

Outcome of Laparoscopic Cholecystectomy in Acute Pancreatitis Secondary to Gallstones: A Prospective Observational Study from Pakistan

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ABSTRACT

Background: Acute gallstone pancreatitis is quite common throughout the globe.

Objective: To assess the outcome of laparoscopic cholecystectomy in patients with acute pancreatitis secondary to gallstone.

Methods: A prospective observational study was conducted at the Department of Surgery, Jinnah Postgraduate Medical Center, Karachi, Pakistan between July 2020 to June 2021. All patients who were diagnosed with gallstones pancreatitis were eligible to take part in the study. Other causes of acute pancreatitis like drugs, hyperlipidemia, endoscopic retrograde cholangiopancreatography (ERCP), postoperative and idiopathic were excluded from the study. Patients were offered laparoscopic cholecystectomy. Early laparoscopic cholecystectomy was considered for patients operated between the time of the attack to within 10 days. Operative and postoperative parameters like the mean operative time, the number of ports, mean hospital stay, placement of a drain, and postoperative complications were recorded and analyzed.

Results: A total of 383 patients were evaluated with a median age of 47 (IQR=36-58) years. 41 (18.5%) patients had difficult dissection. The median operative time was 47 (IQR=38-54) minutes while the median hospital stay was 7 (IQR=4-7) days. Sixty patients had drain placement. Only minor complications were seen in 20 (9%) patients. Furthermore, the majority of the patients in the gallbladder group *i.e.* 96.53% had complete recovery while the mortality rate was also very low *i.e.* 0.46%.

Conclusion: Laparoscopic cholecystectomy can be safely performed in selected cases of acute gallstones pancreatitis to prevent further attacks and other consequences of delayed treatment.

Keywords: *Laparoscopy, cholecystectomy, gallstone, gall bladder stone, pancreatitis.*

INTRODUCTION

One of the most dreadful complications of gall bladder stones is acute pancreatitis. Acute pancreatitis secondary to gallstones approximately accounts for 30-50% of cases [1]. In Pakistan, the incidence of acute pancreatitis is on the rise, despite the advancement in the healthcare sector. The global incidence of acute pancreatitis is 13 to 45 per 100,000 [2].

Acute pancreatitis is more common in males than females. Additionally, the trend rises with increasing age [3].

Acute pancreatitis secondary to gallstones is a challenge for surgeons as there is no definitive consensus on the treatment and management protocol. Moreover, about 20 to 30 percent of patients diagnosed with acute pancreatitis follow a severe clinical course and out of these 25 percent develop life-threatening complications

[4, 5]. The mortality rate in severe acute pancreatitis can be as high as 30% [6]. In a study by Yin. *et al.* It was found that acute pancreatitis secondary to gallbladder accounted for up to 58.7 percent cases, followed by hyperlipidemia in 14.3% cases, and alcohol in 4.5% cases [6].

The pathophysiology behind acute pancreatitis secondary to gallbladder stones is the common channel for bile and pancreatic enzymes [7]. The gallbladder stone can migrate through the biliary channels and get impacted at Vater's ampulla.

Laparoscopic cholecystectomy offers a minimally invasive procedure for patients with disorders of the gallbladder. It is the treatment of choice as it limits the recurrence as well [8]. The use of laparoscopic surgery for cholecystectomy has decreased surgical morbidity and has become a popular procedure due to the short hospital stay and size of its incisions, a high incidence of postoperative nausea and vomiting has been reported in these patients [9, 10]. However, there is still no consensus about which patients would benefit from

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early laparoscopic cholecystectomy and which would benefit from late surgery. Moreover, there is limited data on the patient outcomes and complications related to the procedure from the local population. Thus, the current study aimed at evaluating the clinical outcomes in patients with acute pancreatitis who underwent laparoscopic cholecystectomy in our setup.

MATERIALS AND METHODS

A prospective observational study was conducted at the Department of Surgery, Jinnah Postgraduate Medical Center, Karachi, Pakistan between July 2020 to June 2021. A non-probability convenience sampling technique was employed to recruit the participants in the study. The study was started after taking ethical approval from the Institutional Review Board (#S-123).

