

Cholelithiasis: A Contemporary Review of Its Clinical Impact And Management Strategies

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ABSTRACT

Introduction: Cholelithiasis, defined as the presence of stones in the common bile duct, represents a frequent cause of biliary obstruction and complications such as cholangitis and acute pancreatitis. Its prevalence is estimated at 10–20% in patients with cholelithiasis, increasing in older adults and in the presence of metabolic or anatomical predisposing factors.

Clinical presentation: Manifestations range from asymptomatic forms to severe clinical scenarios. Right upper quadrant pain, jaundice, choloria, and acholia are the predominant symptoms and may be accompanied by fever or sepsis in cases of cholangitis. Elevations in transaminases, even when marked, do not exclude the diagnosis.

Diagnosis: Evaluation is based on the combination of clinical, biochemical, and imaging criteria, with risk stratification according to ASGE and WSES guidelines. Endoscopic ultrasound (EUS) and magnetic resonance cholangiopancreatography (MRCP) are the most accurate methods for confirming the diagnosis in patients at intermediate risk, whereas endoscopic retrograde cholangiopancreatography (ERCP) is reserved for therapeutic purposes.

Treatment and prognosis: ERCP with stone extraction and sphincterotomy is the treatment of choice, followed by early cholecystectomy, ideally during the same hospital admission, which reduces recurrence and complications. In refractory cases, advanced endoscopic, percutaneous, or surgical approaches may be considered. Prognosis depends on timely biliary drainage and control of sepsis, with recurrence rates reaching up to 30% depending on anatomical and technical factors.

Conclusion: Cholelithiasis requires a stratified diagnostic approach and comprehensive evidence-based management, in which early intervention and recurrence prevention are key to optimizing clinical outcomes. Furthermore, in secondary and tertiary care hospitals, the standardization of diagnostic-therapeutic pathways (risk stratification, rational selection of EUS/MRCP, and ERCP–cholecystectomy coordination during the same admission) represents a high-impact intervention to reduce unnecessary procedures, readmissions due to recurrent biliary events, and complications associated with delayed biliary drainage.

KEYWORDS: Cholelithiasis, Biliary obstruction, Cholangitis, Acute pancreatitis, Endoscopic ultrasound (EUS), Magnetic resonance cholangiopancreatography (MRCP), Endoscopic retrograde cholangiopancreatography (ERCP).

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INTRODUCTION.

The common bile duct is the main biliary duct resulting from the union of the common hepatic duct and the cystic duct of the gallbladder (Figure 1-2). Its function is to transport bile from the liver and gallbladder to the duodenum, facilitating fat digestion. Anatomically, the common bile duct usually measures between 8 and 10 cm in length and 5 to 6 mm in diameter in adults, although the diameter may vary depending on age and clinical conditions. (1-2)

The normal diameter of the common bile duct varies significantly according to age and certain clinical conditions, particularly cholecystectomy. In healthy adults, a physiological increase in diameter occurs with age. Recent population-based studies using MRCP have established that the upper limit of normal diameter of the common bile duct

(95th percentile) is up to 8 mm in individuals younger than 65 years and up to 11 mm in those older than 65 years. (3)

Other studies using different imaging modalities (ultrasound, CT) confirm that the average diameter in adults ranges between 4.7 and 5.4 mm, with an approximate increase of 0.07 mm per year of life, suggesting that an upper limit of 8 mm is reasonable after the age of 50 years. (4-5)

Choledocholithiasis is defined as the presence of stones within the common bile duct. These stones usually migrate from the gallbladder (secondary choledocholithiasis), although they may form de novo in the common bile duct (primary choledocholithiasis). Choledocholithiasis may present asymptotically or with symptoms such as right upper quadrant pain, jaundice, choloria, acholia, and, in complicated cases, cholangitis or acute pancreatitis. (6-8)

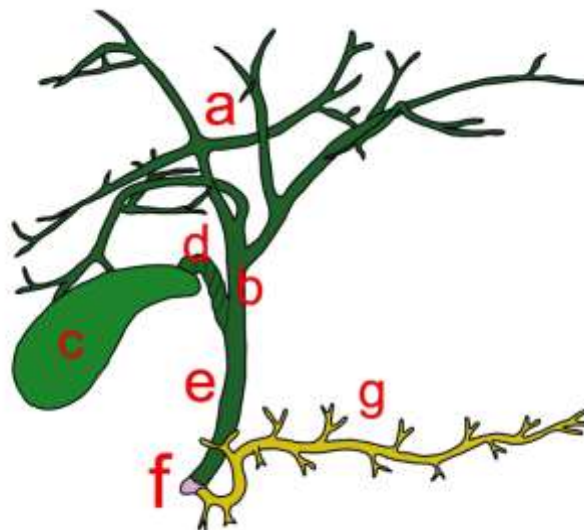


Figure 1. Anatomy of the biliary tract, showing the intrahepatic bile ducts (a), the common hepatic duct (b), the gallbladder (c), the cystic duct (d), the common bile duct (e), the ampulla of Vater (f), and the main pancreatic duct (g).

