

Current Management of Acute Gallstone Pancreatitis: Narrative Review Article

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Abstract: Acute gallstone pancreatitis is the most common cause of acute pancreatitis, and it is divided into mild and severe forms. The management of acute gallstone pancreatitis will initially include fluid resuscitation, supportive care, and analgesia, followed by definitive management. An endoscopic retrograde cholangiopancreatography (ERCP) is done to remove the stone in the ampulla of Vater. An urgent endoscopic retrograde cholangiopancreatography (ERCP) is performed for acute gallstone pancreatitis with cholangitis, while an early ERCP is done for mild and severe acute gallstone pancreatitis without cholangitis. Laparoscopic cholecystectomy is performed to prevent recurrence of acute gallstone pancreatitis, with early laparoscopic cholecystectomy being performed for mild acute gallstone pancreatitis and delayed laparoscopic cholecystectomy being done for severe acute gallstone pancreatitis. In this review we will investigate the role of endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopic cholecystectomy in the management of acute gallstone pancreatitis.

Keywords: "Acute Pancreatitis", "Acute Biliary Pancreatitis", "Gallstone Pancreatitis", "Endoscopic Retrograde Cholangiopancreatography", "Cholecystectomy", "Laparoscopic Cholecystectomy".

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INTRODUCTION

Acute pancreatitis is characterized by inflammation of the pancreas, and its clinical presentation is that of upper abdominal pain and vomiting. The incidence of acute pancreatitis varies according to the location, with a rate of 80 per 100,000 population in the United States and 100 per 100,000 population in Europe. The incidence has been gradually increasing in Western countries (Frossard *et al.*, 2008; Sohail *et al.*, 2024). The Atlanta Classification of acute pancreatitis has defined it as the presence of abdominal pain consistent with acute pancreatitis, the presence of elevated serum amylase or lipase that is three times the normal limit, and the radiological features of acute pancreatitis on computerized tomography or magnetic resonance imaging. The presence of two out of these three criteria is diagnostic of acute pancreatitis. Acute pancreatitis is divided into mild and severe forms (Banks *et al.*, 2013; Mittal *et al.*, 2025). Gallstones are the most common cause of acute pancreatitis, followed by alcohol consumption. The severity of acute pancreatitis is

assessed by using the Ranson's or Glasgow Imrie criteria, the acute physiology and chronic health evaluation (APACHE) score, or by using the computerized tomography evaluation (Chen *et al.*, 2023; Szatmary *et al.*, 2022).

The management of acute pancreatitis involves the use of intravenous fluids and supportive care, with monitoring of the vital signs and pain management. For patients with gallstone pancreatitis, definitive management would involve the use of endoscopic retrograde cholangiopancreatography (ERCP) and performing a cholecystectomy (Boxhoorn *et al.*, 2020; Kapetanios, 2010). The management of gallstone pancreatitis will depend on its severity and the presence of cholangitis. Patients with mild gallstone pancreatitis can undergo an early endoscopic retrograde cholangiopancreatography (ERCP), while patients with severe gallstone pancreatitis with features of cholangitis may undergo an urgent endoscopic retrograde cholangiopancreatography (ERCP). Early Cholecystectomy is performed for patients with mild

gallstone pancreatitis, while for patients with severe gallstone pancreatitis, an interval or delayed cholecystectomy is performed (Cucher *et al.*, 2014; Walkowska *et al.*, 2022).

We have conducted this review article to look at the management of gallstone pancreatitis and the timing of endoscopic retrograde cholangiopancreatography (ERCP) in the management of gallstone pancreatitis, regarding the severity of acute gallstone pancreatitis. We have also looked at when a laparoscopic cholecystectomy should be performed for patients with acute gallstone pancreatitis. The role of early and delayed laparoscopic cholecystectomy for acute gallstone pancreatitis will also be evaluated. We have conducted a literature review using PUBMED, Cochrane database of clinical reviews, Google scholar and Semantic Scholar, looking for randomized controlled trials, systematic reviews, meta-analyses, observational, and cohort studies from 1990 to 2026. All the articles obtained were in full-text form. The following key words were used: "Gallstone pancreatitis", "Endoscopic retrograde cholangiopancreatography", "laparoscopic cholecystectomy", "Cholecystectomy", "Acute biliary pancreatitis", and "acute pancreatitis". All articles were in the English language, and pediatric and pregnant patients were excluded from this review. Case reports and commentaries were excluded.

