

The Optimal Timing of Cholecystectomy in Patients of Acute Biliary Pancreatitis

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Abstract

Introduction: Acute pancreatitis is a common hepatobiliary disorder and in the majority of patients the etiology is either alcohol-associated or biliary. The incidence of acute biliary pancreatitis is increasing worldwide. The majority of patients with acute pancreatitis (80%) have a mild course of their disease, but 20% of patients develop severe pancreatitis. Nowadays, early laparoscopic cholecystectomy in biliary pancreatitis is indicated. Early laparoscopic cholecystectomy reduces the risk of recurrent biliary events without an increase in operative difficulty or perioperative morbidity.

Aim: To give an optimal timing of cholecystectomy in patients of acute biliary pancreatitis along with assigning an optimal method (laparoscopic or open) to the categories.

Methodology: Total 25 patients were admitted in the NIMS hospital, which were eligible according to the inclusion criteria and ready to give consent. Post admission all the clinical, biochemical and radiological parameters were assessed and were categorized according to the MODIFIED GLASGOW CRITERIA. The statistical analysis was performed and descriptive

statistics like frequency (%) was used to analyze the data.

Results: None of the patients in mild pancreatitis category developed any complication while undergoing cholecystectomy in the same hospital stay. All patients of severe disease when operated in same hospital stay developed complications irrespective of the technique of cholecystectomy used and Laparoscopic Cholecystectomy in the setting of mild disease (done same stay) and severe disease (done in next hosp admission) is a safe procedure.

Conclusion: Patients with mild disease can safely undergo laparoscopic cholecystectomy after clinical subsidence of attack whereas; patients with severe disease should undergo laparoscopic cholecystectomy 4-6 wks after clinical subsidence of first attack of biliary pancreatitis.

Keywords: Laparoscopic Cholecystectomy, Acute pancreatitis, Modified Glasgow Criteria

Introduction

Gall stone or acute biliary pancreatitis (ABP) is one of the common problems in surgical practice. Gall stones are recognized as the leading cause of acute pancreatitis worldwide.^{1, 2} ABP represents an acute inflammatory process with variable severity which ranges from a

mild, self-limiting disease to a severe disease with fulminant course leading to multi system failure. ABP is defined as acute pancreatitis in association with gallstones, in the absence of other known etiologies, particularly alcohol.³ Although choledocholithiasis is common, only 3% -8% of patients with symptomatic cholelithiasis manifests as ABP.⁴ This disease has preponderance for females between 50-70 years of age.⁵ ABP is a recurrent disease with a relapse rates exceeding 30%.⁶ The pathophysiology of ABP is poorly understood. Acute pancreatitis is the result of premature activation of digestive enzymes within the pancreatic acinar cells. These activated enzymes disrupt tissue and cell membranes, cause edema and cellular damage, initiate autodigestion, and result in the release of proinflammatory mediators.⁷ These mediatory quickly initiate a local and a systemic inflammatory cascade, which play a pivotal role in systemic manifestation of the disease.⁸ Clinical features are similar to that of acute pancreatitis of other etiology. These are insidious onset of constant epigastric pain, which often radiates to back with pain getting relief on sitting and bending forwards. Other symptoms include hyperthermia, hypovolemia, decreased bowel sounds, rebound tenderness, guarding are common. Patients with acute biliary pancreatitis may present with jaundice in addition to above clinical features.⁹ Approximately 10-20% patients develop a severe form of ABP with multisystem involvement and the mortality rate is estimated between 2-10% and is seen exclusively seen in patients with severe ABP.¹⁰ The remainder of patients with mild disease is expected to recover fully. Therefore, an early assessment of the disease severity is very essential so that an appropriate intervention can be initiated. Increasing evidence suggests that type and timing of intervention is