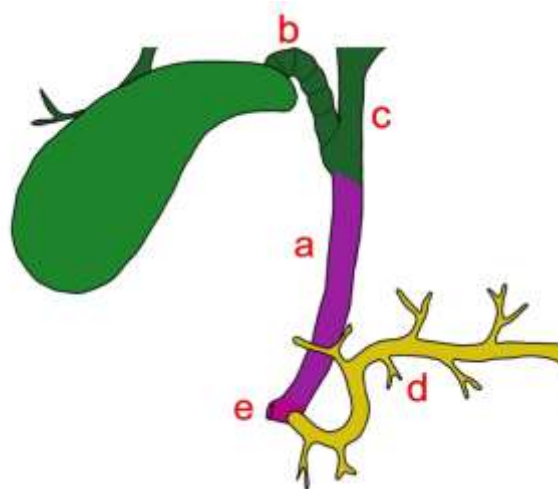


Figure 2. The common bile duct (a) is shown, formed by the union of the cystic duct (b) and the common hepatic duct (c). The junction of the common bile duct with the main pancreatic duct (d), forming the ampulla of Vater (e), is also observed.

JUSTIFICATION

Reviews of choledocholithiasis often focus on describing diagnostic criteria and therapeutic alternatives; however, in the daily practice of a hospital setting, the main gap is

operational: how to translate evidence into a reproducible care pathway that avoids delays, redundant tests, and readmissions. In secondary and tertiary care hospitals (e.g., Clínica Hospital Mérida of ISSSTE, Yucatán, Mexico),

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choledocholithiasis is a frequent cause of emergency consultation and hospitalization, and its management affects hospital stay, antibiotic use, availability of endoscopy suites, access to advanced imaging (EUS/MRCP), and surgical scheduling. The absence of a standardized clinical pathway favors variability (repeated laboratory and imaging requests, avoidable diagnostic ERCP, or delayed biliary drainage), with a direct impact on costs and patient safety. (6, 9-20)

The problem is significant: in scenarios of cholangitis or biliary pancreatitis with persistent obstruction, delayed biliary drainage is associated with worse outcomes, longer hospital stay, and increased consumption of critical resources. Evidence particularly supports urgent ERCP (ideally within the first 24 hours) in moderate to severe cholangitis and emphasizes that severity and organ dysfunction should guide prioritization of the procedure. (9-13, 21-23)

Complementarily, performing early cholecystectomy after endoscopic resolution (preferably during the same admission) reduces recurrent biliary events and readmissions, an outcome highly relevant for any hospital facing bed pressure. (14-20)

However, implementation requires recognition of local limitations in the performance of predictive criteria. Several studies show that high-risk criteria may overestimate the actual probability of choledocholithiasis in some cohorts, and that the performance of ASGE/ESGE/SAGES criteria varies between hospitals and populations; in Mexico, it has been documented that the utility of predictors depends on referral patterns and access to confirmatory studies. (24-28)

Therefore, rather than rigidly applying an algorithm, each institution should understand its own performance (negative ERCP rate, waiting times for MRCP/EUS) and adjust operational thresholds with periodic auditing.

In this context, the practical objective of this manuscript is to offer a critical comparison of the literature used and guide its application in a real hospital environment:

1. Standardize risk stratification,
2. Prioritize the use of EUS/MRCP/IOC according to availability and costs,
3. Prioritize biliary drainage in complicated cases, and
4. Promote early cholecystectomy to reduce recurrence and readmissions. (6, 9-20)

For implementation, it is suggested that each institution explicitly define its resources and target times (e.g., availability of ERCP 24/7 vs scheduled, access to EUS, MRCP scheduling, capacity for intraoperative cholangiography and laparoscopic bile duct exploration) and use this review as the basis for constructing an institutional clinical pathway with auditable indicators: time to biliary drainage in cholangitis, rate of unnecessary ERCP, proportion of same-admission cholecystectomy, and readmissions due to biliary events. (9-20)

EPIDEMIOLOGY

The worldwide incidence of choledocholithiasis in patients with cholelithiasis ranges between 10% and 20%. (6-8)