DISCUSSION

Endoscopic Retrograde Cholangiopancreatography in the Management of Acute Gallstone Pancreatitis

Endoscopic retrograde cholangiopancreatography (ERCP) is performed for patients with gallstone pancreatitis where the stone is lodged in the ampulla of Vater, to remove it and treat the underlying acute pancreatitis. It is performed as an urgent procedure for patients with gallstone pancreatitis with underlying cholangitis or sepsis. Stones within the common bile duct can also be removed, and a sphincterotomy is performed at the ampulla to allow passage of residual stones into the duodenum. The timing of performing an endoscopic retrograde cholangiopancreatography (ERCP) in patients with gallstone pancreatitis who do not exhibit symptoms of cholangitis remains undecided. Endoscopic retrograde cholangiopancreatography (ERCP) is an invasive procedure with risks of developing acute pancreatitis, cholangitis, and duodenal perforation (Carr-Locke *et al.*, 2003; Fogel & Sherman, 2014; Kundumadam *et al.*, 2021).

The outcomes and timing of endoscopic retrograde cholangiopancreatography (ERCP) were assessed by Halasz *et al.*, A total of 267 patients with acute biliary pancreatitis underwent endoscopic retrograde cholangiopancreatography (ERCP), and a successful cannulation rate was seen in 84% of the cases and associated with a lower complication rate when compared with unsuccessful cannulation (22,5%

vs40.8%)(Halász *et al.*, 2019). Ricci *et al.*, conducted a retrospective study on the treatment of gallstone pancreatitis. A total of 90 patients with gallstone pancreatitis had undergone endoscopic retrograde cholangiopancreatography (ERCP), with a success rate of 95.5%, and it was associated with a procedure-related morbidity rate of 6.7%(Ricci *et al.*, 2002).

The American College of Gastroenterology guidelines for the management of acute pancreatitis have recommended endoscopic retrograde cholangiopancreatography (ERCP) for patients with acute gallstone pancreatitis with cholangitis within 24 hours from admission. For patients with acute gallstone pancreatitis without cholangitis, endoscopic retrograde cholangiopancreatography (ERCP) need not be performed as an early procedure; other diagnostic tests, like magnetic resonance cholangiopancreatography (MRCP) or Endoscopic ultrasound (EUS), can be performed to establish the diagnosis (Tenner *et al.*, 2013). The American Gastroenterological Association Institute Guidelines on the management of acute pancreatitis have advised against the routine use of endoscopic retrograde cholangiopancreatography (ERCP) in patients with acute gallstone pancreatitis with no symptoms of cholangitis (Crockett *et al.*, 2018). Several reviews that looked at the role of endoscopic retrograde cholangiopancreatography (ERCP) in the management of acute gallstone pancreatitis have also recommended it for patients with cholangitis, but were unclear on the timing for patients with mild acute gallstone pancreatitis (Behrns *et al.*, 2008; Nabi & Nageshwar Reddy, 2025; Nasr, 2022).

A multicenter randomized controlled trial comparing urgent endoscopic retrograde cholangiopancreatography (ERCP) with conservative treatment in severe acute pancreatitis was conducted by Schepers *et al.*, A total of 232 patients were randomized, with 118 undergoing endoscopic retrograde cholangiopancreatography (ERCP) and 113 undergoing conservative treatment. There were no differences in the primary endpoints (38% vs. 44%), cholangitis (2% vs. 10%), and adverse events (74% vs. 80%). This study showed that endoscopic retrograde cholangiopancreatography (ERCP) need not be performed urgently in patients with severe acute gallstone pancreatitis without cholangitis (Schepers *et al.*, 2020). A systematic review and meta-analysis comparing urgent endoscopic retrograde cholangiopancreatography (ERCP) and conventional therapy for acute biliary pancreatitis without cholangitis was conducted by Shrestha *et al.*, A total of 4 studies with 605 patients were included in this study. There were no significant differences regarding mortality (OR0.59,95%CI, overall complications (OR0.56,95%CI), and organ failure (OR1.06,95%CI). This study showed that an urgent endoscopic retrograde cholangiopancreatography (ERCP) did not reduce

mortality and morbidity in severe acute gallstone pancreatitis without cholangitis(Shrestha *et al.*, 2022). A meta-analysis on the clinical efficacy of endoscopic retrograde cholangiopancreatography (ERCP) was conducted by Tang *et al.*, A total of 15 studies with 1639 patients were included in this study, with 823 undergoing endoscopic retrograde cholangiopancreatography (ERCP) and 816 undergoing conservative treatment. Endoscopic retrograde cholangiopancreatography was associated with better clinical efficacy and outcomes when compared with conservative treatment in the management of acute gallstone pancreatitis(Tang *et al.*, 2022).