The sample size was computed using Select Statistics (online sample size calculator), keeping the complication rate in patients undergoing laparoscopic cholecystectomy as 5%, margin of error as 3%, and level of confidence as 95%, a sample size of 203 was obtained [5]. All patients who were diagnosed with pancreatitis were eligible to take part in the study. Diagnosis of gallstone pancreatitis was established according to our hospital protocol. Evidence of Gallstones was established on abdominal ultrasound imaging. Individuals with discomfort in the epigastric region had cholelithiasis on ultrasound imaging, both cases with and without stones in the common bile duct (CBD), following clinical assessment were included in the study. A flow chart illustrating the inclusion and exclusion criteria is given in **Fig. (1)**.

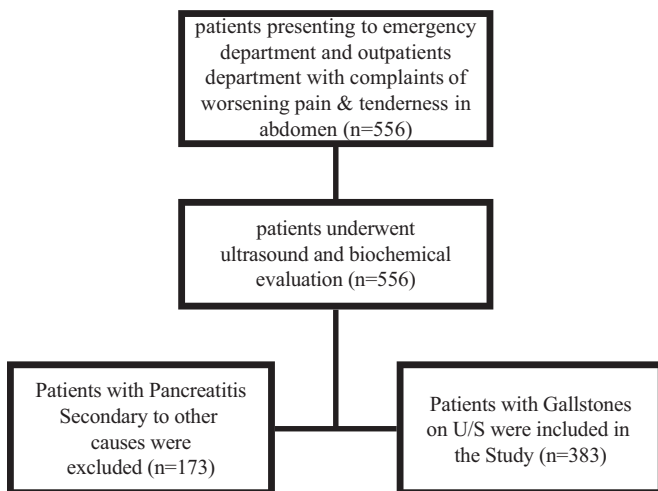


Fig. (1): Patient selection process.

Findings of pancreatic edema on ultrasound or CT scan elevated pancreatic enzymes (serum amylase) above three times than standard, increased alanine aminotransferase (ALT) by three times or above. Patients with a history of alcohol-induced and other cause-related acute pancreatitis were excluded from the study. This was determined when the patient stated consumption of more than 40 grams of alcohol per day or was diagnosed with biliary stone disease upon ultrasound.

Additionally, other potential triggers of acute pancreatitis such as hyperlipidemia, endoscopic retrograde cholangiopancreatography (ERCP), postoperative, and idiopathic acute pancreatitis and drugs were also eliminated from the research study.

For selection, the illness was rated using Ranson's criteria. Patients with a Ranson's score of 3 or less had mild acute biliary pancreatitis (ABP), whereas those with a score of 3 or more had severe illness. Patients with advanced disease were excluded from the study and provided conventional therapy. Patients who were operated on between the time of the incident and within 10 days were selected for early laparoscopic cholecystectomy (<6 weeks). All of the patients were thoroughly briefed, and a signed agreement was attained.

ERCP or choledochoscopy was used to drain the biliary tree preoperatively or during the procedure. All the individuals had a conventional laparoscopic cholecystectomy involving four ports. The first 10mm port was placed subumbilical using the open Hasson method, to create pneumoperitoneum. In the epigastric region, another 10mm port was implanted. In the midline and right subcostal zone, two 5mm ports were placed. Additional ports were developed to meet the requirement. Diathermy was utilized for dissection, and a harmonic blade was used for complex dissections in the calot's zone. In patients who had a challenging procedure and were at risk of complications or bile leakage, a subhepatic tube was implanted.

Age, race, body mass index (BMI), locality, and comorbid diseases, among other sociodemographic characteristics, were recorded. The mean procedural time, the number of ports, average hospital stay, drain placement, and postoperative events were all logged and assessed during the procedure. In-hospital death was the outcome measure. All the surgeries were operated by the same surgeon.

All patients were discharged post-operatively upon completion of recovery. Complete recovery was considered when the incision sites were healing properly and no infection was observed. Minor complications were identified as those complications which did not require secondary procedure or hospitalization and were managed in the outpatients' department. For instance, postoperative infection was regarded as a minor complication if the symptoms resolved spontaneously or after a 1-week course of broad-spectrum antibiotics. The patients were monitored for a week initially, then monthly, and followed by a minimum three-month interval.

All data statistical package for social software (SPSS version 26). All non-normally distributed variables including the age, body mass index, hospital stay, and operative duration were presented as median and interquartile ranges. The normality distribution was checked with the Shapiro-wilk test. The categorical

Table 1: Characteristics of study participants.