Recent Mexican clinical literature commonly estimates that choledocholithiasis occurs in 10–20% of patients with cholelithiasis, in 7–14% of those undergoing cholecystectomy, and in 18–33% of cases of acute biliary pancreatitis. (29)

Choledocholithiasis shares and amplifies risk factors associated with cholelithiasis. Risk increases with age (>55 years) and with the presence of gallbladder stones, particularly when stones are multiple and/or small, as these migrate more easily into the common bile duct. (30-32)

The anatomy and dynamics of the bile duct also play a role: dilation of the common bile duct (≥ 10 mm), unfavorable morphology or angulation, the presence of a perampullary diverticulum, and functional alterations (stenosis, papillary dysfunction) are all associated with the presence and recurrence of stones after endoscopic extraction. (33-37)

Metabolic factors also contribute to stone formation: obesity, metabolic syndrome, insulin resistance, and dyslipidemia favor stone formation and their presentation within the biliary tract. In addition, bacterial colonization of the biliary tree and previous sphincterotomy predispose to pigment stones and recurrence. (31, 35, 38-40)

Finally, certain management-related factors and characteristics of the index episode—such as leaving the gallbladder in situ after endoscopic stone extraction and the presence of multiple stones in the common bile duct—are associated with increased recurrence. In clinical prediction, total bilirubin >4 mg/dL and elevated alkaline phosphatase are useful markers prior to cholecystectomy or ERCP. (35, 37, 41)

CLINICAL PRESENTATION

Choledocholithiasis may present with a wide spectrum of clinical manifestations, ranging from asymptomatic disease to severe manifestations. The most common symptom is abdominal pain in the right upper quadrant, which may be intermittent or persistent and is frequently accompanied by nausea and vomiting. In some cases, the pain may radiate to the right shoulder or supraclavicular region. Jaundice is common when significant biliary obstruction is present and may be associated with choloria and acholia. (42)

In the context of acute choledocholithiasis, a significant proportion of patients may present with marked elevations of transaminases (ALT and AST), reaching values greater than 500 IU/L in approximately one-third of cases and even exceeding 1000 IU/L in nearly 8% of patients. This pattern may mimic hepatocellular injury rather than a purely cholestatic pattern. Therefore, elevated transaminases do not exclude choledocholithiasis and should be considered in the differential diagnosis of acute liver disease. (43)

Other clinical findings include fever and signs of sepsis in cases complicated by cholangitis, as well as pruritus in

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prolonged biliary obstruction. Physical examination may reveal jaundice and tenderness on palpation of the right upper quadrant, although the absence of physical findings does not exclude the disease. In addition to abnormalities in liver enzymes, leukocytosis and elevation of direct bilirubin may be observed. (42)

DIAGNOSIS.

The diagnosis of choledocholithiasis is based on a combination of clinical, biochemical, and imaging criteria,

with risk stratification according to international guidelines such as those from the American Society for Gastrointestinal Endoscopy (ASGE) (Table 1) and the World Society of Emergency Surgery (WSES). (6, 24, 44)

Diagnostic criteria are not absolute; rather, they allow classification of patients into high, intermediate, or low risk of common bile duct stones, guiding the need for additional studies or interventions. (6)

Risk	Predictors	Management
High risk	Predictors • Direct visualization of stones in the common bile duct by ultrasound, CT, MRCP, or endoscopic ultrasound. • Clinical cholangitis (fever, jaundice, right upper quadrant pain, with or without sepsis). • Total bilirubin >4 mg/dL together with common bile duct dilation (>6 mm with gallbladder in situ, >8 mm post-cholecystectomy),	Management • Therapeutic ERCP + cholecystectomy during the same hospitalization (preferred).
Intermediate risk	Predictors • Common bile duct dilation (>6 mm) without other high-risk criteria. • Abnormal liver function tests (alkaline phosphatase, transaminases) without another apparent cause. • Age >55 years.	Management • Perform a non-invasive confirmatory test (EUS or MRCP) or intraoperative cholangiography (IOC). • If choledocholithiasis is confirmed, perform therapeutic ERCP or laparoscopic bile duct exploration. • If choledocholithiasis is not confirmed, manage as a low-risk patient.
Low risk	Predictors • Absence of the above risk factors.	Management • Elective cholecystectomy ± IOC, only in symptomatic cholelithiasis.

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Critical comparison of predictive criteria.