dependent on presence of and severity of local complications, like necrosis or pseudocyst.^{11, 12} With advent and integration of minimally invasive surgery, radiology and interventional techniques there has been marked change in management of complicated acute pancreatitis. Incorporation of these modalities has brought into question the use and timing of operative management of pancreatic necrosis, gallstones, pseudo cyst.¹³ Owing to use of local, confusing and variable terms, pancreatologists constituted a classification for establishing uniformity for inter institutional comparisons. This is known as the ATLANTA CLASSIFICATION. This defines acute pancreatitis as an inflammatory process of pancreas with variable involvement of other tissues or remote organ system.¹³ The type and timing of intervention is dependent on the severity and presence of local complications. Regardless of the severity patients require analgesia, fluid resuscitation, and close observation for signs of clinical deterioration. Narcotic medications are usually required for adequate analgesia. Despite reports that morphine increases sphincter of oddi pressure, there is no evidence that it affects clinical outcome in pancreatitis.¹⁴ Fluid resuscitation is an important aspect of management. There is a risk of renal failure in patients with delayed or inadequate fluid resuscitation.¹⁵ The primary role of cholecystectomy is prevention of recurrence. It has no role in ameliorating the course of present episode. The timing of surgical intervention in patients ABP has been a focus of much debate. Intraoperative cholangiography (IOC) can be undertaken concurrently with laparoscopic cholecystectomy and has been shown to be safe and effective. Furthermore, IOC followed by selective postoperative ERCP in patients with choledocholithiasis is more cost effective and efficient

than routine preoperative ERCP. It is now widely accepted that patients with severe ABP who undergo early surgery have higher morbidity and mortality rates. The timing of cholecystectomy in these patients must only be considered aftersystemic inflammatory response subsides.^{16, 17} Therefore, the aim of the study was to give an optimal timing of cholecystectomy in patients of acute biliary pancreatitis along with assigning an optimal method (laparoscopic or open) to the categories.

MATERIAL AND METHODS

Sample Size

25 patients admitted in surgical ward of NIMS hospital.

Eligibility Criteria

- ✓ Patients presenting with acute biliary pancreatitis as well as who diagnosed by various clinical and biochemical and radiological methods.
- ✓ Patients who were ready to give consent were included in this study.

Exclusion Criteria

- ✓ All other etiologies of pancreatitis namely, such as:-
 - Alcohol abuse
 - Traumatic
 - Hyperlipidaemia
 - Hyper triglyceridemia
 - Hypercalcaemia
 - Hereditary
 - Drug induced
 - Idiopathic
- ✓ Patients who denied giving written consent were excluded from this study.

Parameters To Be Assessed

- Clinical- Age, pulse, blood pressure, temperature, urine output, nasogastric tube aspirate.

- Biochemical- blood sugar, serum urea, serum creatinine, serum bilirubin (direct and indirect), SGOT, SGPT, alkaline phosphatase, total lipid profile, serum calcium, serum total protein, arterial blood gas analysis.
- Radiological- USG, ERCP, MRCP, CECT SCAN
CT scan will be done in patients whose clinical condition fails to improve.
CT SCAN will be done on Day 3 or Day 4.

Categorization of Patients

All the patients were categorized according to the MODIFIED GLASGOW CRITERIA.

Management of Patients During The Hospital Stay Included

- Adequate pain control
- Fluid resuscitation
- Correcting electrolyte imbalance
- Antibiotics
- Parenteral nutrition- only for severe cases
- Parenteral nutrition for mild cases.

Statistical Analysis

The statistical analysis was performed using the Windows program, SPSS (version 22.0). Descriptive statistics like frequency (%) was used to analyze the data.

Results

There were total of 25 patients included in the study. Out of which according to the modified Glasgow criteria, 13 patients (52%) were of mild pancreatitis category and 12 (48%) were of severe type.

Out of the 25 patients who qualified for the study, there was a slight female preponderance. There were 13 female patients (52%) and 12 male patients (48%).

