



Gallstone Pancreatitis: How Does Management Differ from Other Causes of Acute Pancreatitis?

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Pearls and Pitfalls

- Gallstone pancreatitis is treated differently than alcoholic or other types of pancreatitis.
- An elevated ALT level with concomitant elevation of lipase >3x upper normal reference is highly suggestive of gallstone pancreatitis.
- The probability of a common bile duct (CBD) stone increases from 28% to 50% when the diameter cut-off of the CBD is changed from 6 mm to 10 mm.
- Imaging and surgery will be required for most patients unless unstable. Surgery is often not emergent.
- ERCP is unnecessary in most cases and comes with risk of complications.

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Acute pancreatitis (AP) is generally defined as an inflammatory condition of the pancreas characterized by severe, persistent epigastric pain and elevated levels of serum pancreatic enzymes [1]. While there are many documented causes of AP, the most common cause of AP worldwide is gallstone pancreatitis (GP) [2–4]. There are two accepted theories on how gallstones induce AP. Reflux of bile into the pancreatic duct occurs due to transient or complete obstruction of the ampulla or due to edema around the ampulla after passage of the stone. Fortunately, only 3–7% of patients with gallstones will develop AP [5]. Unlike other causes of AP, GP requires a more extensive workup with labs and imaging and directed treatment course addressing the underlying cause [6]. Patients with confirmed GP have a significant risk of life-

threatening complications including persistent biliary obstruction and acute cholangitis, which can lead to systemic organ failure [7, 8].

Current recommendations state that all patients with suspected common bile duct stones causing acute GP should be evaluated with liver enzyme levels and a trans-abdominal right upper quadrant ultrasound focusing on the gallbladder; searching for the presence of gallstones and the diameter of the common bile duct. [6, 9]

All patients presenting with their first attack of acute pancreatitis should be evaluated for GP [9, 10]. Furthermore, for patients with a known history of gallstones, the index of suspicion for GP should be significantly higher, and these patients may need a more extensive evaluation if initial screening tests are negative. A meta-analysis found that an alanine aminotransferase (ALT) concentration greater than 150 U/L had a positive predictive value of 95% for the diagnosis of gallstone pancreatitis when there is a concomitant elevation of serum lipase to three times the normal value [11, 12].

A dilated common bile duct (CBD) on transabdominal ultrasound is suggestive of choledocolithiasis, and classically a cutoff of 6 mm has been used to distinguish a dilated CBD (with adjustment for age); however, the probability of a CBD stone increases from 28% to 50% when the cutoff is changed from 6 mm to 10 mm [13–16]. The size of biliary stones matters. Stones with a diameter less than 5 mm are more likely to pass through the cystic duct and cause obstruction at or around the ampulla; therefore, the presence of small stones and sludge on transabdominal ultrasound are more concerning for the possibility of having common bile duct stones than the finding of a large stone within the gallbladder [17, 18]. Ultrasound is operator dependent, and limited by bowel gas and body habitus, leading to a sensitivity variation of 20–90% in various studies [19]. A 2015 Cochrane meta-analysis of 5 studies with 523 patients showed a sensitivity of 73% and specificity of 91% [20].

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Consultation and Disposition

For patients suspected of having acute GP, the decision to consult gastroenterology versus general surgery depends on both initial laboratory tests and ultrasound imaging, as well as level of suspicion that there is a persistent stone in the CBD. For patients with GP diagnosed by elevated liver enzymes and the presence of gallstones, dilation of the CBD, or evidence of a stone within the CBD, the current treatment guidelines recommend admitting the patient for further evaluation and management. There is no clear consensus recommendation of the most appropriate service for admission; however, there is a small observational trial of 100 patients with mild GP who were admitted to medicine versus general surgery. Those admitted to the general surgery service had a shorter length of hospital stay and shorter time to surgical intervention [21].