Although the ASGE 2019 stratification is widely used, its performance is not uniform. Prospective and validation studies have shown that “high-risk” criteria correctly identify many patients with stones but may also generate a non-negligible percentage of negative ERCP when applied without confirmation in settings with lower prevalence or different case mixes. (25-27)

Additionally, comparisons between criteria (ASGE/ESGE/SAGES) suggest that differences in biochemical and imaging thresholds translate into different sensitivity–specificity profiles. Therefore, algorithm selection should consider the cost of an unnecessary ERCP versus the clinical cost of delaying biliary drainage. (24)

In Mexican series, the performance of predictive criteria has been evaluated in public hospitals and referral centers, showing variability in diagnostic accuracy. This reinforces the need for each institution to understand its local negative ERCP rate and the actual availability of EUS/MRCP/IOC.

From a practical perspective, when a hospital lacks EUS and access to MRCP is limited, intraoperative cholangiography or intraoperative ultrasound during cholecystectomy may function as confirmation strategies in intermediate-risk patients, reducing unnecessary ERCP without postponing surgical resolution. (6, 28-29)

Role of imaging in diagnosis.

The presence of a stone in the common bile duct on imaging studies is the strongest individual predictor of choledocholithiasis. The combination of bilirubin >4 mg/dL

and dilation of the common bile duct also has high specificity. In patients with acute cholecystitis, significant elevation of ALT (>3 times the upper limit), elevated alkaline phosphatase, and a common bile duct >6 mm increase the probability of choledocholithiasis. (6, 24-27, 44)

According to the 2019 ASGE guidelines, the two advanced imaging modalities recommended for patients with intermediate probability of choledocholithiasis—EUS (endoscopic ultrasound) and MRCP (magnetic resonance cholangiopancreatography)—demonstrate high diagnostic performance but with important differences.

EUS shows the highest overall sensitivity, with approximately 97% sensitivity and near 90% specificity, making it the most effective technique for detecting small stones and microlithiasis in the common bile duct.

MRCP offers a lower sensitivity, around 87%, although it maintains high specificity of approximately 92%. This means that MRCP is highly effective at confirming the absence of stones when negative but may miss small stones that could be detected by EUS. (6)

For dilation of the common bile duct (>6 mm), biliary ultrasound in one study reported a sensitivity of 87.9% and a specificity of 22.9% (Figure 3). Regarding visualization of “stones in the common bile duct” on ultrasound, one study reported sensitivity of 25% and specificity of 88.5% for this particular finding (Figures 4-5). For the combination of “TB >4 mg/dL and CBD dilation,” one study reported sensitivity of 59.4% and specificity of 58.3%. (28)

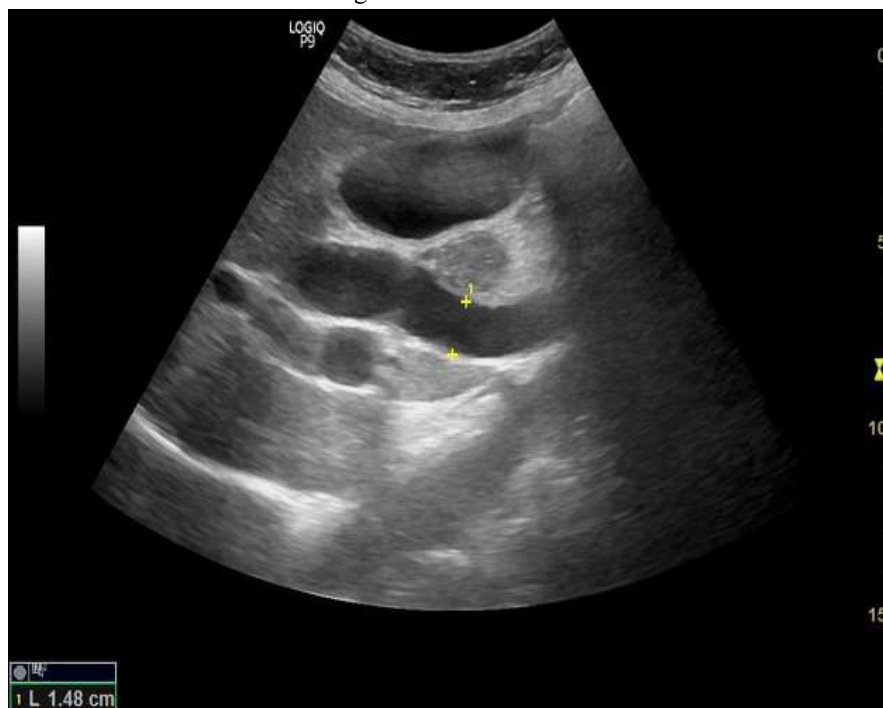


Figure 3. Abdominal ultrasound in axial sections with a convex transducer in grayscale demonstrates dilation of the common bile duct up to 14 mm.