Approx half (48%) of the patients were from the fifth decade

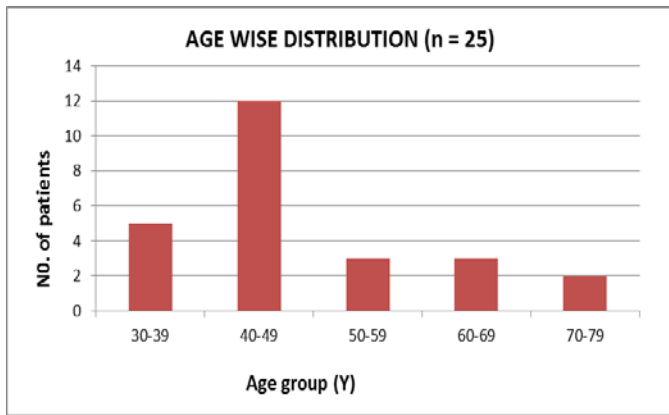


Fig. 1: Age wise distribution of study participants

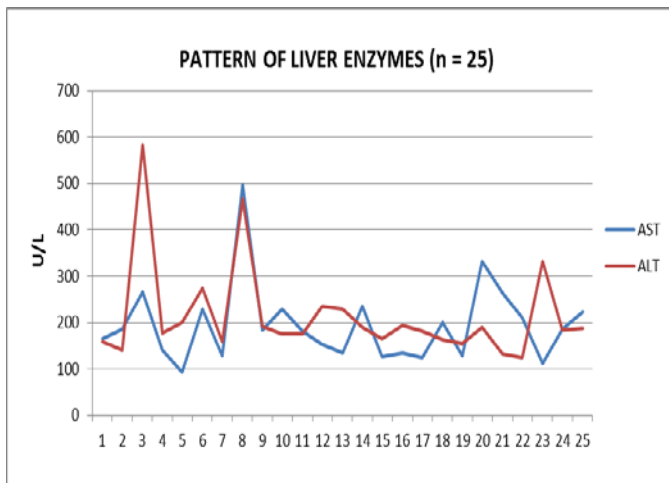


Fig. 2: Pattern of Liver enzymes obtained from study participants

The average AST levels were 180.3 U / L.

The average ALT levels were 191.9 U / L.

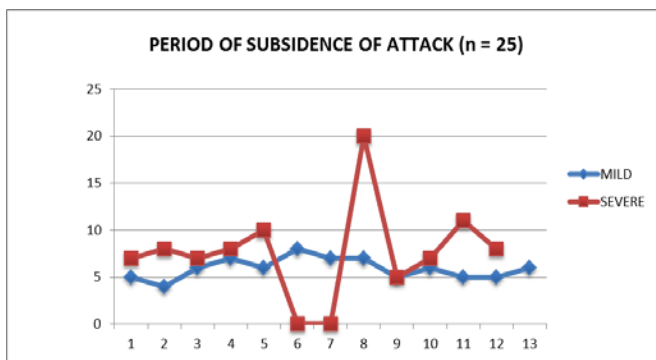


Fig. 3: Duration of subsidence of attack recorded from study participants

Patients were of mild disease

Average period of subsidence of attack in patients with mild disease was 5.9 days

Patients were of severe disease

In 2 patients the attack did not subside. In the rest average period of subsidence of attack was 9.1 days

Patients Operated In Same Hospital Stay

In total 19 patients were operated in same hospital stay, out of that, 13 were of mild disease and 6 were of severe disease.

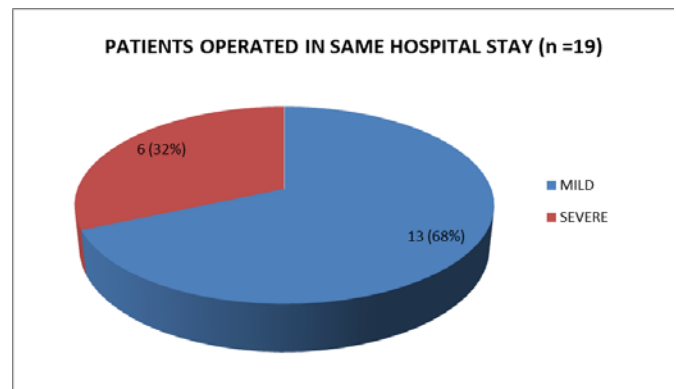


Fig. 4: Distribution of patients operated in same hospital stay Nature of Complications In Patients Operated In Same Hospital Stay

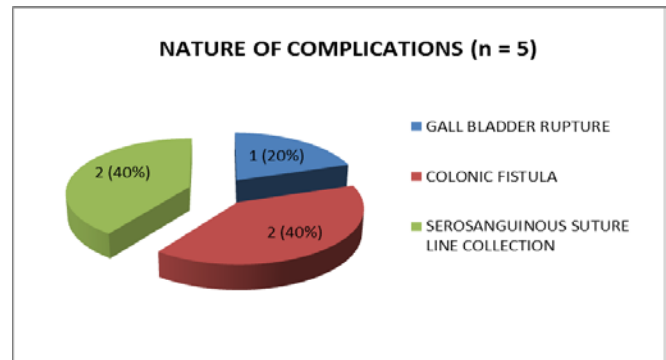


Fig. 5: Distribution of complications developed among patients during same hospital stay

Nature of complication in patients of severe pancreatitis operated same hospital stay

- One of the patient who had developed gut fistula had a recurrent attack of biliary pancreatitis, the first one being mild and the next one being severe
- The patients who had developed suture line collection had an extended hospital stay

- Both the patient who developed gut fistula eventually died.

