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Endoscopic management of bile duct stones

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INTRODUCTION

Choledocholithiasis (also referred to as bile duct stones) is the presence of one or more gallstones in the common bile duct. Choledocholithiasis is common in patients with symptomatic gallstone disease. Gallstones may form in the common bile duct in patients with biliary stasis or may form in the gallbladder and then pass into the common bile duct via the cystic duct. In addition, some patients who have undergone cholecystectomy have retained or recurrent stones.

Endoscopic retrograde cholangiopancreatography (ERCP) confirms the diagnosis of choledocholithiasis, and ERCP-guided techniques (eg, endoscopic biliary sphincterotomy followed by stone removal with balloon catheters) are used to clear the common bile duct. This topic will provide an overview of endoscopic techniques for removing bile duct stones.

The clinical manifestations, diagnosis, and management of patients with common bile duct stones, including timing of cholecystectomy and surgical common bile duct exploration, are presented in more detail separately. (See "Choledocholithiasis: Clinical manifestations, diagnosis, and management" and "Surgical common bile duct exploration".)

An overview of ERCP, including pre- and post-procedure care, is presented separately. (See "Overview of endoscopic retrograde cholangiopancreatography (ERCP) in adults".)

PREPROCEDURE EVALUATION

The diagnosis of choledocholithiasis is often suspected based on presenting symptoms (eg, biliary-type abdominal pain, jaundice), complications (eg, cholangitis, pancreatitis), laboratory studies (cholestatic pattern of liver test abnormalities), and imaging (transabdominal ultrasound, computed tomography scan, magnetic resonance cholangiopancreatography). Thus, most patients will have had laboratory studies and imaging, thereby mitigating the need for additional testing before ERCP. Review of the radiographic imaging prior to ERCP will help to define the biliary ductal anatomy. (See "Choledocholithiasis: Clinical manifestations, diagnosis, and management".)

ERCP-GUIDED STONE REMOVAL

Goals — For patients with choledocholithiasis, the goal of endoscopic intervention is complete stone removal during the index procedure. Stone removal is confirmed with cholangiogram and/or passage of a balloon through the duct and ampulla without resistance following sphincterotomy. For patients with incomplete duct clearance, an additional intervention (ie, temporary biliary stent placement) may be needed until a follow-up endoscopic retrograde cholangiopancreatography (ERCP) is performed. (See 'Patients with incomplete duct clearance' below.)

Patient preparation — The preprocedure preparation for patients undergoing ERCP is discussed separately. (See "Overview of endoscopic retrograde cholangiopancreatography (ERCP) in adults", section on 'Patient preparation'.)

Preprocedure and endoscopic strategies to reduce the risk of post-ERCP pancreatitis (eg, administration of rectal nonsteroidal anti-inflammatory drugs [NSAIDS]) are discussed separately. (See "Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis", section on 'Preventive strategies'.)

Accessing the biliary tree with cannulation — Prior to bile duct stone removal, the initial step during ERCP is gaining access to the biliary tree by cannulating the common bile duct. This is typically followed by performing a cholangiogram and creating an adequately sized exit path for the stone by enlarging the ampulla by incising it (ie, sphincterotomy) and/or by dilating it with a balloon [1]. (See "Endoscopic biliary sphincterotomy" and "Endoscopic balloon dilation for removal of bile duct stones".)

For some patients with complicated bile duct stones, cannulation of the bile duct may be technically challenging. As an example, impaction of a stone within the biliary sphincter may limit advancing a sphincterotome or guidewire. For such patients, other techniques such as

access sphincterotomy or needle-knife sphincterotomy may be used to reach the biliary tree. (See 'Patients with complicated stones' below.)

Access sphincterotomy is discussed in more detail separately. (See "Precut (access) papillotomy".)

Patients with uncomplicated stones — Most patients have uncomplicated common bile duct stones (ie, ≤3 stones that are ≤1 cm in size) [1-3]. After gaining access to the biliary tree, removal of uncomplicated bile duct stones is typically achieved with biliary sphincterotomy followed by stone extraction with a balloon or basket catheter [4].