Figure 4. Abdominal ultrasound in axial sections with a convex transducer in grayscale shows gallstones within the body of the gallbladder as well as in the distal portion of the common bile duct.



Figure 5. Abdominal ultrasound in axial sections with a convex transducer in grayscale; in the distal portion of the common bile duct, an impacted stone measuring 13 × 22 mm is observed in anteroposterior and transverse axes, with posterior acoustic attenuation and ectasia of the proximal common bile duct.

Primary choledocholithiasis is defined as the formation of stones within the main bile duct that occur *de novo*, meaning they are not remnants of stones that migrated from the gallbladder prior to cholecystectomy. It is considered primary when there is a symptom-free interval of at least two years after cholecystectomy before the appearance of stones in the common bile duct, together with characteristics such as soft stones, light-brown color or biliary sludge, and absence of a long cystic duct remnant or postoperative biliary stenosis. (45)

Secondary choledocholithiasis refers to the presence of gallstones in the common bile duct that originate in the gallbladder and migrate into the main bile duct. That is, stones initially form in the gallbladder and subsequently pass into

the common bile duct, unlike primary choledocholithiasis, in which stones form directly in the bile duct due to local factors such as biliary stasis or infection. This distinction is relevant because the etiology, recurrence risk, and therapeutic approach may vary depending on the origin of the stones. Secondary choledocholithiasis is the most common form in clinical practice, particularly in patients with concomitant cholelithiasis. (46-47)

Continuing with the diagnostic classification, choledocholithiasis may be categorized as “complicated” or “uncomplicated.” Complicated choledocholithiasis is defined as the presence of common bile duct stones associated with acute clinical complications, mainly acute pancreatitis or cholangitis during the episode of choledocholithiasis. (48)

TREATMENT

According to the 2019 ASGE guidelines, patients with low risk of cholelithiasis should not undergo routine diagnostic endoscopic studies. In this group, the recommended approach is elective laparoscopic cholecystectomy, with the option of intraoperative cholangiography (IOC) or intraoperative ultrasound depending on availability, comorbidities, and anatomical complexity. ERCP should be reserved only for cases in which biliary stones are documented during surgery or in the early postoperative period. (6)

In patients with intermediate risk, the ASGE recommends confirming the diagnosis before indicating therapeutic ERCP, using one of the following strategies according to local resources: endoscopic ultrasound (EUS), magnetic resonance cholangiopancreatography (MRCP), laparoscopic intraoperative cholangiography, or intraoperative ultrasound. These techniques allow more precise selection of candidates for ERCP, reducing unnecessary procedures and their complications. Once cholelithiasis is confirmed, the standard treatment is ERCP with sphincterotomy and stone extraction, followed by cholecystectomy during the same hospital admission when possible. (6)

Patients classified as high risk should be referred directly for therapeutic ERCP for biliary decompression, since the probability of stones is >50% and the risk of delaying treatment exceeds that of an unnecessary endoscopic procedure. In this context, ERCP is considered the first-line therapy to achieve biliary decompression (sphincterotomy, stone extraction, placement of stents if necessary), followed by early laparoscopic cholecystectomy to prevent recurrence, adjusting the urgency of the procedure according to the presence of cholangitis or hemodynamic instability. (6)

In patients with cholelithiasis associated with acute cholangitis, ERCP should be performed urgently, ideally within the first 24 hours from diagnosis or hospital admission, as this strategy is associated with a significant reduction in hospital mortality and shorter hospital stay, particularly in cases of moderate or severe cholangitis. (9-12)

Evidence supports that the benefit of urgent ERCP is more evident in patients with moderate to severe cholangitis, whereas in mild cases the impact on mortality is less pronounced. (10-11)

In the context of acute biliary pancreatitis with cholelithiasis and concomitant cholangitis, the recommendation is also to perform ERCP within the first 24 hours, since delayed biliary decompression is associated with worse clinical outcomes. (6, 9, 12-13)

However, recent studies suggest that performing ERCP excessively early (for example, within the first 18 hours from symptom onset) may increase the risk of procedure-related complications such as aspiration pneumonia and post-ERCP hypotension; therefore, optimization of resuscitation and stabilization before the intervention is recommended. (13)

In patients with acute biliary pancreatitis without cholangitis, ERCP should not be performed urgently; in these cases, it may be deferred up to 72 hours, as no clinical benefit has been demonstrated with early intervention.