Characteristics	Frequency (%)
Median Age# (years)	47 (36-58)
Gender	
Male	111 (29)
Female	272 (71)
Median Body Mass Index (BMI)# (Kg/m2)	28 (24-35)
Residence	
Urban	221 (57.7)
Rural	162 (42.3)
Comorbid Conditions	
Hypertension	170 (44.4)
Diabetes	203 (53)
Liver Cirrhosis	9 (2.3)
Number of patients receiving definitive treatment on index Hospital admission	222 (58)
Number of patients referred for ERCP for definitive treatment	50 (13.1)
Number of patients referred for ERCP prior to operation	50 (13.1)
Number of patients managed on conservative treatment or left without any definitive treatment	111 (29)

#: Non-normal distributed numerical variables are presented as median with interquartile range

values were presented as frequency and percentages including gender, complications, number of ports, etc.

RESULTS

Table 1 illustrates the characteristics of study participants. A total of 383 patients were evaluated. The majority were females and in more than one-half of the population, diabetes mellitus type II was observed.

The median duration of early laparoscopic cholecystectomy was 6 (5-9) days. 41 (18.5%) patients had difficult dissection. In 181 (81.5%) patients four ports were inserted and in 41 (18.5%) patients five ports were inserted. The median operative time was 47 (38-54) minutes while the median hospital stay was 7 (4-10) days. Sixty patients (27%) had drain placement.

Only minor complications were seen in 20 (9%) patients. Furthermore, Fig. (2) below illustrates that the majority of the patients in the gallbladder group had a complete recovery. The in-hospital mortality rate of patients with gallstone pancreatitis as compared to pancreatitis associated with other causes is also illustrated in Fig. (2).

DISCUSSION

In our study, we found patients who were managed by Endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic sphincterotomy were treated conservatively and no definitive management was given. No mortality was seen during laparoscopic cholecystectomy along with no significant post-op complication. We found laparoscopic cholecystectomy to be a safer choice in mild gallstone pancreatitis in order to not delay treatment of the disease and prevent recurrence of acute pancreatitis. It also resolved the issue of noncompliance to definitive treatment for patients of third-world countries. Amin *et al.* found no significant association between open cholecystectomy and preoperative ERCP [11]. Factors leading to open cholecystectomy were old age, obesity, history of abdominal surgery and diabetes. Open cholecystectomy in their study was discovered to be a safer approach to laparoscopic cholecystectomy despite its benefits in complicated gallbladder disease. However, open cholecystectomy was seen with increased mortality and morbidity. Another study by Hameed *et al.* found gallstones to be one of the common causes of pancreatitis and has high mortality rates [12]. Acute gallstone pancreatitis was also most likely to be seen in females, which was similar to our study. Acute cholecystitis earlier was perceived as a contraindication for laparoscopic cholecystectomy during the early period of the surgery since it came with