Creating an exit path — For patients with uncomplicated stones, an adequately sized exit path for stone removal is typically accomplished by performing biliary sphincterotomy. The goal of biliary sphincterotomy is to fully transect the biliary sphincter by severing the deep muscle layers of the sphincter of Oddi (figure 1). This maneuver eliminates the principal anatomic barrier impeding stone passage, and thus, it facilitates stone extraction.

The length of the sphincterotomy is tailored to the size of the stone(s), ampulla, and common bile duct.

Adverse events related to ERCP with biliary sphincterotomy include pancreatitis, bleeding, and cholangitis [5,6]. Adverse events and technical aspects of endoscopic biliary sphincterotomy are discussed in more detail separately. (See "Endoscopic biliary sphincterotomy".)

Extracting the stone — Following endoscopic biliary sphincterotomy, some stones will exit the bile duct without further intervention, while other stones will require extraction methods. Commonly used extraction devices include balloon or basket catheters. The devices are available in multiple configurations and sizes, and selecting a device is individualized and guided by stone characteristics, bile duct anatomy, and endoscopist preference:

- **Balloon device** – A balloon device is often used for patients with a nondilated common bile duct and a single, free-floating stone. Balloons may also be used for patients with multiple small stones (≤1 cm) (image 1). We choose a balloon that closely approximates or is larger than the diameter of the duct. Tips for removing a stone using a balloon catheter include:

  - For patients with a single stone, advance the balloon into the bile duct and proximal to the stone. Pull the balloon/stone apparatus distally and through the ampulla to extract the stone.

- For patients with >1 stone, begin by extracting the stone that is closest to the ampulla (ie, most distal stone). Then, proceed proximally in a gradual fashion to avoid stone impaction.

If there is resistance when the stone reaches the ampulla (eg, sphincterotomy is smaller than stone diameter), greater mechanical advantage can be obtained by turning the small wheel of the duodenoscope to the right and pushing the duodenoscope further into the duodenum, which straightens the bile duct axis. If more force is needed, the left hand can be flexed while grasping the endoscope and turning the body toward the right, which forces the endoscope into a straighter position. However, care should be taken to avoid perforation of the opposite duodenal wall by the endoscope (especially if a considerable amount of force is required), since the bend in the endoscope pushes against the duodenal wall during straightening.

Balloon catheters are generally not used for large, untreated stones (ie, stones >1 cm prior to lithotripsy) because the balloon/stone apparatus may become impacted in the distal common bile duct if it cannot be pulled through the sphincterotomy.

- **Basket device** – A basket device is often used for patients with a nondilated common bile duct (ie, diameter ≤10 mm) or with multiple stones (ie, >3 stones). When multiple stones are present, each stone is grasped and removed separately to avoid impaction of the basket in the ampulla.

  The technique for basket-facilitated stone extraction is summarized as follows:

  - Advance the basket device into the common bile duct and proximal to the stone.
  - Grasp the stone with the basket. Avoid tightly closing basket wires against the stone surface.
  - Gently pull the basket/stone apparatus distally and through the ampulla to extract the stone.
  - If there is resistance, apply suction, apply steady traction, and/or perform maneuvers to improve mechanical advantage as discussed above.

  Measures to reduce the risk of impacting the basket/stone apparatus within the bile duct include:

  - Avoid closing the basket tightly against the stone. If wires are imbedded in the stone's surface and the basket/stone apparatus becomes impacted, the stone cannot be easily

removed from the basket. In addition, it may be difficult to regain access to the bile duct to perform additional therapeutic maneuvers such as mechanical lithotripsy. In some cases, surgical intervention may be required to remove the basket/stone apparatus.

- When >1 stone is present, begin by first extracting the most distal stone (ie, the one closest to the ampulla) to avoid a "traffic jam" as the captured stone is pulled to the level of the remaining gallstones.

Endoscopic sphincterotomy and stone extraction are effective for clearing the bile duct in 85 to 90 percent of patients, with an overall rate of adverse events of approximately 5 percent and a mortality rate of less than 1 percent [3,7]. Specific adverse events related to ERCP and biliary sphincterotomy (eg, bleeding, perforation) are discussed separately:

- (See "Overview of endoscopic retrograde cholangiopancreatography (ERCP) in adults", section on 'Complications'.)
- (See "Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis".)
- (See "Endoscopic biliary sphincterotomy", section on 'Complications'.)