Nature of complications in patients with mild disease operated in same stay

- In this category only one patient out of 13 developed complication.
- It was in the form of gall bladder rupture due to marked adhesions the area of calot's triangle.

Complications in operated patients with severe disease

Patients with severe disease were operated in same hospital stay. Out of these patients 5 patients (= 85%) developed complications.

The patients in this category who were operated in next hospital admission developed no complications.

Timing of Cholecystectomy In Patients With Severe Disease

11 patients of this category underwent cholecystectomy, 6 patients underwent the procedure in same hospital stay and 5 underwent the procedure in next hospital stay

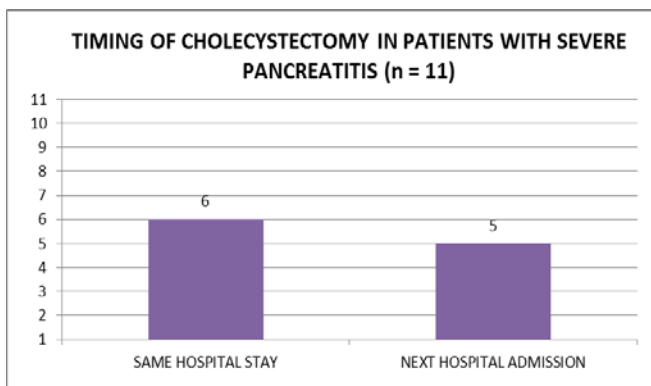


Fig. 6: Distribution of patients underwent cholecystectomy in same hospital stay and during next admission

Technique of Cholecystectomy Employed

- ✓ In patients with mild disease operated in same hospital stay

All the 13 patients of mild disease underwent cholecystectomy in same hospital stay. Out of these 13 patients, 11 underwent laparoscopic cholecystectomy; and 2 patients underwent open cholecystectomy, due to cardiovascular co morbidities.

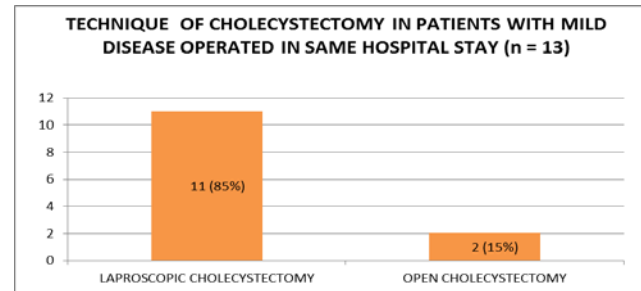


Fig. 7: Distribution of techniques employed for cholecystectomy among patients with mild disease

- ✓ In patients with severe disease operated in same hospital stay

All the patients with severe disease undergoing cholecystectomy in same hospital stay underwent the procedure through open technique.

- ✓ In patients of severe disease operated in next hospital admission

5 patients of this category underwent cholecystectomy. 3 out of 5, underwent laparoscopic cholecystectomy and 2 underwent open procedure.

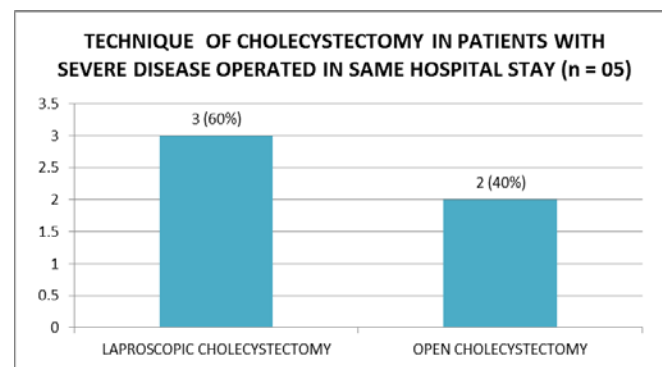


Fig. 8. Distribution of techniques employed for cholecystectomy among patients with severe disease

Intraoperative Findings

- ✓ In cases of mild pancreatitis

Out of 13 patients in the mild pancreatitis category 6 patients had intraoperative difficulty in the form of dense adhesion of omentum over the gall bladder and the calot's triangle. Though there was no intraoperative visceral injury, these adhesions had led to increased operative time.

