Review Article

Current Management of Gallstone Pancreatitis: Narrative Review

Abstract

Acute gallstone pancreatitis is the most common cause of acute pancreatitis, and the management depends on its severity. Acute gallstone pancreatitis can be divided into mild or severe acute pancreatitis. The management of acute gallstone pancreatitis can be divided into endoscopic management with endoscopic retrograde cholangiopancreatography (ERCP)and definitive treatment in the form of laparoscopic cholecystectomy. There is still no consensus on the most appropriate time for performing endoscopic treatment in gallstone pancreatitis and if early or delayed laparoscopic cholecystectomy should be performed. The diagnostic ability of endoscopic ultrasound and magnetic resonance cholangiopancreatography (MRCP) is also discussed. We have conducted this review article to look at the diagnosis and treatment of acute gallstone pancreatitis.

Keywords-Gallstone Pancreatitis, Endoscopic retrograde cholangiopancreatography, laparoscopic cholecystectomy, Acute biliary pancreatitis and endoscopic ultrasound.

Introduction

Acute pancreatitis is a common cause of severe upper abdominal pain, and it has a global prevalence of 76.2 per 100,000 population. It has the highest prevalence in central, eastern Europe and south Asia accounts for the highest prevalence in the Asia pacific region. Gallstones account for the most common etiology of acute pancreatitis followed by alcohol consumption (1).A systemic review and meta-analysis on the etiology of acute pancreatitis by Zilio et al found that gallstones are the most common etiology of acute pancreatitis worldwide and it is thought that due to the epidemic of obesity and hyperlipidemia has increased its incidence. The highest incidence of gallstone pancreatitis is seen in Latin America(2).

The diagnosis of acute pancreatitis is usually established by two of the following three criteria which include, severe upper abdominal pain or pain in the epigastric region of the abdomen, a serum amylase or lipase level that is three times the upper limit of normal and findings of acute pancreatitis on cross sectional imaging like computerized tomography or magnetic resonance imaging(3)

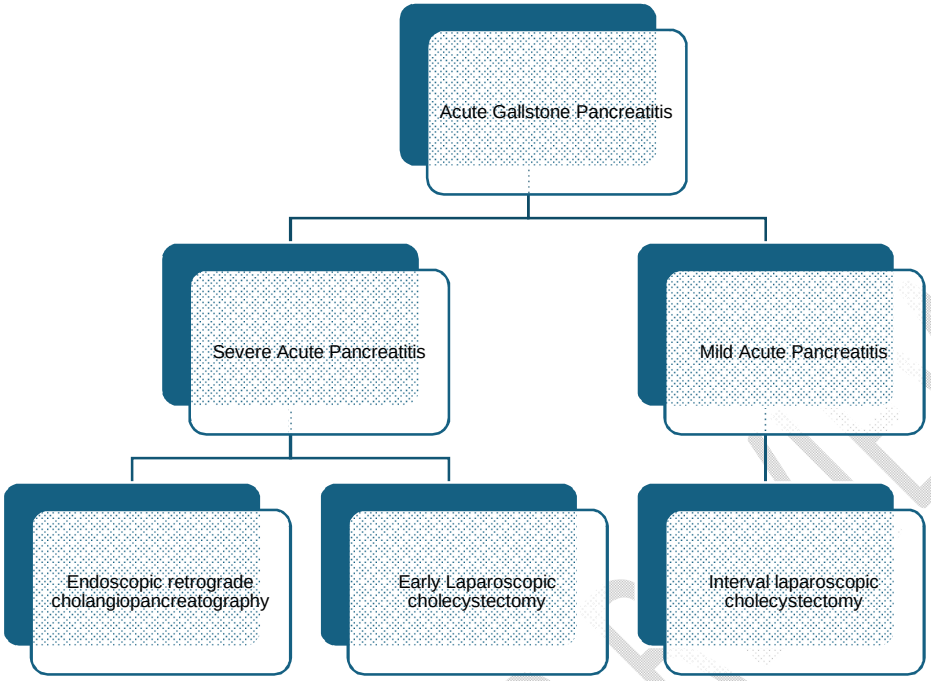
The severity of acute pancreatitis was classified according to the Revised Atlanta criteria into mild, moderate and severe pancreatitis. Mild acute pancreatitis is classified as mild disease in the absence of organ failure. Moderate acute pancreatitis is characterized by local or systemic complications in the absence of persistent organ failure. Severe acute pancreatitis is characterized by single or multiple organ failure of more than 48 hours(4).