In summary, in cases of cholelithiasis with cholangitis (with or without acute biliary pancreatitis), ERCP should ideally be performed within the first 24 hours after diagnosis, prioritizing clinical stabilization before the procedure and recognizing that the benefit is greater in moderate or severe cholangitis. (6, 9-13, 49)

In the context of cholelithiasis resolved by ERCP, current medical literature supports that cholecystectomy should be performed early, ideally within the first 7 days after ERCP and preferably during the same hospital admission. This recommendation is based on the significant reduction in recurrent biliary events (RBE), operative complications, and total hospital stay, as well as lower conversion rates to open surgery and fewer postoperative complications. (14-18)

The most robust evidence indicates that performing cholecystectomy within the first 72 hours after ERCP offers additional advantages, such as shorter operative time, less tissue inflammation, fewer complications, and lower conversion to open surgery. (17-18)

On the other hand, although some studies show that delayed cholecystectomy (beyond 2 weeks) does not increase perioperative complications, it is associated with a higher rate of readmissions due to biliary events and longer cumulative hospital stay. In patients with cholelithiasis and acute cholecystitis or cholangitis, cholecystectomy during the same admission after ERCP also significantly reduces the incidence of recurrent biliary events. (19-20)

When ERCP does not successfully resolve cholelithiasis, several management options supported by current medical literature exist. The choice depends on the cause of failure, patient anatomy, clinical urgency, and available resources:

1. Repeat ERCP with advanced techniques:

If papillary access is possible but cannulation fails, techniques such as double-guidewire cannulation, transpancreatic sphincterotomy, needle-knife papillotomy, or fistulotomy may be used. If the first attempt fails, a delayed repeat ERCP (interval ERCP) may be successful in up to 76% of cases with a low complication rate. (50)

2. Endoscopic rescue techniques:

When conventional ERCP is unsuccessful, rendezvous procedures guided either by endoscopic ultrasound (EUS-RV) or percutaneous transhepatic access (PTE-RV) may be considered. The technical success rate of EUS-RV and PTE-RV exceeds 80%, although adverse event rates range between 13–19%. EUS also allows direct biliary drainage through placement of transmural stents (choledochoduodenostomy or hepaticogastrostomy), particularly in experienced centers. (50-51)

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3. Temporary biliary stent placement:

In difficult choledocholithiasis, placement of plastic or metal stents may facilitate reduction in the number and size of stones, allowing successful extraction during a subsequent ERCP (2–6 months later). This strategy achieves complete resolution in 65–93% of cases during the second procedure. The use of stents as definitive therapy is recommended only in patients with very limited life expectancy due to the high risk of recurrent cholangitis. (6)

4. Intraductal lithotripsy:

For large, hard, or multiple stones, mechanical, electrohydraulic (EHL), or laser lithotripsy may be used, preferably under direct visualization with a cholangioscope. These techniques have demonstrated higher success rates for the extraction of refractory stones. (6)

5. Surgical intervention:

If endoscopic and percutaneous options fail or are unavailable, surgical exploration of the bile duct (laparoscopic or open) is the definitive treatment. Techniques include transcystic or transductal exploration, with or without T-tube drainage, and in complex cases biliary-enteric anastomosis (e.g., choledochoduodenostomy). Surgery offers high resolution rates and good long-term outcomes, although with higher morbidity in elderly patients or those with multiple prior ERCP attempts. (52-53)

6. Management in altered anatomy:

In patients with Roux-en-Y gastric bypass anatomy, specialized techniques such as balloon-assisted ERCP, laparoscopic transgastric ERCP, or surgical bile duct exploration may be employed. (54)

PROPOSED CLINICAL PATHWAY FOR INTRA-HOSPITAL IMPLEMENTATION (ADAPTABLE TO THE CLÍNICA HOSPITAL MÉRIDA OF ISSSTE).

Based on the summarized guidelines and evidence, an operational pathway is proposed that may be adapted to the resources of the Clínica Hospital Mérida of ISSSTE and standardize decision-making from emergency admission to definitive resolution (Figure 6).