Patients with complicated stones — Approximately 10 to 15 percent of bile duct stones have features that are associated with difficult extraction, and removal typically cannot be achieved with the standard approach of biliary sphincterotomy followed by stone extraction with balloon catheters [4]. (See 'Patients with uncomplicated stones' above.)

Risk factors for difficult stone extraction — Patients with complicated stones (also referred to as difficult stones) have one or more factors associated with difficult stone extraction (table 1) [8,9]:

- Stone characteristics – Stone size >1 cm in diameter; stone number >3; stone location is proximal to a biliary stricture, impacted in the bile duct, or intrahepatic
- Anatomic factors – Surgically altered anatomy (eg, Roux-en-Y anatomy), tortuous bile duct

Creating an exit path — For most patients with complicated bile duct stones, creating a successful exit path involves a combination of a limited biliary sphincterotomy and endoscopic papillary balloon dilation, while balloon dilation alone is generally reserved for selected patients (eg, those with surgically altered anatomy, those with ampullary stenosis) [1,10,11]. (See 'Special populations' below and "Endoscopic balloon dilation for removal of bile duct stones".)

For patients with a large common bile duct stone (ie, size >1 cm) (image 2), we typically perform a small or mid-sized biliary sphincterotomy (ie, one-third to one-half of the distance to

the papillary roof) followed by endoscopic papillary balloon dilation, and this approach is supported by society guidelines [12,13].

Data suggest that sphincterotomy combined with balloon dilation is more effective for duct clearance than sphincterotomy alone for large bile duct stones [1,12,14-16]. In a meta-analysis of nine trials including over 1100 patients with large bile duct stones, balloon dilation (maximum balloon size, 15 to 20 mm) combined with sphincterotomy resulted in higher likelihood of complete stone clearance compared with sphincterotomy alone (pooled odds ratio [OR] 2.8, 95% CI 1.4-5.7) [12]. Balloon dilation combined with sphincterotomy was associated with lower likelihood of using mechanical lithotripsy for stone extraction compared with sphincterotomy alone (OR 0.23, 95% CI 0.07-0.72), while there was no significant difference in adverse events between groups.

Technical aspects and adverse events associated with biliary sphincterotomy and endoscopic papillary balloon dilation are discussed in more detail separately. (See "Endoscopic biliary sphincterotomy" and "Endoscopic balloon dilation for removal of bile duct stones".)

Fragmenting the stones — For patients with bile duct stones requiring fragmentation prior to removal, selecting a method of stone fragmentation is individualized and informed by stone characteristics (ie, size, number), bile duct anatomy, equipment availability, and endoscopist preference [3].

As an example, we often use cholangioscopy-guided electrohydraulic or laser lithotripsy for large stones (eg, size >12 mm), for stones associated with distal bile duct stricture, or for impacted stones. Cholangioscopy-guided lithotripsy optimizes stone fragmentation, expedites the procedure, and requires few endoscopic accessories. (See 'Cholangioscopy-assisted lithotripsy' below and "Cholangioscopy and pancreatoscopy".)

Cholangioscopy-assisted lithotripsy — Cholangioscopy is an endoscopic technique that facilitates management of complicated bile duct stones by providing direct access to the common bile duct for interventions such as lithotripsy. We typically use a digital, single-use cholangioscope that is attached to the duodenoscope and controlled by a single endoscopist (ie, SpyGlass DS system) for this indication. The equipment, technical aspects, efficacy, and adverse events associated with cholangioscopy are discussed separately. (See "Cholangioscopy and pancreatoscopy".)

During cholangioscopy, bile duct stones can be fragmented by using a lithotripsy probe:

- Electrohydraulic lithotripsy – Lithotripsy of bile duct stones can be performed using electrohydraulic methods. The technical aspects and efficacy of electrohydraulic lithotripsy

are discussed separately. (See "Electrohydraulic lithotripsy in the treatment of bile and pancreatic duct stones".)

