% of acute pancreatitis cases in well-developed countries [1]. When there is constant biliopancreatic obstruction, there is progressive inflammation of the pancreas. This is how we can explain the pathogenesis of acute gallstone pancreatitis (AGP) [2]. There might be

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repeating events of common bile duct obstruction, acute pancreatitis, self-limiting biliary colic, or acute cholangitis [3, 4]. All these might happen repeatedly after acute gallstone pancreatitis. To prevent these repeating biliary events, there is a treatment of biliary tree clearance and cholecystectomy [5]. AGP episodes are typically moderate and self-limiting. Nevertheless, 10 to 20 percent of patients develop acute pancreatitis, which has a significant mortality and morbidity rate [6].

In individuals with severe pancreatitis, cholecystectomy is delayed in some cases where the complications are organ failure or pancreatic necrosis. In such cases, it is delayed until local complications arise [7]. People who have been diagnosed with severe pancreatitis may be candidates for endoscopic sphincterotomy (ES) and endoscopic retrograde cholangiopancreatography (ERCP). In cases where acute pancreatitis is moderate or mild, laparoscopic cholecystectomy is the ideal treatment [9].

According to the International Association of Pancreatology, cholecystectomy should be considered for those individuals who experience an episode of acute gallstone pancreatitis (AGP) [10]. The sooner they recover from the acute attack, the faster they should undergo cholecystectomy. The American College of Gastroenterology also recommended it within the index of admission [11]. To prevent the rate of recurrent AGP, cholecystectomy is performed early because recurrent AGP is severe and linked with high mortality and morbidity. However, most surgeons prefer delayed cholecystectomy because of the link between high mortality and high complications with early cholecystectomy.

Individuals who undergo endoscopic sphincterotomy are at high risk of conversion to open cholecystectomy because it could cause anatomic distortion due to acute inflammation in the perioperative area. This could also cause a number of problems, such as prolonged surgery time and an increase in complications during the surgery, which ultimately leads to prolonged hospital stays. For patients having an early or delayed cholecystectomy following an episode of mild to moderate acute AGP, this study compares the time duration of the operation, perioperative complications, conversion rate, time duration of hospital stay, and rate of gallstone-related recurring problems.

2. Methodology

This study is a randomized controlled trial that was performed in the Department of General Surgery. Participants in this research were those who were diagnosed with mild to moderate acute gallstone pancreatitis. All the individuals were aged between 18 and 75 years. Patients were informed about the research, and their written consent was obtained. The Ethical Review Committee approved this research.

Exclusion criteria: Those patients who had peripancreatic inflammation, pancreatic necrosis, or pleural effusion on imaging were not part of this research. Moreover, individuals with persistently deranged liver function tests (LFTs) were also not a part of this research. Those individuals who were diagnosed with severe pancreatitis and had a Ranson score above 6 were also excluded.

To identify an individual with AGP, the individual should fulfil the following criteria: increase in levels of serum amylase, nausea, history of acute upper abdominal pain, increase in levels of serum lipase, vomiting, and gallstones detected in ultrasonography. The mild to moderate pancreatitis was classified under the following criteria: mild when Ranson's score was below 3, moderate when Ranson's score was 3-6, and no evidence of organ failure or pancreatic necrosis on abdominal imaging. The participants were randomly put in either a Delayed cholecystectomy group (DC) or an Early Cholecystectomy group (EC). Laparoscopic cholecystectomy was performed in both groups. Cholecystectomy was performed within the index admission in the EC group. DC was performed four weeks after discharge from the hospital. All the individuals, after the surgery, were presented in the outpatient department for 6 months following discharge.

A pre-designed form was used to collect data regarding progress before surgery, during surgery, and after surgery. The information collected was related to the time duration of the operation, perioperative complications, conversion rate, time duration of hospital stay, and rate of gallstone-related recurring problems. SPSS version 26 was used to analyze the data. Fisher's exact test was used to compare the data. A significant P-value was determined by being less than 0.05.

3. Results

There were a total of 100 people who met the inclusion criteria of our research from the Department of Surgery. All the individuals were aged from 18 years to 75 years. The average age calculated was 45.01 years. The participants were randomly placed in both groups and were equally divided. There were 50 patients in the DC group and 50 in the EC group. There was no difference related to gender, age, or ethnicity seen in either of the groups. The median time duration from diagnosis of acute gallstone pancreatitis to LC was 7 days in the EC group, while it was 28 days in the DC group. A total of eight people who underwent open surgery. Out of these 8 people, 5 were in the EC group and 3 were in the DC group. Among the 5 people in the EC group, there were 4 who had Ransom's score above 3, and only 1 had a score below 3. However, all three patients had Ransom's score above 3 in the DC group. Table 1 shows the classification of patients according to Ransom's score.