The role of endoscopic sphincterotomy on future recurrent acute gallstone pancreatitis in patients who did not undergo an elective or interval cholecystectomy was assessed by Ridditid *et al.*, A total of 146 patients with mild acute gallstone pancreatitis were included in this study, with 79 having undergone endoscopic retrograde cholangiopancreatography (ERCP), and 51 did not undergo an endoscopic

retrograde cholangiopancreatography (ERCP). The patients who had undergone a sphincterotomy had a lower rate of recurrent acute gallstone pancreatitis(Ridditid *et al.*, 2019). Hernandez looked at the role of endoscopic sphincterotomy in the recurrence of acute gallstone pancreatitis. A total of 292 patients were included in this study, and the recurrence rate of acute gallstone pancreatitis was lower in patients who had undergone endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy. This can be considered for patients who are not suitable candidates for a cholecystectomy (Hernandez *et al.*, 2004). A meta-analysis of randomized controlled trials of endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic sphincterotomy for acute gallstone pancreatitis was conducted by Sharma *et al.*, A total of 4 studies with 460 patients were included in this study. Endoscopic retrograde cholangiopancreatography (ERCP) was associated with reduced morbidity and mortality, and it had a reduced recurrence rate for acute gallstone pancreatitis(Sharma & Howden, 1999).

Table 1 : Timing of Endoscopic Retrograde Cholangiopancreatography (ERCP) in Acute Gallstone Pancreatitis

Reference	Guideline / Study type	ERCP timing recommendation	Indications for ERCP	Key message
Tenner <i>et al.</i> , 2013	American College of Gastroenterology (ACG) Clinical Guideline	Less than 24 hours if cholangitis; no routine early ERCP otherwise	Acute cholangitis	Routine early ERCP is not recommended without cholangitis
Crockett <i>et al.</i> , 2018	American College of Gastroenterology (ACG) Guideline Update	Within 24 h for cholangitis; avoid early ERCP if no obstruction	Cholangitis; persistent biliary obstruction	Supports selective ERCP with Endoscopic Ultrasound (EUS)/Magnetic resonance cholangiopancreatography (MRCP) first
Schepers <i>et al.</i> , 2020	Systematic review/meta-analysis	Less than 24 hours only for cholangitis; More than 72 hours for selective cases	Cholangitis; ongoing obstruction	No benefit of routine early ERCP in the absence of cholangitis

Laparoscopic Cholecystectomy in the Management of Acute Gallstone Pancreatitis

Laparoscopic cholecystectomy is recommended for patients with acute gallstone pancreatitis, with early laparoscopic cholecystectomy being recommended for patients with mild acute gallstone pancreatitis to prevent recurrence. Patients with severe acute gallstone pancreatitis will, however, undergo an interval or elective laparoscopic cholecystectomy after 8 weeks to allow the inflammation to subside and reduce the risk of postoperative complications(Fugazzola *et al.*, 2024). Riquelme et al conducted a randomized controlled trial on Early laparoscopic cholecystectomy for mild acute gallstone pancreatitis. A total of 52 patients were randomized into 26 who underwent early laparoscopic cholecystectomy and 26 who underwent delayed laparoscopic cholecystectomy. There were no differences in the postoperative complications between the procedures, but early laparoscopic cholecystectomy was associated with

a reduced length of hospital stay(Riquelme *et al.*, 2020). A multi-center randomized controlled trial comparing same admission versus interval cholecystectomy for mild gallstone pancreatitis (PONCHO) was conducted by Da Costa et al. A total of 266 patients were randomized to 129 who underwent same admission cholecystectomy and 137 who underwent interval cholecystectomy. Recurrent gallstone pancreatitis occurred in 9% of the interval cholecystectomy group, against 2% in the same-day cholecystectomy group. There were no differences regarding the post-operative complications and mortality between the groups(Da Costa *et al.*, 2015).

A meta-analysis of randomized controlled trials comparing early versus delayed cholecystectomy for mild gallstone pancreatitis was conducted by Moody *et al.*, A total of 5 studies with 629 patients were included in this study, of which 318 underwent early laparoscopic cholecystectomy, and 311 underwent delayed laparoscopic cholecystectomy. The recurrent biliary

pancreatitis rate was reduced in the early laparoscopic cholecystectomy group (OR 0.17, 95% CI), and there were no differences in intra- and postoperative complications (Moody *et al.*, 2019). A systematic review and meta-analysis comparing same admission versus delayed cholecystectomy for mild acute biliary pancreatitis was conducted by Lyu *et al.*, A total of 11 studies with 1833 patients were included in this study, and there were no differences in the postoperative complication rates, the conversion to open cholecystectomy, and the length of hospital stay between the procedures. However, gallstone-related complications like recurrent attacks of biliary colic and acute pancreatitis were seen in 25.39% of cases in the delayed cholecystectomy group (Lyu *et al.*, 2018). A Cochrane Review on early versus delayed laparoscopic cholecystectomy for acute gallstone pancreatitis was conducted by Gurusamy *et al.*, A total of one clinical trial was included in this review, and this study found that there was no increase in risk of complications following early laparoscopic cholecystectomy for mild acute gallstone pancreatitis (Gurusamy *et al.*, 2013). A meta-analysis on the optimal timing of laparoscopic cholecystectomy for mild acute gallstone pancreatitis was conducted by Zhong *et al.* A total of 19 studies with 2639 patients were included in this study, and there were no differences regarding intraoperative, postoperative, and conversion rates between early and delayed laparoscopic cholecystectomy. Early laparoscopic cholecystectomy was associated with a reduced length of hospital stay and a lower recurrence rate (Zhong *et al.*, 2019). Another meta-analysis comparing early versus delayed cholecystectomy for acute gallstone pancreatitis by Dai *et al.* also concluded the same (Dai *et al.*, 2021).