The management of acute pancreatitis is by providing supportive care in the form of fluid resuscitation with intravenous crystalloid solutionslike normal saline or Hartmann's solution, adequate pain control in the form of opioids, continuous monitoring of vital signs and evaluation of organ function(5).

The management of acute gallstone pancreatitis includes several other modalities that are specific to gallstone disease. This includes performing a cholecystectomy to prevent recurrence of gallstone pancreatitis and remove its source. An Endoscopic retrograde Cholangiopancreatography (ERCP)is performed in patients with acute gallstone pancreatitis with underlying cholangitis. These two interventions are important in the management of gallstone pancreatitis, and other measures include performing an intra-operative cholangiography and a laparoscopic common bile duct exploration in those patients who will undergo a laparoscopic cholecystectomy(6,7)

We have conducted this review article to look at the management of gallstone pancreatitis, the timing of endoscopic retrograde cholangiopancreatography (ERCP) in the management of gallstone pancreatitis. When should laparoscopic cholecystectomy be performed in patients with gallstone pancreatitis and if an intraoperative cholangiography be performed. The indication and complication of all these procedures were investigated. We have conducted a literature review using PUBMED, Cochrane database of clinical reviews, Google scholar and semantic scholar looking for randomized control trials, systemic reviews, meta-analysis, observational and cohort studies from 1990 to 2024.All the articles obtained were in full text form. The following key words were used, "Gallstone pancreatitis", "Endoscopic retrograde cholangiopancreatography", "laparoscopic cholecystectomy", "Acute biliary pancreatitis "and "Endoscopic ultrasound". All articles were in English language and pediatric and pregnant patients were excluded from this review. Case reports and commentaries were excluded.

Image 1. Management of acute gallstone pancreatitis



Flowchart showing the management of acute gallstone pancreatitis

Discussion

Endoscopic Management of acute gallstone pancreatitis

Endoscopic retrograde cholangiopancreatography (ERCP) is recommended for patients with severe gallstone pancreatitis who present with cholangitis and obstructive jaundice due to choledocholithiasis. This procedure is performed with 48 hours of presentation and is commonly performed in older patients and those patients with severe acute gallstone pancreatitis(8–12)

Early endoscopic retrograde cholangiopancreatography (ERCP) is beneficial if it is performed within 24 to 48 hours from the onset of symptoms in patients who present with symptoms of acute biliary pancreatitis with associated cholangitis and persistent biliary obstruction. It is also beneficial to perform an endoscopic sphincterotomy as it can help to prevent recurrent symptoms of pancreatitis(13–16).An evidence-based review by Barkun et al concluded that early endoscopic management of acute gallstone pancreatitis with endoscopic retrograde cholangiopancreatography(ERCP) being performed within 72 hours from admission will reduce the risk of biliary sepsis, and the additional sphincterotomywill further reduce the risk of biliary sepsis and retained stones in the biliary system(17)

The addition of endoscopic sphincterotomy helps to reduce the risk of recurrent attacks of gallstone pancreatitis in selected patientslike those with co-morbidities and who are not fit to undergo a cholecystectomy or those who refuse surgery(18).The American Gastroenterological Association Institute Guideline on the management of acute pancreatitis has advised endoscopic retrograde cholangiopancreatography (ERCP) in patients with gallstone pancreatitis without cholangitis(19)Endoscopic sphincterotomy was found to be beneficial when performing an endoscopic retrogradecholangiopancreatography(ERCP) for patients with acute gallstone pancreatitis with small gallstones,and a study by Kim et al concluded that biliary stones that were less that 5mm would benefit from an endoscopic retrograde cholangiopancreatography(ERCP) and endoscopic sphincterotomy(20).