- Laser lithotripsy – Lithotripsy of bile duct stones can be accomplished using laser light. The equipment, technical aspects, and efficacy of laser lithotripsy for bile duct stones is discussed separately. (See "Laser lithotripsy for the treatment of bile duct stones".)

Mechanical lithotripsy — Mechanical lithotripsy is a simple method for facilitating large stone extraction that usually involves using a through-the-scope instrument (ie, one that passes through the duodenoscope) to fragment stones within the bile duct:

- **Equipment and technique** – Mechanical lithotriptors typically have a metal basket that is surrounded by a plastic covering within a metal sheath that can be passed over a wire [17]. After inserting the through-the-scope lithotriptor into the bile duct, the device is opened to capture the stone within the basket. The stone is then fragmented by closing the basket against a metal spiral sheath [1].

  Mechanical lithotripsy can also be performed using an external device that is inserted after the duodenoscope has been removed from the patient (ie, out-of-the-scope device). However, the out-of-the-scope device is only used emergently when a basket containing a large stone becomes impacted in the ampulla.

  To perform mechanical lithotripsy with an out-of-the-scope device, the outer sheath of the basket with the entrapped stone is either cut or disassembled. Then, the basket wire is introduced through the metallic sheath of the lithotriptor. Cranking of the lithotriptor forces the metallic sheath to move forward until it reaches the stone causing tightening, and the resulting pressure fragments the stone.

  The out-of-the-scope lithotriptors require the stone to be at the ampullary level, and their use is contraindicated for more proximal stones (unless they can be dragged to an ampullary location) since ductal rupture can occur. In addition, it is very important that after the bare basket is wound in the handle, a loop inside the stomach be formed with the metallic sheath to permit straightening of the lithotriptor cable upon stone fragmentation. Failure to do this can lead to gastric lacerations. Once the stone is fragmented, the basket is removed and the smaller stones are extracted using standard techniques. A small mucosal laceration at the roof of the papilla or at the papillotomy site may be noted but is of uncertain clinical significance.

- **Efficacy** – The success rate for fragmenting stones followed by ductal clearance with mechanical lithotripsy has ranged from 75 to 90 percent, although up to 30 percent of

patients require more than one endoscopic session to achieve clearance [18-21]. Predictors of unsuccessful mechanical lithotripsy have included stone impaction, stone size >30 mm, and ratio of stone to bile duct diameter size >1 [19,21].

- **Adverse events** – Reported rates of adverse events related to ERCP with mechanical lithotripsy range from 1 to 14 percent and include bleeding, pancreatitis, and cholangitis [20]. Events that are unique to mechanical lithotripsy include basket entrapment or fracture of the basket, traction wire, or lithotriptor handle. In a study including 643 patients with bile duct stones who had mechanical lithotripsy using through-the-scope technique, the rate of adverse events was 3.5 percent [22]. Technical complications such as entrapped baskets are typically managed nonsurgically by extending the sphincterotomy or using other lithotripsy methods (eg, cholangioscopy-assisted lithotripsy). (See 'Cholangioscopy-assisted lithotripsy' above.)

Extracting the stone fragments — Following lithotripsy, the stone fragments are removed from the bile duct by grasping them with a basket and pulling the basket through the ampulla and into the duodenum. (See 'Extracting the stone' above.)

Patients with incomplete duct clearance — For most patients with bile duct stones, clearance of the bile duct is achieved by removing the stones during the index ERCP [7]. However, when complete stone removal is not achieved, establishing drainage by placing a temporary biliary stent is a reasonable option [17]. A biliary stent facilitates drainage and prevents cholangitis until the follow-up ERCP is performed. (See 'Goals' above.)

For patients with incomplete stone removal, a temporary biliary plastic stent (eg, stent size, 10 French) is placed during ERCP. After approximately 6 to 12 weeks, the ERCP is repeated to achieve stone clearance, and advanced techniques such as cholangioscopy or sphincteroplasty may be required. (See 'Cholangioscopy-assisted lithotripsy' above.)