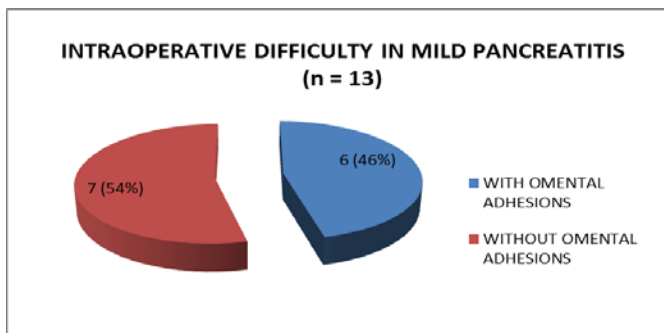


Fig.9: Intraoperative findings among patients with mild pancreatitis

✓ **In cases of patients with severe pancreatitis operated in same hospital stay**

5 out of 6 patients of this category had intraoperative difficulty. 2 had pancreatic necrosis, 3 had markedly adherent omentum over the gall bladder and the calot's triangle along with the friability of the tissue which had led to gall bladder rupture in 1 case.

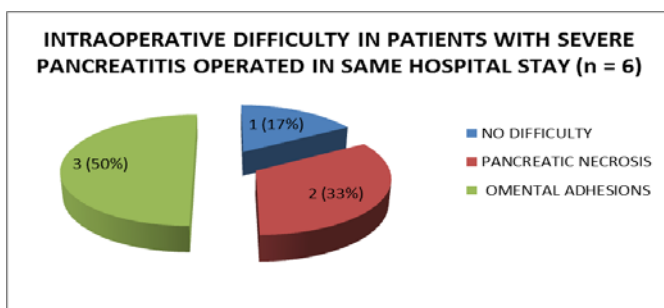


Fig. 10: Intraoperative findings among patients with severe pancreatitis

Final Outcome of Patients

✓ **Outcome of patients with mild disease**

All the 13 patients with mild disease underwent cholecystectomy in the same hospital stay after clinical subsidence of attack (average period of 5.9 days).

✓ **Outcome of patients with severe disease**

Out of 6 patients operated in same stay 2 died due to postoperative complication, and 4 patients underwent cholecystectomy after clinical subsidence of attack (average period of 9.1 days). All the 4 patients had complications and thus a prolonged hospital stay.

5 patients of this category were operated in next hospital admission. All the 5 patients were had an uneventful post-operative recovery.

1 patient died due to non-subsidence of the attack.

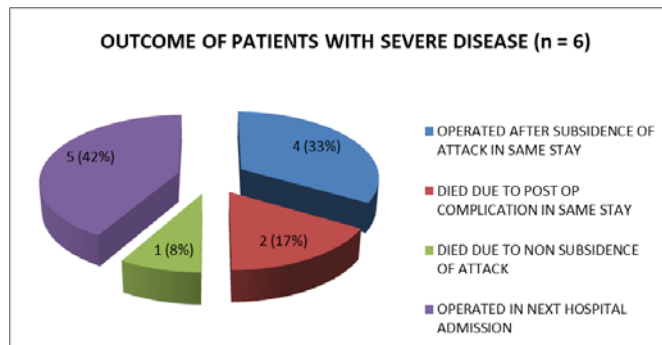


Fig. 11: Distribution of final outcome among patients with severe disease

Post-Operative Hospital Stay

✓ **Mild biliary pancreatitis**

All the patients of mild pancreatitis were operated in same ital stay. In this group of patients; period for subsidence of ta k was 5.9 days. All the patients had an uneventful post operative adolescence with no further attack of biliary pancreatitis.

✓ **Severe biliary pancreatitis**

In this group average period of subsidence of attack was 9.1 days. Two patients out of six patients of this category operated in same hospital stay continued to have pancreatic necrosis. First patient had under gone pancreatic necrosectomy with cholecystectomy on day 10 after admission and another pancreatic necrosectomy was done 6 days after the first surgery. The patient died 4 days after the second surgery.

The second patient underwent pancreatic necrosectomy with cholecystectomy on day 15 after admission. However pancreatic necrosis continued and the patient expired 15 days after the surgery.

Follow Up After Discharge

One month follow up of the patients was done on OPD basis.

✓ Follow up of patients operated for mild biliary pancreatitis

13 patients were operated in this group. None of them had repeat attack of pancreatitis in one month follow up after discharge from the hospital.

✓ Follow up of patients operated for severe biliary pancreatitis

3 patients who had developed serosanguinous suture line collection were managed with closed suction drainage of the wound. The collection eventually subsided in 1 week time. None of the patients who underwent cholecystectomy developed repeat attack of pancreatitis.

Endoscopic Retrograde Cholangiopancreatography With Endoscopic Sphincterotomy (Ercp With Es)

Out of all the cases only 1 patient presented with features of obstructive jaundice.