The Japanese Guidelines in the management of acute pancreatitis has also recommended endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy for patients who present with acute gallstone pancreatitis with underlying cholangitis. However early unlimited endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy is not supported in the management of mild gallstone pancreatitis as it is associated with increased morbidity and mortality(21,22)

A multi-center randomized control trial comparing urgent endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy versus conservative treatment in predicted severe acute gallstone pancreatitis (APEC) was conducted by Schepers et al.232 patients were randomized to 118 who underwent endoscopic retrograde cholangiopancreatography and sphincterotomy and 114 underwent conservative treatment. Primary endpoints occurred in 45 patients in the ERCP group and 50 patients in the conservative groups. There were no reported differences in both the groups with regards to the primary endpoint and this study concluded that urgent endoscopic retrograde cholangiopancreatography is indicated with patients with gallstone pancreatitis with under lying cholangitis or persistent choledocholithiasis only(23)

Table 1. Mortality rate between ERCP and conservative for gallstone pancreatitis

Study	Year	Study type	N=numbers	Mortality and major	Mortality and major	Relative Risk

				complication-ERCP	complication-conservative treatment	
Schepers et al	2020	Multi-center randomized control trial	117-ERCP 113 - conservative treatment	38%	44%	0.87

Table showing the mortality rate between ERCP and conservative for gallstone pancreatitis

Cholecystectomy for acute gallstone pancreatitis

A cholecystectomy is usually performed after the patient has recovered from acute gallstone pancreatitis and it is done after eight weeks as an elective procedure. It is performed as to prevent recurrent attacks of acute gallstone pancreatitis. The timing of performing a cholecystectomy depends on the severity of acute gallstone pancreatitis, with an elective cholecystectomy being performed once the acute condition has subsided. For mild acute gallstone pancreatitis, the cholecystectomy can be performed during the index admission, and this can reduce the risk of recurrent attacks of gallstone pancreatitis(24–28).

The timing of laparoscopic cholecystectomy was retrospectively evaluated by Uhi et al for patients with gallstone pancreatitis who had undergone endoscopic therapy. This study concluded that for patients with mild acute gallstone pancreatitis, laparoscopic cholecystectomy can be performed within 7 days of treatment but for patients with severe gallstone pancreatitis, the laparoscopic cholecystectomy should be performed after 3 weeks from the onset of symptoms to allow thesystemic inflammation that occurs in severe pancreatitis to subside(29).

A single center randomized control trial on gallstone pancreatitis-Admission versus normal cholecystectomy (Gallstone PANC trial) was conducted by Mueck et al.A total of 97 patients were divided into 49 who underwent an early cholecystectomy and 48 who underwent an interval cholecystectomy. The study concluded that early cholecystectomy was associated with reduced complications, length of hospital stays and the need for repeat endoscopic retrograde cholangiopancreatography (ERCP) in patients with mild gallstone pancreatitis. Another randomized control trial by Riquelme et al also confirmed that early laparoscopic cholecystectomy reduces the hospital stay in mild gallstone pancreatitis. Both these trials demonstrated the early laparoscopic cholecystectomy was associated with reduced length of hospital stay.(30,31).

A meta-analysis on the optimal timing of laparoscopic cholecystectomy in patients with mild gallstone pancreatitis was conducted by Zhong et al.2639 patients were included in this study and there were no differences with regards to the post operative complications, length of hospital stays and recurrence rates between those who underwent early laparoscopic cholecystectomy and

delayed laparoscopic cholecystectomy. This study concluded that early laparoscopic cholecystectomy for mild gallstone pancreatitis was safe and effective(32).

A meta-analysis of randomized control trials of early versus delayed cholecystectomy formild gallstone pancreatitis was conducted by Moody et al.629 patients were included from 5 randomized control trials and there were no differences with regards to the intraoperative and post operative complications. The number of patients who developed recurrent attacks was reduced in the patients who underwent early laparoscopic cholecystectomy. This study concluded that early laparoscopic cholecystectomy for mild gallstone pancreatitis was feasible and not associated with any increased risk of complications(33).

A Cochrane review on early versus delayed laparoscopic cholecystectomy for acute gallstone pancreatitis by Gurusamy et al. This study concluded that early laparoscopic cholecystectomy was not associated with any increase in complications and due to the shorten hospital stay was preferable to delayed laparoscopic cholecystectomy(34).

For patients who present with moderate to severe gallstone pancreatitis there are no definitive guidelines on when to perform an interval cholecystectomy, but it is generally agreed upon that the best time to perform this procedure is at eight weeks after the onset of severe pancreatitis as this period is associated with reduced morbidity and mortality(35).