A randomized controlled trial comparing index versus delayed cholecystectomy in mild gallstone pancreatitis was conducted by Noel *et al.*, A total of 66 patients were randomized to 32 who underwent index cholecystectomy and 34 who underwent delayed

cholecystectomy. There was no significant difference in complications between the procedures, but delayed cholecystectomy was associated with an increased risk of gallstone-related conditions, such as recurrence (Noel *et al.*, 2018). The outcomes of early versus delayed laparoscopic cholecystectomy in mild to moderate acute gallstone pancreatitis were assessed by a randomized prospective study by Jee *et al.*, A total of 72 patients were randomized to 38 who underwent early laparoscopic cholecystectomy and 34 who underwent delayed laparoscopic cholecystectomy. There were no differences regarding the complications and conversion rates between the procedures, but delayed laparoscopic cholecystectomy was associated with a higher rate of recurrent biliary events and length of hospital stay (Jee *et al.*, 2018).

Martino *et al.*, looked at the timing of performing a cholecystectomy for patients with moderate to severe acute biliary pancreatitis. A total of 3696 patients were included, with 1202 undergoing early laparoscopic cholecystectomy and 2494 undergoing delayed laparoscopic cholecystectomy. Early laparoscopic cholecystectomy was associated with a higher risk of morbidity and mortality and is not recommended for patients with moderate and severe acute gallstone pancreatitis (Di Martino *et al.*, 2023). The timing of performing a cholecystectomy in patients with moderate to severe acute gallstone pancreatitis was assessed by a retrospective study by Nealon *et al.*, A total of 187 patients were included in this study, 78 underwent early laparoscopic cholecystectomy, and 109 underwent delayed laparoscopic cholecystectomy. Early laparoscopic cholecystectomy was associated with a higher rate of sepsis (47% vs 7%) and complications (44% vs 5%) when compared to delayed laparoscopic cholecystectomy. This study also concluded that early laparoscopic cholecystectomy is not recommended for severe acute gallstone pancreatitis (Nealon *et al.*, 2004).

Table II : Early vs Delayed Laparoscopic Cholecystectomy (LC) in Acute Gallstone Pancreatitis

Reference	Study type	Definition of early LC	Definition of delayed LC	Key findings	Overall conclusion
Lyu <i>et al.</i> , 2018	Systematic review & meta-analysis	Index admission or less than 2 weeks	More than 2–6 weeks after discharge	Reduced recurrent biliary events and shorter hospital stay; no increase in complications or conversion to open surgery	Early LC is safe and preferred in mild AGP
Moody <i>et al.</i> , 2019	Systematic review	Index admission LC	Interval LC after recovery	Shorter length of stay and fewer readmissions; similar operative time and morbidity	Index-admission LC recommended for mild Acute Gallstone Pancreatitis
Zhong <i>et al.</i> , 2019	Meta-analysis	More than 2 weeks from symptom onset	More than 6 weeks	No difference in mortality or bile duct injury; fewer recurrent biliary events with early LC	Early LC is effective and safe in mild disease

Reference	Study type	Definition of early LC	Definition of delayed LC	Key findings	Overall conclusion
Dai <i>et al.</i> , 2021	Meta-analysis	Same admission or less than 14 days	More than 6 weeks	Lower recurrence of biliary events and shorter total hospital stay; no increase in surgical difficulty	Supports early LC as standard of care

CONCLUSION

Endoscopic retrograde cholangiopancreatography (ERCP) is indicated for the management of acute gallstone pancreatitis, with the timing of performing this procedure still an area of controversy. An urgent endoscopic retrograde cholangiopancreatography (ERCP) is indicated for patients with underlying cholangitis with acute gallstone pancreatitis, while an early endoscopic retrograde cholangiopancreatography (ERCP) is performed for patients with mild and severe acute gallstone pancreatitis without cholangitis. The timing of when to perform a laparoscopic cholecystectomy for patients with acute gallstone pancreatitis will depend on the severity of acute pancreatitis, with early laparoscopic cholecystectomy being performed for mild acute pancreatitis and delayed laparoscopic cholecystectomy being done for severe acute gallstone pancreatitis.

Conflict of Interest: There is no conflict of interest

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