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Chapter 15

An Update on the Management of Acute Gallstone Pancreatitis

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Abstract

Acute gallstone pancreatitis represents the predominant etiology of acute pancreatitis and is categorized into mild and severe forms. The initial management of acute gallstone pancreatitis encompasses fluid resuscitation, supportive care, and analgesia, followed by definitive treatment. Endoscopic retrograde cholangiopancreatography (ERCP) is employed to extract the stone from the ampulla of Vater. In cases of acute gallstone pancreatitis with cholangitis, an urgent ERCP is indicated, whereas an early ERCP is performed for both mild and severe acute gallstone pancreatitis in the absence of cholangitis. Laparoscopic cholecystectomy is conducted to prevent recurrence, with early laparoscopic cholecystectomy being performed for mild cases and delayed laparoscopic cholecystectomy for severe cases. This chapter will explore the roles 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, and Laparoscopic cholecystectomy.

1. Introduction

Acute pancreatitis is characterized by inflammation of the pancreas, typically presenting clinically with upper abdominal pain and vomiting. The incidence of acute pancreatitis varies geographically, with a rate of 80 per 100,000 individuals in the United States and 100 per 100,000 individuals in Europe. Notably, the incidence has been gradually increasing in Western countries (Frossard et al., 2008; Sohail et al., 2024). According to the Atlanta Classification, acute pancreatitis is defined by the presence of abdominal pain consistent with the condition, elevated serum amylase or lipase levels exceeding three times the normal limit, and radiological features indicative of acute pancreatitis on computed tomography or magnetic resonance imaging. The diagnosis of acute pancreatitis requires the presence of at least two of these three criteria. The condition is categorized into mild and severe forms (Banks et al., 2013; Mittal et al., 2025). Gallstones are identified as the most common etiology of acute pancreatitis, followed by alcohol consumption. The severity of acute pancreatitis is assessed using the Ranson's or Glasgow Imrie criteria, the Acute Physiology and Chronic Health Evaluation (APACHE) score, or through computed tomography evaluation (Chen et al., 2023; Szatmary et al., 2022).

The management of acute pancreatitis primarily involves the administration of intravenous fluids and supportive care, with vigilant monitoring of vital signs and effective pain management. In cases of gallstone pancreatitis, definitive treatment includes endoscopic retrograde cholangiopancreatography (ERCP) and cholecystectomy (Boxhoorn et al., 2020; Kapetanos, 2010).The approach to managing gallstone pancreatitis is contingent upon its severity and the presence of cholangitis. Patients with mild gallstone pancreatitis may undergo early ERCP, whereas those with severe gallstone pancreatitis exhibiting features of cholangitis may require urgent ERCP. An early cholecystectomy is recommended for patients with mild gallstone pancreatitis, while an interval or delayed cholecystectomy is advised for those with severe gallstone pancreatitis. (Cucher et al., 2014; Walkowska et al., 2022).

In this chapter, we examine the management of gallstone pancreatitis, with a particular focus on the timing of endoscopic retrograde cholangiopancreatography (ERCP) in relation to the severity of acute gallstone pancreatitis. Additionally, we assess the appropriate timing for performing laparoscopic cholecystectomy in patients with acute gallstone pancreatitis. The chapter further evaluates the roles of early versus delayed laparoscopic cholecystectomy in this context. Our literature review was conducted using PUBMED, the Cochrane Database of Clinical Reviews, Google Scholar, and Semantic Scholar, targeting randomized controlled trials, systematic reviews, meta-analyses, observational studies, and cohort studies published between 1990 and 2026. All articles were obtained in full-text format. The search employed the following keywords: "Gallstone pancreatitis," "Endoscopic retrograde cholangiopancreatography," "Laparoscopic

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cholecystectomy," "Cholecystectomy," "Acute biliary pancreatitis," and "Acute pancreatitis." Articles were restricted to those published in English, and studies involving pediatric and pregnant patients were excluded. Case reports and commentaries were also omitted from this review.