If there is ongoing obstruction or cholangitis, ERCP is warranted. For patients with cholangitis, ERCP should be performed as soon as possible and within 24 h. If there is obstruction only, there is no definitive time but is recommended in <72 h, which allows for brief observation period for improvement. Magnetic resonance cholangiopancreatography (MRCP) or endoscopic ultrasound (EUS) can be performed during the observation period to further eliminate those without a stone and unlikely to benefit from ERCP. For patients with suspected acute GP with liver function tests (LFTs) that have normalized and a transabdominal ultrasound that shows sludge or gallstones with a normal common bile duct diameter, literature supports performing an intraoperative cholangiogram or laparoscopic ultrasound during the cholecystectomy [22]. If a stone in the CBD is found on EUS or MRCP, current guidelines recommend ERCP for stone removal followed immediately by cholecystectomy. A Cochrane meta-analysis of 5 randomized controlled trials with 644 patients showed a significant decrease in local complications with early routine ERCP for biliary obstruction [23]. Studies have not found a benefit in overall mortality to recommend early ERCP or emergent ERCP for acute GP with biliary obstruction but no signs of systemic inflammatory response syndrome (SIRS) or acute cholangitis. MRCP does not rule out stones <5 mm so caution is warranted with negative results [24].

After acute GP, patients benefit from cholecystectomy to prevent relapse from further stones. The timing varies based on the severity of the AP. Mild pancreatitis should have a cholecystectomy during the index admissions since it has been shown to reduce recurrence without increasing morbidity or operative difficulty [25]. Patients with moderate-to-severe pancreatitis should have a cholecystectomy from 4 to 6 weeks after improvement due to higher likelihood of necrosis and secondary infection [26]. High-risk patients (elderly, multiple comorbidities) can forego cholecystectomy

but are higher risk of repeat AP, some of which is severe [10]. The risks and benefits should be discussed with the patient and surgical team.

Suggested Resources

- Core EM: <https://coreem.net/core/cholangitis/>
- University of Maryland Medical Reference Guide: <https://www.umm.edu/health/medical/reports/articles/gallstones-and-gallbladder-disease>

References

1. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus. *Gut*. 2013;62(1):102–11.
2. Yadav D, Lowenfels AB. Trends in the epidemiology of the first attack of acute pancreatitis: a systematic review. *Pancreas*. 2006;33(4):323–30.
3. Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. *Gastroenterology*. 2013;144(6):1252–61.
4. Párniczky A, Kui B, Szentesi A, Balázs A, Szűcs Á, Mosztbacher D, et al. Prospective, multicentre, nationwide clinical data from 600 cases of acute pancreatitis. *PLoS One*. 2016;11(10):e0165309.
5. Moreau JA, Zinsmeister AR, Melton LJ 3rd, DiMagno EP. Gallstone pancreatitis and the effect of cholecystectomy: a population-based cohort study. *Mayo Clin Proc*. 1988;63(5):466–73.
6. Tenner S, Baillie J, De Witt J, Vege SS, American College of Gastroenterology. American College of Gastroenterology guideline: management of acute pancreatitis. *Am J Gastroenterol*. 2013;108(9):1400–15;1416.
7. Lee DWH, Chan ACW, Lam Y-H, Ng EKW, Lau JYW, Law BKB, et al. Biliary decompression by nasobiliary catheter or biliary stent in acute suppurative cholangitis: a prospective randomized trial. *Gastrointest Endosc*. 2002;56(3):361–5.
8. Lee BS, Hwang J-H, Lee SH, Jang SE, Jang ES, Jo HJ, et al. Risk factors of organ failure in patients with bacteremic cholangitis. *Dig Dis Sci*. 2013;58(4):1091–9.
9. Greenberg JA, Hsu J, Bawazeer M, Marshall J, Friedrich JO, Nathens A, et al. Clinical practice guideline: management of acute pancreatitis. *Can J Surg*. 2016;59(2):128–40.
10. Working Group IAP/APA Acute Pancreatitis Guidelines. IAP/APA evidence-based guidelines for the management of acute pancreatitis. *Pancreatol*. 2013;13(4 Suppl 2):e1–15.
11. Tenner S, Dubner H, Steinberg W. Predicting gallstone pancreatitis with laboratory parameters: a meta-analysis. *Am J Gastroenterol*. 1994;89(10):1863–6.
12. Baj J, Radzikowska E, Maciejewski M, Dąbrowski A, Torres K. Prediction of acute pancreatitis in the earliest stages – role of biochemical parameters and histopathological changes. *Pol Przegl Chir*. 2017;89(2):31–8.
13. Contractor QQ, Boujemla M, Contractor TQ, el-Essawy OM. Abnormal common bile duct sonography. The best predictor of choledocholithiasis before laparoscopic cholecystectomy. *J Clin Gastroenterol*. 1997;25(2):429–32.
14. Baron RL, Stanley RJ, Lee JK, Koehler RE, Melson GL, Balfe DM, et al. A prospective comparison of the evaluation of biliary