1. Initial evaluation (first contact): directed history, physical examination, complete blood count and liver profile, and biliary ultrasound as the first-line imaging study. Document signs of cholangitis/sepsis and need for resuscitation. (9-13, 21-23, 42)

2. Risk stratification (ASGE 2019): classify patients into low, intermediate, or high risk and determine the next step without diagnostic “shortcuts.” In high-risk patients, ERCP should be therapeutic (not diagnostic) and prioritized according to clinical severity. (6, 25-27)
3. High risk or complicated choledocholithiasis: if moderate to severe cholangitis is present, perform urgent ERCP ideally within <24 h; in biliary pancreatitis with concomitant cholangitis maintain the same goal after hemodynamic stabilization. Avoid excessively early ERCP when resuscitation is incomplete. (9-13)
4. Intermediate risk: confirm with EUS or MRCP depending on availability. If EUS is unavailable and MRCP has significant delays, consider intraoperative cholangiography or intraoperative ultrasound during cholecystectomy, with a defined plan for resolution of choledocholithiasis (postoperative ERCP or laparoscopic bile duct exploration) if stones are confirmed. (6)
5. Low risk: proceed with laparoscopic cholecystectomy with selective IOC depending on findings and available resources, reserving ERCP for stones documented intraoperatively or postoperatively. (6)
6. After bile duct clearance: schedule early cholecystectomy, preferably during the same admission (ideally within 72 h–7 days), to reduce recurrent biliary events and readmissions. (14-20)
7. ERCP failure or altered anatomy: define escalation (repeat ERCP with advanced techniques, EUS-guided or percutaneous rendezvous, temporary stent placement, intraductal lithotripsy, or surgery) based on local expertise and clinical urgency. (50-54)
8. Establish a database for hospital audit indicators: time from cholangitis diagnosis to biliary drainage (operational goal <24 h in moderate/severe cases); proportion of therapeutic vs negative ERCP; proportion of same-admission cholecystectomy after ERCP and ERCP-to-cholecystectomy interval; readmissions for recurrent biliary events at 30–90 days and recurrence of bile duct stones. (9-12, 14-20, 24-28, 55-57)

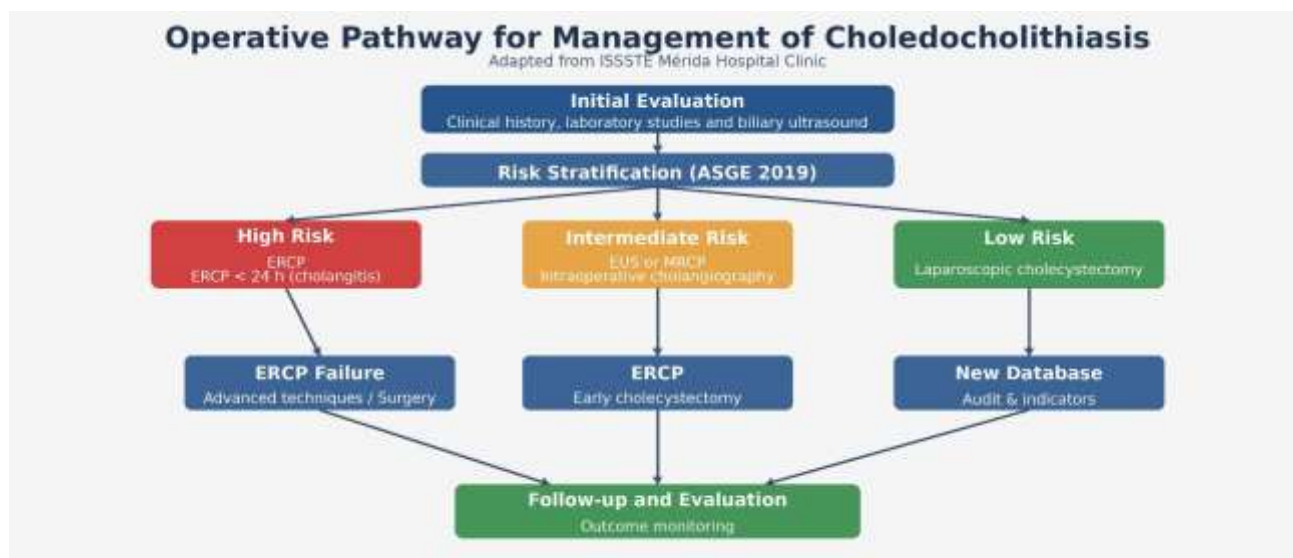


Figure 6. Operational pathway adaptable to the resources of Clínica Hospital Mérida of ISSSTE for the diagnosis and management of choledocholithiasis.

PROGNOSIS

The prognosis of choledocholithiasis largely depends on the presence and severity of acute cholangitis. Although overall mortality usually ranges between 1% and 14%, it may increase to up to 29% in critically ill patients with significant organ dysfunction, high lactate or bilirubin levels, non-lithiasic obstruction, or delayed biliary drainage. Thus, cases with severe sepsis and multiorgan failure have a guarded prognosis, whereas timely drainage and absence of organ dysfunction are associated with low mortality. The recent development of simple prognostic scores reinforces the importance of early severity stratification to optimize outcomes. (21-23)

Choledocholithiasis has a recurrent course, with recurrence rates ranging from 4% to 30% after endoscopic treatment, influenced by anatomical and technical factors. In elderly patients undergoing choledocholithotomy, recurrence was reported at 8.8%, associated with prior cholecystectomy, elevated inflammatory parameters, multiple stones, and larger stone diameter.