2. Discussion

2.1. Endoscopic retrograde cholangiopancreatography in acute gallstone pancreatitis

Endoscopic retrograde cholangiopancreatography (ERCP) is indicated for patients with gallstone pancreatitis when a stone is obstructing the ampulla of Vater, facilitating its removal and addressing the underlying acute pancreatitis. This procedure is performed urgently in cases of gallstone pancreatitis complicated by cholangitis or sepsis. Additionally, stones located within the common bile duct can be extracted, and a sphincterotomy is conducted at the ampulla to enable the passage of residual stones into the duodenum. The optimal timing for ERCP in patients with gallstone pancreatitis who do not present with symptoms of cholangitis remains a subject of debate. It is important to note that ERCP is an invasive procedure associated with risks, including the development of acute pancreatitis, cholangitis, and duodenal perforation (Carr-Locke et al., 2003; Fogel & Sherman, 2014; Kundumadam et al., 2021).

Halasz et al. evaluated the outcomes and timing of endoscopic retrograde cholangiopancreatography (ERCP) in a cohort of 267 patients with acute biliary pancreatitis. The study reported a successful cannulation rate of 84%, which was associated with a lower complication rate compared to unsuccessful cannulation (22.5% vs. 40.8%) (Halász et al., 2019). In a separate retrospective study, Ricci et al. investigated the treatment of gallstone pancreatitis. This study involved 90 patients who underwent ERCP, achieving a success rate of 95.5%, with a procedure-related morbidity rate of 6.7% (Ricci et al., 2002).

The American College of Gastroenterology guidelines for managing acute pancreatitis recommend performing endoscopic retrograde cholangiopancreatography (ERCP) within 24 hours of admission for patients with acute gallstone pancreatitis accompanied by cholangitis. In contrast, for patients with acute gallstone pancreatitis without cholangitis, ERCP is not required as an early intervention; alternative diagnostic procedures, such as magnetic resonance cholangiopancreatography (MRCP) or endoscopic ultrasound (EUS), may be utilized to confirm the diagnosis (Tenner et al., 2013).The American Gastroenterological Association Institute Guidelines on the management of acute pancreatitis advise against the routine use of ERCP in patients with acute gallstone pancreatitis who do not exhibit symptoms of cholangitis (Crockett et al., 2018). Several reviews examining the role of ERCP in managing acute gallstone pancreatitis also recommend its use for patients with cholangitis, although they do not provide clear guidance on the timing for patients with mild acute gallstone pancreatitis (Behrns et al., 2008; Nabi & Nageshwar Reddy, 2025; Nasr, 2022).

In a multicenter randomized controlled trial conducted by Schepers et al., the efficacy of urgent endoscopic retrograde cholangiopancreatography (ERCP) was compared with conservative treatment in cases of severe acute pancreatitis. The study involved 232 patients, with 118 receiving ERCP and 113 receiving conservative treatment. The results indicated no significant differences in primary endpoints (38% vs. 44%), incidence of cholangitis (2% vs. 10%), and adverse events (74% vs. 80%). The findings suggest that urgent ERCP is not necessary for patients with severe acute gallstone pancreatitis, provided there is no cholangitis. (Schepers et al., 2020). Additionally, Shrestha et al. conducted a systematic review and meta-analysis comparing urgent ERCP with conventional therapy for acute biliary pancreatitis without cholangitis, incorporating data from four studies with a total of 605 patients. The analysis revealed no significant differences in mortality (OR 0.59, 95% CI), overall complications (OR 0.56, 95% CI), and organ failure (OR 1.06, 95% CI). This study concluded that urgent ERCP does not reduce mortality and morbidity in severe acute gallstone pancreatitis without cholangitis (Shrestha et al., 2022). Furthermore, Tang et al. performed a meta-analysis on the clinical efficacy of ERCP, including 15 studies with 1,639 patients, of whom 823 underwent ERCP, and 816 received conservative treatment. The analysis demonstrated that ERCP was associated with improved clinical efficacy and outcomes compared to conservative treatment in managing acute gallstone pancreatitis (Tang et al., 2022).