Table number 1: Classification of patients according to Ransom's score

Ransom Score	DC group (n=50)	EC group (n=50)
≤ 3	20	33
> 3	30	17

Table number 2: Perioperative outcomes in both of the groups		
Outcomes	DC group (n=50)	EC group (n=50)
Mortality	0	0
Duration of surgery (mins)	30-60	40-60
Conversion to open surgery	3	5
Postoperative complications	3	4
Hospital stay after surgery (days), median	3.4	2.5
Recurrent biliary events	15	0
Perioperative complications	4	9

Table number 3 shows the recurrent biliary events in both groups

Table number 3: Recurrent biliary events in the DC group		
Events	DC group (n=50)	Hospital readmission (n=15)
No. recurrent biliary events	15	9
Recurrent biliary pancreatitis	4	4
Acute cholecystitis	5	5
Biliary colic	6	0

4. Discussion

Laparoscopic cholecystectomy (LC) is the gold standard for the removal of the gallbladder and is a safe and efficient method [12, 13]. The major cause of acute gallstone pancreatitis (AGP) is a temporary or permanent obstruction of the ampulla of Vater by gallstones [14]. AGP usually resolves on its own, but it can cause serious health concerns and even death, especially in severe cases of pancreatitis. As a result, AGP is treated by removing the gallbladder and assessing the common bile duct (CBD), with clearing if necessary. Following a severe AGP episode, gallbladder removal is postponed until local and systemic problems have been resolved. The timing of gallbladder removal in instances of mild to moderate AGP has long been debated.

Early cholecystectomy (EC) supporters say that it provides a comprehensive remedy in a single hospital stay. Supporters of delayed cholecystectomy (DC) argue that doing laparoscopic cholecystectomy (LC) at the same hospitalization can be difficult due to anatomical changes produced by acute pancreatitis. This may lead to additional difficulties during surgery and an increased likelihood of requiring open surgery [15]. Despite this, research has shown that DC is associated with a higher likelihood of recurring issues due to gallstones, and it offers no substantial advantages in terms of perioperative and postoperative complications, or the length of time spent in the hospital after surgery.

The occurrence of biliary complications and the need to switch to open surgery were slightly higher in the early cholecystectomy (EC) group compared to the delayed cholecystectomy (DC) group in this study, but this difference did not reach statistical significance. However, patients in the DC group had a statistically significant greater probability of readmission due to later biliary difficulties, which were connected to increased health concerns and a longer hospital stay. Some patients may also be lost to follow-up after being discharged from the hospital after their acute attack because their symptoms have faded. It's worth mentioning that acute gallstone pancreatitis can reoccur at a rate of 32–61% if left untreated [16]. As a result, early laparoscopic cholecystectomy is regarded as a safe and effective treatment option. The length of the procedure and the subsequent hospital stay were comparable in both groups.

Early cholecystectomy (EC) has been shown to reduce the number of problems caused by gallstones that come back in cases of mild to moderate acute gallstone pancreatitis (AGP) without making surgery harder or causing more problems during or after surgery [17].

In this study, it was discovered that among patients who underwent EC, those with moderate pancreatitis and a higher RS (Ranson's score) had a much higher conversion rate to open surgery than those with mild pancreatitis. The severity of pancreatitis in both groups was principally responsible for the difference in conversion rate. As a result, we recommend that for patients admitted with moderate pancreatitis and an RS of more than 3, a skilled surgeon considers both early and delayed cholecystectomy to reduce the risk of future problems.

In cases of acute gallstone pancreatitis, biliary tract anatomy caused by pancreatitis is known to complicate dissection. This could explain the higher conversion rate reported in this study, though it's worth noting that the difference was not statistically significant. Acute empyema with inflammation, bowel injury, injury to the common bile duct (CBD), and uncontrolled bleeding were additional risk factors [18]. These complications were more common in moderate pancreatitis cases than in mild cases. Even though the complication and conversion rates were higher, patients who underwent early cholecystectomy (EC) had a significantly lower rate of recurring gallstone-related complications than those who underwent delayed cholecystectomy (DC).

When the morbidity rate and hospital expenses associated with recurrent biliary episodes were examined, EC was deemed a better option than DC [19, 20]. Except for those who had an injury to the common bile duct (CBD) and bowel, patients in both groups had comparable postoperative hospital stays. Notably, only individuals who required

conversion to open surgery experienced postoperative problems, but these complications were not associated with severe health issues. Recurrent biliary episodes are known to increase morbidity, mortality, and hospital costs. Early laparoscopic cholecystectomy has been shown to be a safe and cost-effective method of treating mild to moderate acute pancreatitis, which is consistent with the findings of this study.

We found that early cholecystectomy (EC) gave better results when we compared the morbidity associated with delayed cholecystectomy (DC) to the rate of complications during the perioperative phase in a tertiary care hospital. Although the perioperative complication rate was greater in patients with moderate pancreatitis, these complications were often treatable, majority of patients recovered without incident during their hospital stay. None of the postoperative problems were serious enough to require hospital readmission. This contrasts with the rate of hospital readmissions attributable to recurrent biliary events that occurred in the time interval following the resolution of an acute attack of acute gallstone pancreatitis (AGP). Pancreatitis has been linked to local and systemic consequences, as well as morbidity and mortality. It's worth noting that no deaths were reported in this study.

5. Conclusion

For individuals with acute gallstone pancreatitis (AGP), laparoscopic early cholecystectomy is the ideal surgical technique. Once the acute phase has passed, this treatment can be performed safely and efficiently in cases of mild and moderate pancreatitis. The risk of conversion to open surgery was somewhat greater in the EC group compared to the DC group. DC was associated with a higher likelihood of recurring biliary episodes and hospital readmissions. This leads to increased patient morbidity and healthcare expenses.

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