Postprocedure care — For most patients with an intact gallbladder and common bile duct stones who initially undergo ERCP, endoscopic stone removal is followed by elective cholecystectomy to reduce the risk of recurrent gallstone disease. The natural history of gallstone disease and the general management of patients with gallstones, including nonsurgical approaches, are discussed separately:

- (See "Choledocholithiasis: Clinical manifestations, diagnosis, and management".)
- (See "Approach to the management of gallstones".)
- (See "Overview of gallstone disease in adults".)
- (See "Overview of nonsurgical management of gallbladder stones".)

For patients who develop recurrent symptoms of choledocholithiasis (ie, right upper quadrant pain, nausea, vomiting) following ERCP-guided stone removal, we initiate evaluation with liver biochemical tests and imaging (transabdominal ultrasound or magnetic resonance cholangiogram). The diagnosis of recurrent choledocholithiasis is discussed in more detail separately. (See "Choledocholithiasis: Clinical manifestations, diagnosis, and management", section on 'Initial diagnostic evaluation'.)

SPECIAL POPULATIONS

Patients with increased bleeding risk — Patients with disorders of hemostasis (eg, patients with cirrhosis) who develop bile duct stones may be at greater risk for bleeding related to endoscopic intervention [23]. For such patients, we typically perform a small (eg, 5 mm) sphincterotomy followed by balloon dilation to create an exit path while minimizing the risk of bleeding. In a meta-analysis of 15 studies including over 6500 patients who had interventional endoscopic retrograde cholangiopancreatography (ERCP), cirrhosis was associated with higher risk of bleeding compared with no cirrhosis (odds ratio [OR] 2.05, 95% CI 1.62-2.58) [23]. (See "Gastrointestinal endoscopy in patients with disorders of hemostasis".)

Patients with anatomic variations — For patients with altered anatomy, accessing the biliary tree may be challenging and options for stone removal may be limited:

- Surgically altered anatomy – For patients with surgically altered anatomy (eg, Roux-en-Y anatomy), methods for stone removal are limited to balloon or basket removal if the procedure is performed with an enteroscope rather than a duodenoscope. Mechanical lithotriptors cannot be used due to the length of the enteroscope. The approach to performing ERCP in patients with surgically altered anatomy is discussed separately. (See "ERCP in patients with Roux-en-Y anatomy" and "Endoscopic retrograde cholangiopancreatography (ERCP) after Billroth II reconstruction".)

- Periampullary diverticulum – For patients with periampullary diverticulum, stone extraction can be accomplished using any method (balloon or basket device, lithotripsy) after an exit path is created via biliary sphincterotomy and/or balloon dilation. However, biliary sphincterotomy may be challenging in such patients because the length and direction of the incision may be difficult to assess, and these issues are presented separately. (See "Endoscopic biliary sphincterotomy", section on 'Modifications for anatomic variations'.)

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Biliary infection and obstruction".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Gallstones (The Basics)" and "Patient education: Choosing surgery to treat gallstones (The Basics)")
- Beyond the Basics topics (see "Patient education: Gallstones (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- **Background** – Choledocholithiasis (also referred to as bile duct stones) is the presence of one or more gallstones in the common bile duct. Endoscopic retrograde cholangiopancreatography (ERCP) confirms the diagnosis of choledocholithiasis, and ERCP-guided techniques (eg, endoscopic biliary sphincterotomy followed by stone removal with basket or balloon catheters) are typically used to clear the common bile duct. (See 'Introduction' above.)
- **Preprocedure evaluation** – Most patients with bile duct stones typically have laboratory studies (liver biochemical tests) and imaging (eg, transabdominal ultrasound, magnetic resonance cholangiopancreatography) when the diagnosis of choledocholithiasis is

suspected. Thus, additional testing before ERCP is typically not needed. (See 'Preprocedure evaluation' above and "Choledocholithiasis: Clinical manifestations, diagnosis, and management".)

- **Goal of endoscopic intervention** – For patients with bile duct stones, the goal of endoscopic intervention is complete stone removal during the index procedure by eliminating the biliary sphincter (ie, the principal anatomic barrier impeding stone passage) and facilitating stone extraction (figure 1).