The patient was a case of mild biliary pancreatitis

An ERCP with ES was done on 2 day of admission and two stones were retrieved. It took 7 days for the subsidence of attack. The patient underwent a laparoscopic cholecystectomy thereafter in the same hospital stay.

Discussion

This study was designed to throw light over various aspects of acute biliary pancreatitis. These included its diagnostic work up and setting a management protocol. In our study the most commonly affected patients were female between the age group 40-50 years which was a

decade less than the western literature.⁵ Choledocholithiasis was found only in one out of 25 (4%) patients as compared to 3% -8% as reported in world literature.⁴ All the patients presented to us with upper abdominal pain, with radiation to back and nausea and only one patient presenting with features of obstructive jaundice. After initial resuscitation various pathological and biochemical tests were conducted. These included complete blood count, liver function tests, renal function tests, serum lactate dehydrogenase, serum albumin, lipid profile and arterial PO₂. The liver enzymes (ALT, AST) were consistently raised. Average ALT and AST levels were 191.9 U/L and 180.3U/L respectively pointing towards importance of raised levels of these enzymes in diagnosis of acute biliary pancreatitis. After obtaining the results these patients were categorized into mild and severe pancreatitis according to the modified Glasgow criteria. All the patients were managed under close observation and were provided with adequate analgesia in the form of synthetic opioids; adequate fluid resuscitation; parenteral antibiotics and intensive care in a specialized unit when required. All the ¹³ patients of the mild category were operated in the same hospital stay after subsidence of the attack. Only one patient developed an intraoperative complication. It was in the form of gall bladder rupture due to presence of marked adhesions in the area of calot's triangle. The employed method of cholecystectomy was laparoscopic cholecystectomy with only two patients undergoing an open procedure due medical co morbidity. One of these had a history of ischemic heart disease and the other one had chronic obstructive pulmonary disease. These observations thereby prove that patient with mild biliary pancreatitis can safely undergo cholecystectomy in same hospital stay after subsidence of attack. Since no patient of mild

pancreatitis undergoing laparoscopic cholecystectomy developed any complication, it is recommended as a safe procedure in these patients. The success rate of laparoscopic cholecystectomy in this set of patients was 100% with no conversions to the open technique. In the severe pancreatitis category six patients were operated in same hospital stay. Five patients out of these developed complications either intraoperative or postoperative. Five patients of the severe pancreatitis category were operated in hospital admission. Out of these five patients three safely underwent laparoscopic cholecystectomy while two patients had to be taken for an open procedure due to cardiovascular co morbidity. Neither the patients undergoing a laparoscopic procedure nor those undergoing an open procedure developed any complications. One patient who initially had mild pancreatitis refused to undergo cholecystectomy in the initial hospital stay, returned back with a recurrent attack of severe pancreatitis four weeks afterward. The patient was managed in intensive care. A necrosectomy with cholecystectomy was performed but the patient eventually died due to postoperative complications. In contrast to this the patients who underwent cholecystectomy in the same hospital stay did not develop any episode of pancreatitis in the postoperative follow up. Thus, the efficacy of the eradication of gall stone in preventing further pancreatic disease was confirmed as no patients developed further attacks of pancreatic inflammation following surgery. Similarly, a study by Mageed A et al., also reported that in mild gallstone pancreatitis, ELC results in a shorter overall hospital stay with a significant reduction in the recurrent biliary events with no apparent impact on the safety and technical difficulty of the procedure or perioperative complication rate.¹⁸ However, Omar MA et al.,

compared the outcomes of Early Laparoscopic Cholecystectomy (ELC) vs. Delayed Laparoscopic Cholecystectomy (DLC) for patients with mild ABP and reported that, ELC can be done safely and efficaciously with a significant reduction in the recurrent biliary events, the total length of hospital stay and frequency of readmission compared with DLC.^{19,5}

CONCLUSION

Patients of acute biliary pancreatitis should be first categorized into mild and severe disease using any of the available prognostic criteria, simplest being the modified Glasgow criteria. In relation to these above-mentioned observations we come to a conclusion that patients with mild biliary pancreatitis should undergo laparoscopic cholecystectomy in same hospital stay after subsidence of the attack, whereas the patients with severe biliary pancreatitis should undergo laparoscopic cholecystectomy in the next hospital admission.

This strategy provides time for sufficient resolution of inflammatory response and clinical recovery. Additional savings in both time and money seem to give an additional benefit to such an approach.

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