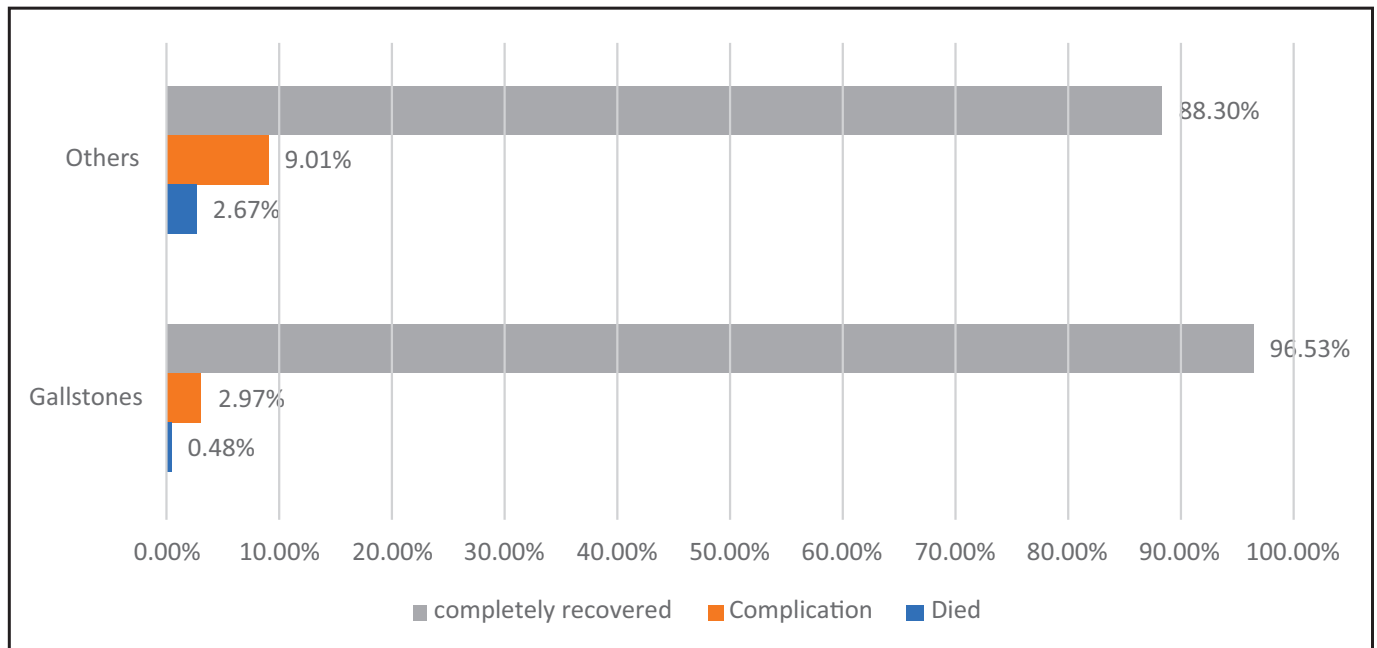


Fig. (2): Distribution of patients' outcomes in our study population.

a higher risk in reported studies [13, 14]. Over the years, however, studies have found through multiple trials that laparoscopic surgery is beneficial in the early stages of the disease [15]. Furthermore, Tayeb *et al.* in their study found laparoscopic cholecystectomy to have decreased stay in the hospital and a lower risk of injuries of the bile as compared to open cholecystectomy [16]. Laghari *et al.* in their study found laparoscopic cholecystectomy to be a safe procedure for gallstone disease as well and found a conversion rate of 1.67% [17]. Furthermore, the authors argued that complications were manageable in the hands of a surgeon who had expertise in the area and there was no significant morbidity or mortality in comparison to open cholecystectomy. Abidi *et al.* studied the outcome of laparoscopic cholecystectomy on geriatric patients (above 60 years of age) and found the mortality rate to be only 1% [18]. The procedure had significantly fewer complications and less postoperative pain as compared to open cholecystectomy for this age group. Salam *et al.* in their study found Magnetic Resonance Cholangiography (MRCP) (95.83%) to be more sensitive (Endoscopic Retrograde Cholangiopancreatography (ERCP) and also to be superior to other testing regimens in diagnosing malignant obstructive jaundice (98%) [19]. Similarly, Alam *et al.* discussed laparoscopic cholecystectomy being most likely seen with a low rate of infection at the port site where the gallbladder was removed [20].

Rajdev *et al.* in their study Laparoscopic cholecystectomy to be the main management plan for patients presenting with cholelithiasis for reasons such as shorter duration of hospital stay, cosmetic reasons and less pain after surgery [21]. The authors also discussed surgeons opting for early conversion to open cholecystectomy to reduce the mortality and morbidity rate in patients with a high difficulty score for surgery. Furthermore, similar to our study, the authors in collaboration with the PanWessex Study Group found the preferred mode of treatment to be Laparoscopic cholecystectomy (96%) in patients with acute pancreatitis [22].

The present study highlights that early laparoscopic cholecystectomy (before six weeks) is a very safe option with minimum mortality and morbidity.

There are certain limitations of the study. For instance, this study was conducted on an observational study type design and did not include a long-term follow-up. We had a limited sample size hence, the generalizability of the study findings was limited. Further large-scale, multi-center studies are needed to look comprehensively into the matter.

CONCLUSION

Early Laparoscopic cholecystectomy can be safely performed in selected cases of acute gallstones pancreatitis to prevent further attacks and other consequences of delayed treatment. Laparoscopic

cholecystectomy was found to be a safe procedure for acute pancreatitis as it has low rates of mortality and morbidity. Further studies on the matter are warranted for better insights.

ETHICS APPROVAL

Ethical approval was obtained from the institutional review board of Jinnah Postgraduate Medical Center. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki declaration.

CONSENT FOR PUBLICATION

All participants were requested verbal and written consent prior to inclusion in the study.

AVAILABILITY OF DATA

The data will not be publically accessible however, the corresponding author can be contacted for data files.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHOR'S CONTRIBUTION

All authors contributed equally and substantially.

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