Consistently, the literature identifies advanced age, dilation and angulation of the common bile duct, periampullary diverticulum, chronic biliary infection, and certain endoscopic procedures as risk factors, which may increase recurrence up to approximately 30% in older adults with markedly dilated bile ducts. (55-57)

Choledocholithiasis is an important cause of acute biliary pancreatitis and cholangitis, and patients with residual or recurrent stones remain at significant risk for developing either complication, even simultaneously. Although the coexistence of pancreatitis in the setting of cholangitis is associated with a stronger inflammatory response, a recent study showed that it does not significantly modify mortality, ICU requirement, or ERCP success. Instead, factors such as age and cardiovascular dysfunction determine severity. Overall, these findings indicate that prognosis mainly

depends on timely biliary drainage and early control of sepsis and multiorgan failure. (23, 57-58)

From a hospital perspective, prognosis is also influenced by continuity of care: omission of cholecystectomy after endoscopic clearance, failure to identify anatomical risk factors (CBD dilation/angulation, periampullary diverticulum), and lack of directed follow-up increase recurrence and readmissions. (14-20, 35-37, 55-57)

Therefore, in addition to resolution of the index episode, it is reasonable for Mexican hospitals to implement a discharge plan with clear objectives: confirmation of same-admission cholecystectomy when feasible, patient education regarding warning signs, and selective outpatient follow-up (e.g., ultrasound and liver profile in cases with dilated bile duct or recurrent lithiasis).

In patients with significant metabolic factors, addressing obesity/metabolic syndrome and dyslipidemia control may be incorporated into secondary prevention strategies. (31, 38-40, 55-57)

CONCLUSION

Choledocholithiasis is a relevant cause of morbidity due to its association with cholangitis and acute biliary pancreatitis. This article highlights the importance of a diagnostic approach based on risk stratification according to ASGE and WSES guidelines, integrating clinical, biochemical, and imaging data.

Endoscopic ultrasound (EUS) and magnetic resonance cholangiopancreatography (MRCP) stand out as preferred diagnostic methods in patients with intermediate risk, optimizing the indication for ERCP and avoiding unnecessary procedures.

Timely diagnosis and biliary drainage are key determinants of prognosis, reducing complications and mortality.

In management, ERCP with stone extraction followed by early cholecystectomy—preferably during the same hospital

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admission—represents the current standard of care, reducing recurrent biliary events. In cases of therapeutic failure, endoscopic, percutaneous, or surgical techniques remain effective options depending on resource availability and patient anatomy.

Finally, the need for long-term follow-up is emphasized given the recurrence associated with anatomical and metabolic factors, consolidating a comprehensive and evidence-based management approach.

From an institutional perspective, the clinical utility of this literature review lies in translating evidence into measurable and traceable decisions. Adoption of an institutional pathway within ISSSTE (with target timelines, criteria for EUS/MRCP/IOC requests, and endoscopy-surgery coordination) may reduce variability, optimize resources, and improve patient safety, particularly in contexts where ERCP and advanced imaging availability is limited.

ETHICAL CONSIDERATIONS

In accordance with the General Health Law of Mexico, particularly the provisions established in Title Five regarding health research, the present study is classified as research without risk, as it consists of a systematic literature review based exclusively on secondary, public, and previously published sources, without direct or indirect intervention on human subjects and without access to personal data, biological samples, or identifiable information.

Therefore, the study is exempt from the requirement of informed consent and review by a human research ethics committee, without prejudice to adherence to the principles of scientific integrity, responsible information management, and proper citation of sources.

The development of the manuscript is based on the four classical principles of bioethics: autonomy, beneficence, non-maleficence, and justice.

The study also aligns with the principles of the Nuremberg Code and the Declaration of Helsinki, particularly regarding respect for human dignity, the responsibility of the investigator, and the ethical obligation that all scientific production ultimately aims to improve health care.

Finally, this systematic review does not replace the ethical evaluation of the primary studies included but assumes that they were conducted under ethical and regulatory frameworks applicable in their respective contexts.

CONFLICT OF INTEREST

The authors jointly declare that they have no conflicts of interest related to the preparation and content of this scientific article.

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