

Technical Aspects of Bile Duct Evaluation and Exploration

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KEYWORDS

• Common bile duct exploration • Laparoscopic • Open • Cholangiogram • ERCP

KEY POINTS

- Choledocholithiasis is a common manifestation of biliary disease.
- Intraoperative cholangiography can be performed in a variety of ways.
- Common bile duct exploration can be safely performed but necessitates an advanced level of surgical experience to limit complications and improve success.
- An appropriate algorithm based on available resources and the physician skill set is vital for safe and effective management of choledocholithiasis.
- Endoscopic retrograde cholangiopancreatography requires the availability of an advanced endoscopist as well as significant equipment and resources.
- Current training of young surgeons is limited for open biliary procedures and common bile duct explorations. Educational guidelines are necessary to reduce this educational gap.

INTRODUCTION

More than 20 million Americans have some form of gallstone disease. Of these, 5% to 20% present with common bile duct (CBD) stones, with the elderly at greatest risk.¹⁻³ The presence of CBD stones can lead to a range of upstream and downstream effects throughout the biliary tract including obstructive jaundice, cholecystitis, cholangitis, and pancreatitis. The spectrum of morbidity from these diseases varies greatly, ranging from asymptomatic choledocholithiasis to critically ill cholangitis. Prompt identification and treatment are necessary to reduce the severity of illness caused by bile duct stones and subsequent biliary obstruction and ascending infection.

Managing choledocholithiasis can be challenging from an organizational standpoint. Method and timing of cholangiography, timing of operative intervention, potential need for bile duct exploration, and cooperation between surgery and gastroenterology all present challenges to the management of patients with choledocholithiasis.

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Often-overlooked critical aspects of bile duct stone management are resource use as well as availability of a skilled endoscopist. A separate endoscopy team with at least 1 or 2 nurses/technicians is typically necessary for endoscopic retrograde cholangiopancreatography (ERCP), whether it be performed before, during, or after surgery. Specialized equipment is necessary for successful diagnostic and therapeutic endoscopic cholangiography. The experience of the endoscopist also affects the timing of cholangiography, because the clinician's skill set may dictate whether preoperative or postoperative cholangiography is warranted.

The skill level of the surgeon is another critical aspect affecting bile duct stone management. Although most surgeons complete residency with excellent training in laparoscopic cholecystectomy, most are inadequately trained for laparoscopic or open bile duct exploration. In addition, open cholecystectomies are also rarely performed in residency, with most chief residents having performed only 10 open cholecystectomies.⁴

PREOPERATIVE CHOLANGIOGRAPHY

Indications

There are a variety of scenarios in which preoperative cholangiography may be warranted. Such entities may overlap and include cholangitis, biliary pancreatitis, persistent jaundice, uncomplicated choledocholithiasis, benign stricture, and periampullary neoplasm. Of these, ascending cholangitis represents the most severe disease and warrants urgent biliary decompression, preferably by endoscopic means. However, if ERCP is not possible, percutaneous or open biliary decompression is indicated. Mild gallstone pancreatitis can typically be initially observed with trending of pancreatic enzymes; however, severe biliary pancreatitis with ductal disruption is another indication for urgent ERCP. Although variable, liver function tests can aid in diagnosing common duct disorders, but specific patterns and levels are debatable.⁵⁻⁷

The use of preoperative cholangiography may depend on the resources available in a particular health care setting. The absence of a skilled interventional endoscopist means that the surgeon is of the utmost importance in bile duct stone management. Not having the luxury of a skilled therapeutic endoscopist may encourage attempts at preoperative cholangiography. The finding of a bile duct stone may alter a surgeon's operative approach and provide for better preoperative counseling to the patient. Such a circumstance is preferable to finding a bile duct stone during surgery and deferring to a postoperative ERCP, only to have it fail. In addition, for patients presenting with biliary pancreatitis or choledocholithiasis who are unable to undergo cholecystectomy, dedicated ERCP for biliary sphincterotomy may be a viable option.

Magnetic Resonance Cholangiopancreatography Versus ERCP

With regard to the method of preoperative cholangiography, 2 common entities exist: magnetic resonance cholangiopancreatography (MRCP) and ERCP. Both are useful adjuncts in the diagnosis of biliary stone disease, and they each have appropriate indications. Although MRCP can provide anatomic detail of the biliary tract, it is only a diagnostic tool and, as such, cannot provide any direct therapeutic benefit.

ERCP is indicated when therapeutic interventions are needed, such as in acute cholangitis, biliary pancreatitis with ductal obstruction, and uncomplicated choledocholithiasis. However, ERCP should not be performed until a surgical plan is in place. This delay allows more efficient use of hospital resources, decreased hospital length of stay, and greater clarity for the patient as well as surgical/medical care providers. Often overlooked by nonendoscopists, ERCP uses significant resources and

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