Table 2. Length of hospitalization between early and delayed laparoscopic cholecystectomy for acute gallstone pancreatitis

Study	Year	Study type	N=numbers ELC-early laparoscopic cholecystectomy DLC-delayed laparoscopic cholecystectomy	Length of hospital stay for early laparoscopic cholecystectomy(hours)	Length of hospital stay for delayed laparoscopic cholecystectomy(hours)
Mueck et al	2019	Randomized control trial (RCT)	97 ELC-49 DLC-48	16	43
Riquelme et al	2020	Randomized control trial (RCT)	52 ELC-26 DLC-26	58	167

Table showing the length of hospitalization between early and delayed laparoscopic cholecystectomy for acute gallstone pancreatitis

Endoscopic Ultrasound and Magnetic resonance cholangiopancreatography (MRCP) in gallstone pancreatitis

Endoscopic ultrasound is a useful investigative modality to diagnose stones in the common bile duct in patients who present with gallstone pancreatitis. The sensitivity and specificity of endoscopic ultrasound to diagnose stones in the common bile duct is 93% and 96% respectively. Due to its minimally invasive nature and low complications rate, it has been proposed to be used to screen patients who will require an endoscopic retrograde cholangiopancreatography (ERCP)(36–38).

A systemic review was conducted by De Lisi et al comparing endoscopic ultrasound and endoscopic retrograde cholangiopancreatography (ERCP) in acute biliary pancreatitis.545 patients were included in this systemic review and the complication rates were low with endoscopic ultrasound and its ideal for identifying those patients who have common bile duct stones and would than require endoscopic retrograde cholangiopancreatography(ERCP).Endoscopic ultrasound can be used as an effective alternative to diagnostic endoscopic retrograde cholangiopancreatography(ERCP)(39).

Magnetic resonance cholangiopancreatography (MRCP) is anoninvasive imaging modality that does not use radiation that can visualizethe biliary system. It does not require administration of contrast agents and can be used as an alternative to ultrasound and diagnostic endoscopic

retrograde cholangiopancreatography (ERCP) to diagnose stones in the common bile duct. It has a sensitivity and specificity of 94% and 98% respectively for detecting common bile duct stones. Magnetic resonance cholangiopancreatography (MRCP) is ideal for diagnosing patients with gallstone pancreatitis and toindicate which patients will than require a therapeutic endoscopic retrograde cholangiopancreatography (ERCP)(40–42).

The long-term effectiveness of cholecystectomy and endoscopic sphincterotomy in the management of gallstone pancreatitis

Several studies have looked at the long-term effects of cholecystectomy and endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy in patients who underwent treatment for gallstone pancreatitis. The attacks of recurrent acute pancreatitis were higher in patients who underwent endoscopic sphincterotomy than cholecystectomy. Cholecystectomy offers the best protection from recurrent acute pancreatitis and endoscopic sphincterotomy is reserved for patients who are not fit for surgery and for those where surgery may be delayed. The presence of stones in the common bile duct are strong indicators for recurrence(43–46).

Conclusion

Acute gallstone pancreatitis should be diagnosed early and patients who have underlying cholangitis should have an endoscopic retrograde cholangiopancreatography (ERCP) performedurgently. Patients with mild acute gallstone pancreatitis can be investigated with computerized tomography or magnetic resonance cholangiopancreatography (MRCP) and those patients with stones in the common bile duct can undergo and endoscopic retrograde cholangiopancreatography (ERCP) after 48 to 72 hours. An endoscopic sphincterotomy should be performed to prevent recurrence.

Laparoscopic cholecystectomy should be performed to prevent recurrence of gallstone pancreatitis with patients who present with mild gallstone pancreatitis can have the surgery performed during the index admission. Patients who present with severe gallstone pancreatitis usually undergo an interval cholecystectomy after three to six weeks' time to allow for the acute inflammation to subsideand reduce the risk of complications from occurring. Laparoscopic cholecystectomy is performed to prevent recurrent attacks of gallstone pancreatitis.

Endoscopic ultrasound and magnetic resonance cholangiopancreatography (MRCP) can be used to stratify which patents will require an urgent or elective endoscopic retrograde cholangiopancreatography (ERCP), but not all healthcare centers may have thesemodalities, hence early diagnosis and treatment of gallstone pancreatitis is essential to prevent mortality and morbidity in this condition.

The management of patients with gallstone pancreatitisrequires the cooperation between the gastroenterologist and general surgeon to prevent complications from occurring in them.

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