Ridtitid et al. evaluated the impact of endoscopic sphincterotomy on the recurrence of acute gallstone pancreatitis in patients who did not undergo elective or interval cholecystectomy. The study included 146 patients with mild acute gallstone pancreatitis, of whom 79 underwent endoscopic retrograde cholangiopancreatography (ERCP), while 51 did not. The findings indicated that patients who underwent sphincterotomy experienced a lower rate of recurrent acute gallstone pancreatitis (Ridtitid et al., 2019). Similarly, Hernandez investigated the role of endoscopic sphincterotomy in the recurrence of acute gallstone pancreatitis, involving 292 patients. The study demonstrated a reduced recurrence rate of acute gallstone pancreatitis in patients who underwent ERCP with sphincterotomy, suggesting its consideration for patients unsuitable for cholecystectomy (Hernandez et al., 2004). Furthermore, Sharma et al. conducted a meta-analysis of randomized controlled trials on ERCP and endoscopic sphincterotomy for acute gallstone pancreatitis, encompassing four studies with 460 patients. The analysis revealed that ERCP was associated with reduced morbidity and mortality, as well as a decreased recurrence rate of acute gallstone pancreatitis (Sharma & Howden, 1999).

Reference	Guideline / Study type	ERCP timing recommendation	Indications for ERCP	Key message
Tenner et al., 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 et al., 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 et al., 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

Table showing the timing of endoscopic retrograde cholangiopancreatography for acute gallstone pancreatitis.

2.2. Laparoscopic Cholecystectomy in Acute Gallstone Pancreatitis

Laparoscopic cholecystectomy is advised for patients with acute gallstone pancreatitis, with early laparoscopic cholecystectomy recommended for those with mild acute gallstone pancreatitis to prevent recurrence. In contrast, patients with severe acute gallstone pancreatitis are scheduled for an interval or elective laparoscopic cholecystectomy after 8 weeks to allow inflammation to subside and minimize 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 two groups: 26 underwent early laparoscopic cholecystectomy, and 26 underwent delayed laparoscopic cholecystectomy. No differences in postoperative complications were observed between the procedures; however, early laparoscopic cholecystectomy was associated with a reduced length of hospital stay. (Riquelme et al., 2020). A multi-center randomized controlled trial, PONCHO, comparing same-admission versus interval cholecystectomy for mild gallstone pancreatitis, was conducted by Da Costa et al. A total of 266 patients were randomized, with 129 undergoing same-admission cholecystectomies and 137 undergoing interval cholecystectomies. Recurrent gallstone pancreatitis occurred in 9% of the interval cholecystectomy group, compared to 2% in the same-day cholecystectomy group. There were no differences in postoperative complications and mortality between the groups (Da Costa et al., 2015).

Moody et al. conducted a meta-analysis of randomized controlled trials to compare early versus delayed cholecystectomy for mild gallstone pancreatitis. This study included five trials with a total of 629 patients, of whom 318 underwent early laparoscopic cholecystectomy, and 311 underwent delayed laparoscopic cholecystectomy. The findings indicated a reduction in the rate of recurrent biliary pancreatitis in the early laparoscopic cholecystectomy group (OR 0.17, 95% CI), with no significant differences in intra- and postoperative complications (Moody et al., 2019). Lyu et al. performed a systematic review and meta-analysis comparing same admission versus delayed cholecystectomy for mild acute biliary pancreatitis, incorporating 11 studies with 1833 patients. The analysis revealed no differences in postoperative complication rates, conversion to open cholecystectomy, or length of hospital stay between the two approaches. However, gallstone-related complications, such as recurrent biliary colic and acute pancreatitis, were observed in 25.39% of cases in the delayed cholecystectomy group (Lyu et al., 2018). Gurusamy et al. conducted a Cochrane Review on early versus delayed laparoscopic cholecystectomy for acute gallstone pancreatitis, which included one clinical trial. This study found no increased risk of complications following early laparoscopic cholecystectomy for mild acute gallstone pancreatitis (Gurusamy et al., 2013). Zhong et al. conducted a meta-analysis on the optimal timing of laparoscopic cholecystectomy for mild acute gallstone pancreatitis, including 19 studies with 2639 patients. The results showed no differences in intraoperative, postoperative, and conversion rates between early and delayed laparoscopic cholecystectomy. However, early laparoscopic cholecystectomy was associated with a reduced length of hospital stay and a lower recurrence rate (Zhong et al., 2019). A meta-analysis by Dai et al. comparing early versus delayed cholecystectomy for acute gallstone pancreatitis reached similar conclusions (Dai et al., 2021).