- obstruction using computed tomography and ultrasonography. *Radiology*. 1982;145(1):91–8.
15. ASGE Standards of Practice Committee, Maple JT, Ben-Menachem T, Anderson MA, Appalaneni V, Banerjee S, et al. The role of endoscopy in the evaluation of suspected choledocholithiasis. *Gastrointest Endosc*. 2010;71(1):1–9.
 16. Hunt DR. Common bile duct stones in non-dilated bile ducts? An ultrasound study. *Australas Radiol*. 1996;40(3):221–2.
 17. Costi R, Sarli L, Caruso G, Iusco D, Gobbi S, Violi V, et al. Preoperative ultrasonographic assessment of the number and size of gallbladder stones. *J Ultrasound Med*. 2002;21(9):971–6.
 18. Petrov MS, van Santvoort HC, Besselink MGH, van der Heijden GJMG, van Erpecum KJ, Gooszen HG. Early endoscopic retrograde cholangiopancreatography versus conservative management in acute biliary pancreatitis without cholangitis: a meta-analysis of randomized trials. *Ann Surg*. 2008;247(2):250–7.
 19. Barlow AD, Haqq J, McCormack D, Metcalfe MS, Dennison AR, Garcea G. The role of magnetic resonance cholangiopancreatography in the management of acute gallstone pancreatitis. *Ann R Coll Surg Engl*. 2013;95(7):503–6.
 20. Gurusamy KS, Giljaca V, Takwoingi Y, Higgie D, Poropat G, Štimac D, et al. Ultrasound versus liver function tests for diagnosis of common bile duct stones. *Cochrane Database Syst Rev*. 2015;2:CD011548.
 21. Kulvatunyou N, Watt J, Friese RS, Gries L, Green DJ, Joseph B, et al. Management of acute mild gallstone pancreatitis under acute care surgery: should patients be admitted to the surgery or medicine service? *Am J Surg*. 2014;208(6):981–7; discussion 986–7.
 22. Williams E, Beckingham I, El Sayed G, Gurusamy K, Sturgess R, Webster G, et al. Updated guideline on the management of common bile duct stones (CBDS). *Gut*. 2017;66(5):765–82.
 23. Tse F, Yuan Y. Early routine endoscopic retrograde cholangiopancreatography strategy versus early conservative management strategy in acute gallstone pancreatitis. *Cochrane Database Syst Rev*. 2012.
 24. Zidi SH, Prat F, Le Guen O, Rondeau Y, Rocher L, Fritsch J, et al. Use of magnetic resonance cholangiography in the diagnosis of choledocholithiasis: prospective comparison with a reference imaging method. *Gut*. 1999;44(1):118–22.
 25. van Baal MC, Besselink MG, Bakker OJ, van Santvoort HC, Schaapherder AF, Nieuwenhuijs VB, et al. Timing of cholecystectomy after mild biliary pancreatitis: a systematic review. *Ann Surg*. 2012;255(5):860–6.
 26. Nealon WH, Bawduniak J, Walser EM. Appropriate timing of cholecystectomy in patients who present with moderate to severe gallstone-associated acute pancreatitis with peripancreatic fluid collections. *Ann Surg*. 2004;239(6):741–9; discussion 749–51.