- **Patients with uncomplicated stones** – Most patients have uncomplicated bile duct stones (ie, ≤3 stones that are <1 cm in size). After gaining access to the biliary tree, removal of bile duct stones is typically achieved with biliary sphincterotomy followed by stone extraction with balloon or basket catheters (figure 1). (See 'Patients with uncomplicated stones' above.)

- **Patients with complicated stones** – For most patients with complicated bile duct stones (table 1), creating a successful exit path involves a combination of a limited biliary sphincterotomy and endoscopic papillary balloon dilation. For stones requiring fragmentation, selecting a method of lithotripsy is individualized and informed by stone characteristics (eg, size, number), bile duct anatomy, equipment availability, and endoscopist preference. (See 'Patients with complicated stones' above.)

  Lithotripsy methods include cholangioscopy-guided lithotripsy (ie, electrohydraulic or laser) and mechanical lithotripsy. Cholangioscopy facilitates stone removal by providing direct visualization and access to the bile duct. (See 'Fragmenting the stones' above and "Cholangioscopy and pancreatoscopy".)

- **Postprocedure care** – For most patients with an intact gallbladder and common bile duct stones who initially undergo ERCP, endoscopic stone removal is followed by elective cholecystectomy to reduce the risk of recurrent gallstone disease. The timing of cholecystectomy and the natural history of gallstone disease are discussed separately:

  - (See "Choledocholithiasis: Clinical manifestations, diagnosis, and management".)
  - (See "Approach to the management of gallstones".)
  - (See "Overview of gallstone disease in adults".)

