Laparoscopic cholecystectomy was quickly accepted after its introduction in 1987 as the treatment of choice for cholelithiasis. Cholangiography during laparoscopic cholecystectomy was first performed in 1989; shortly thereafter, several successful laparoscopic common bile duct explorations (LCBDE) for common bile duct stones were reported. Over the years, the technique and instrumentation for LCBDE have evolved and the safety and efficacy of the procedure have been proven and well documented. Several studies, both retrospective reports and prospective randomized trials, have shown the advantage of the single-stage laparoscopic approach (laparoscopic cholecystectomy and LCBDE) over the two-stage approach [laparoscopic cholecystectomy and pre- or postoperative endoscopic retrograde cholangiography (ERC) and ductal clearance]. The single-stage approach offers patients a single, less costly procedure for their biliary calculi and a shorter hospital stay. The duct clearance rate for LCBDE and ERC and stone removal does depend on the skills of the surgeon and of the endoscopist, but the reported success rate is similar. However, the single-stage laparoscopic approach leaves the sphincter mechanism intact and carries lower overall morbidity and mortality. Choledocholithiasis is present in about 8% to 15% of patients with cholelithiasis. The presence of choledocholithiasis increases the morbidity and mortality of biliary surgery about fourfold. Therefore, evaluation and treatment of common bile duct (CBD) stones is essential in the management of patients with gallstone disease. The preoperative diagnosis of choledocholithiasis is imprecise unless invasive methods such as ERC are employed. However, subjecting all patients with suspected choledocholithiasis to a preoperative ERC would lead to unnecessary intervention in more than 50% of patients and still miss about 5% of patients with choledocholithiasis who were asymptomatic and not suspected to have CBD stones at the time of surgery. Routine intraoperative cholangiography detects suspected and unsuspected choledocholithiasis, is quick and simple, and has not been required to cause morbidity. Other arguments for routine intraoperative cholangiography are training of residents and detection of bile duct injury. Additionally, by performing intraoperative cholangiography on a routine basis, the surgeon and staff acquire experience in accessing the duct and using fluoroscopy. If CBD stones are identified in about 10% of cases, the average general surgeon (doing 50–75 cholecystectomies a year) will see 5 to 7 cases of CBD stones a year. Therefore, a routine intraoperative cholangiogram is an important practice for the surgeon who plans to perform laparoscopic transcystic CBDE because many of the maneuvers are the same for both.

Three approaches have evolved for LCBDE: laparoscopic transycistic-CBDE, laparoscopic choledochotomy, and laparoscopic antegrade sphincterotomy. Each approach has its specific indications, but in many instances the surgeon has a choice. The transcystic-CBDE is the first choice of most laparoscopic surgeons when faced with choledocholithiasis that seem feasible for the transcystic approach (see indications). It requires no cutting and suturing of the CBD (with the theoretical risk of stricture formation), biliary drainage is rarely required, and patient satisfaction is high. Transcystic-CBDE is associated with lower morbidity and mortality than laparoscopic choledochotomy as well as quicker recovery. The laparoscopic antegrade sphincterotomy has not been widely used, because it requires a side-viewing gastroscope in the room and an additional surgeon or gastroenterologist.

This chapter focuses on the laparoscopic, transcystic choledochoscopic approach for CBD exploration.
Indications and Contraindications

When an intraoperative cholangiogram shows a common bile stone(s), the surgeon must evaluate which therapeutic alternative is best for the patient (Fig. 21.1). If the tools for LCBDE are not available or the surgeon is not skilled or trained in LCBDE, the choice is either to convert to an open procedure or to refer the patient for a postoperative ERC and stone removal. If LCBDE is an option, the surgeon has the choice of a transcystic approach or a choledochotomy. However, before making that choice, the likelihood of a successful transcystic exploration must be assessed (Fig. 21.2). The cholangiogram gives most of the information needed.

Large stones (more than 8 mm in diameter) and multiple stones (5 or more) probably will not be successfully removed by the transcystic approach. Stones in the hepatic ducts are difficult, if not impossible, for the tran-

Figure 21.1. Intraoperative cholangiogram shows a stone in the distal common bile duct (arrow).

Figure 21.2. Algorithm for stones in the common bile duct. CBD, common bile duct; CBDE, common bile duct exploration; ERC, endoscopic retrograde cholangiography; ES, endoscopic sphincterotomy.