Noel et al. conducted a randomized controlled trial to compare index versus delayed cholecystectomy in patients with mild gallstone pancreatitis. The study involved 66 participants, with 32 undergoing index cholecystectomy and 34 undergoing delayed cholecystectomy. The results indicated no significant difference in complications between the two procedures; however, delayed cholecystectomy was associated with an increased risk of gallstone-related conditions, such as recurrence (Noel et al., 2018). Similarly, Jee et al. conducted a randomized prospective study to evaluate the outcomes of early versus delayed laparoscopic cholecystectomy in mild to moderate acute gallstone pancreatitis. This study included 72 patients, with 38 undergoing early laparoscopic cholecystectomy and 34 undergoing delayed laparoscopic cholecystectomy. The findings revealed no differences in complications and conversion rates between the procedures, but delayed laparoscopic cholecystectomy was linked to a higher incidence of recurrent biliary events and an extended length of hospital stay (Jee et al., 2018).

Martino et al. investigated the optimal timing for performing cholecystectomy in patients experiencing moderate to severe acute biliary pancreatitis. The study encompassed a cohort of 3,696 patients, with 1,202 undergoing early laparoscopic cholecystectomy and 2,494 undergoing delayed laparoscopic cholecystectomy. The findings indicated that early laparoscopic cholecystectomy was associated with an increased risk of morbidity and mortality, leading to the recommendation against its use in patients with moderate to severe acute gallstone pancreatitis (Di Martino et al., 2023).Similarly, a retrospective study by Nealon et al. evaluated the timing of cholecystectomy in a sample of 187 patients with moderate to severe acute gallstone pancreatitis. In this study, 78 patients underwent early laparoscopic cholecystectomy, while 109 underwent delayed laparoscopic cholecystectomy. The results demonstrated that early laparoscopic cholecystectomy was linked to a higher incidence of sepsis (47% vs. 7%) and complications (44% vs. 5%) compared to delayed laparoscopic cholecystectomy.

Consequently, this study also concluded that early laparoscopic cholecystectomy is not advisable for severe acute gallstone pancreatitis (Nealon et al., 2004).

Reference	Study type	Definition of early Laparoscopic Cholecystectomy (LC)	Definition of delayed Laparoscopic Cholecystectomy (LC)	Key findings	Overall conclusion
Lyu et al., 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 et al., 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 et al., 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
Dai et al., 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

3. Conclusion

Endoscopic retrograde cholangiopancreatography (ERCP) is recommended for the treatment of acute gallstone pancreatitis, although the optimal timing for this procedure remains a subject of debate. An urgent ERCP is warranted for patients presenting with cholangitis in conjunction with acute gallstone pancreatitis. Conversely, an early ERCP is advised for individuals with mild or severe acute gallstone pancreatitis in the absence of cholangitis. The timing of laparoscopic cholecystectomy in patients with acute gallstone pancreatitis is contingent upon the severity of the pancreatitis. Specifically, early laparoscopic cholecystectomy is performed for mild cases, whereas delayed laparoscopic cholecystectomy is reserved for severe acute gallstone pancreatitis.

Article Information

Conflict of interest: There is no conflict of interest.

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