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GRAPHICS

Sphincter of Oddi in relation to the ampulla of Vater

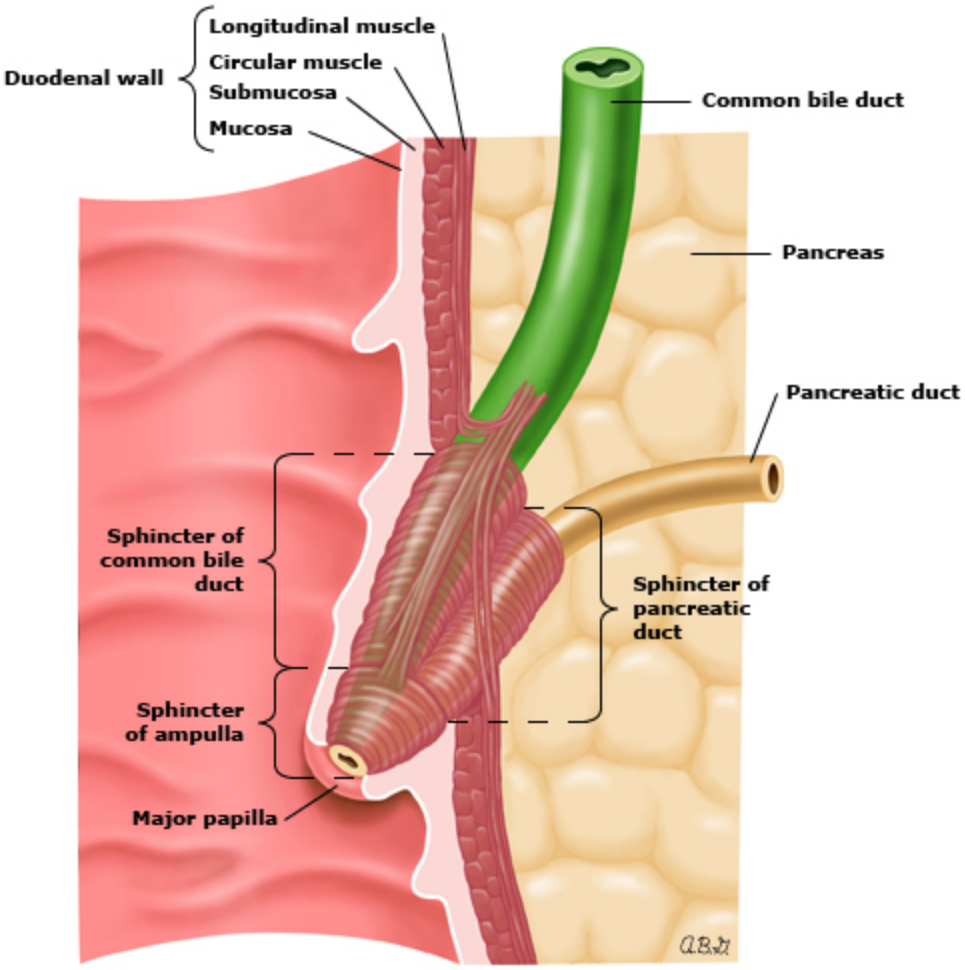
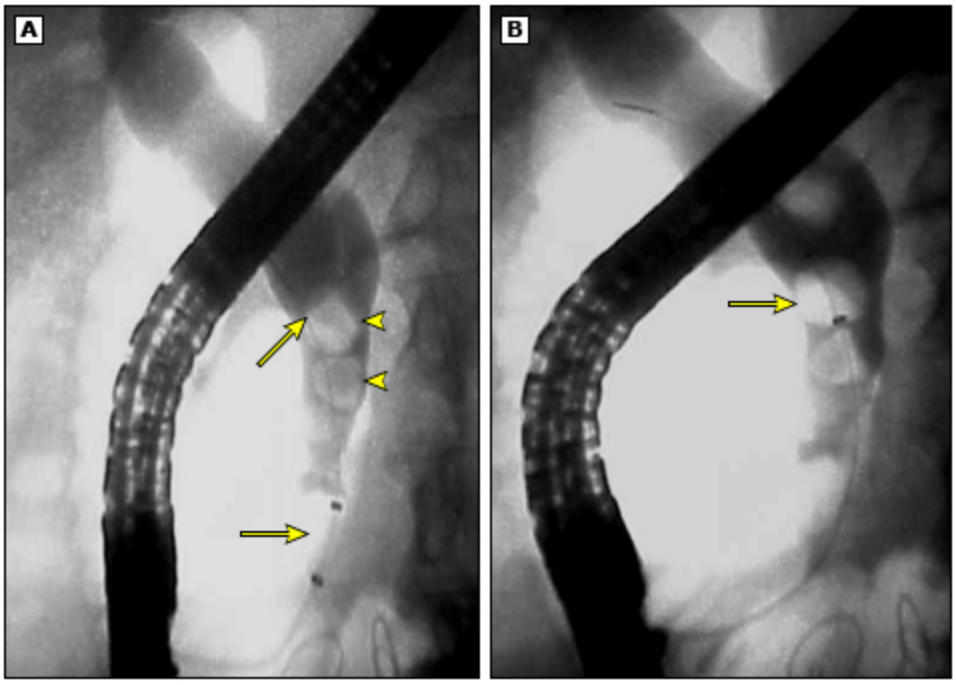


Diagram of the anatomy of the sphincter of Oddi and ampulla of Vater. The muscle fibers of the sphincter of Oddi surround the intraduodenal segment of the common bile duct and the ampulla of Vater. A circular aggregate of muscle fibers, known as the sphincter choledochus (or sphincter of Boyden), keeps resistance to bile flow high and thereby permits filling of the gallbladder during fasting and prevents retrograde reflux of duodenal contents into the biliary tree. A separate structure, called the sphincter pancreaticus, encircles the distal pancreatic duct. The muscle fibers of the sphincter pancreaticus are interlocked with those of the sphincter choledochus in a figure-of-eight pattern.

Graphic 78786 Version 4.0

Balloon extraction of common bile duct stones



Left panel shows a balloon catheter being threaded over a guidewire within the common bile duct (arrows). At least two gallstones are visible in the distal common bile duct (arrowheads), which is dilated. In the right panel, the balloon has been inflated above a gallstone (arrow), which permits the balloon to drag the gallstone out of the duct.

Courtesy of Isaac Raijman, MD.

Graphic 60642 Version 4.0

Factors associated with difficult bile duct stone extraction during ERCP

Stone characteristics
▪ Large size (>1 cm)
▪ Multiple stones (>3 stones)
▪ Location: Proximal to biliary stricture, impacted in bile duct, or intrahepatic
Anatomic factors*
▪ Surgically altered anatomy (eg, Roux-en-Y anatomy)
▪ Tortuous bile duct

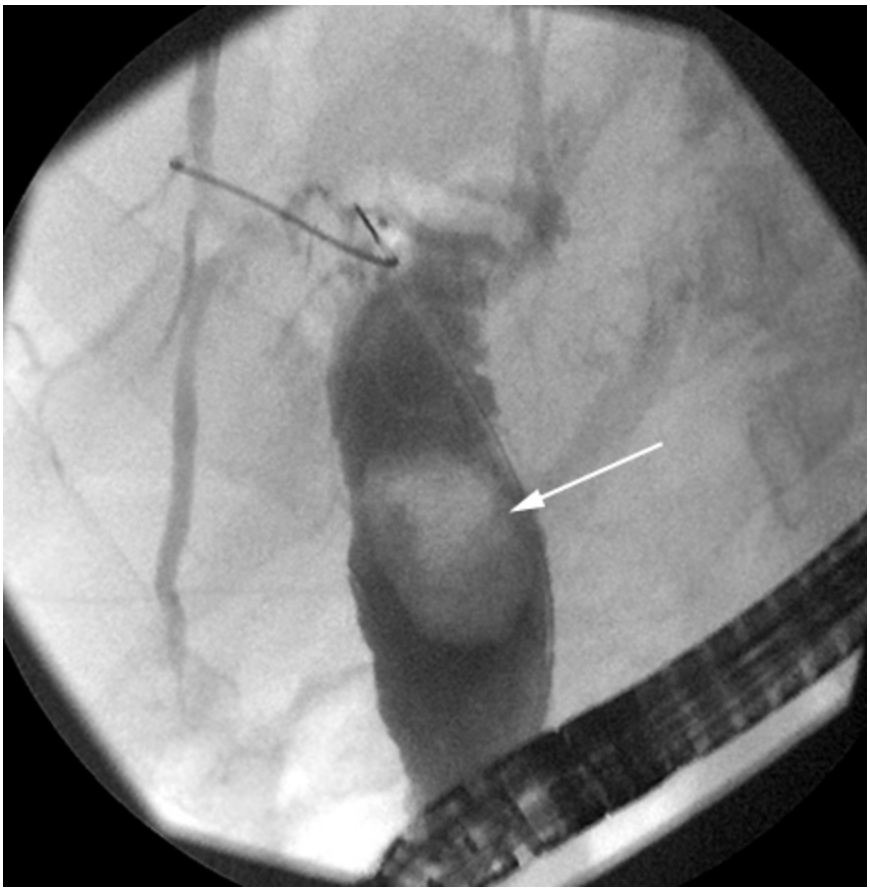
Refer to UpToDate content on endoscopic management of bile duct stones for more detail.

ERCP: endoscopic retrograde cholangiopancreatography.

* Anatomic factors associated with difficult stone extraction may be the result of one or more technical difficulties (ie, reaching the ampulla endoscopically, difficulty cannulating the biliary tree, and/or performing sphincterotomy). Refer to UpToDate content on ERCP in patients with altered anatomy.

Graphic 138304 Version 1.0

Common bile duct stone on endoscopic retrograde cholangiopancreatography (ERCP)



Cholangiogram showing large (2 cm) common bile duct stone (arrow).

Courtesy of Martin L. Freeman, MD.

Graphic 59987 Version 5.0

Contributor Disclosures

Douglas G Adler, MD, FACG, AGAF, FASGE Consultant/Advisory Boards: Abbvie [Endoscopy]; Boston Scientific [Endoscopy]; Endorotor [Endoscopy]; Merit [Endoscopy]; Olympus [Endoscopy]. Speaker's Bureau: Abbvie [Pancreatology, general GI]. All of the relevant financial relationships listed have been mitigated. **J Thomas Lamont, MD** Equity Ownership/Stock Options: Allurion [Weight loss]. Consultant/Advisory Boards: Teledoc [Gastrointestinal diseases]. All of the relevant financial relationships listed have been mitigated. **Kristen M Robson, MD, MBA, FACG** No relevant financial relationship(s) with ineligible companies to disclose.

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