Techniques and Results of Laparoscopic Common Bile Duct Exploration

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Approximately 10% of patients undergoing laparoscopic cholecystectomy harbor common bile duct stones. Although technically much more difficult than laparoscopic cholecystectomy, laparoscopic treatment of common bile duct stones is successful in clearing the ductal system in more than 90% of these patients. It offers the same minimally invasive benefits to the patient without the necessity of laparotomy or secondary procedures such as endoscopic retrograde choledocholithotomy or sphincterotomy.

Numerous techniques for laparoscopic common bile duct exploration (LCDE) have been developed. Each of them accesses the stones by one of two routes: through the cystic duct or through a choledochotomy. Both approaches are associated with equivalent success rates in removing stones, but the transcystic approach has the added benefit of being truly minimally invasive, as compared with choledochotomy.1-22

Indications for LCDE

An abnormal intraoperative cholangiogram is the most common indication for LCDE. Unexplained elevated liver function tests, a dilated ductal system, sonographic evidence of bile duct stones, scintigraphic, endoscopic, or radiographic evidence of common bile duct obstruction, or history of biliary pancreatitis may also lead to LCDE.

Contraindications to LCDE

Absence of any of the preceding indications, inability of the surgeon to perform the maneuvers required for common bile duct exploration, instability of the patient, and local conditions in the porta hepatis that would make exploration hazardous are the primary contraindications to LCDE. In addition, as will be explained shortly, there are relative contraindications to specific approaches to ductal exploration. There are also certain situa-
tions where a given technique of choledocholithotomy is preferred over another.

Equipment Needed for LCDE

Standard instrumentation used for laparoscopic cholecystectomy includes forceps, scissors, dissecting instruments, cholangiographic accessories, and a fluoroscope. In addition to this set, specialized tools are usually needed to perform common bile duct exploration.

Some or all of the following equipment may be required for ductal exploration:

1. Glucagon, 1–2 mg (given IV by the anesthetist)
2. Balloon-tipped catheters (4 French preferred over 3 French and 5 French)
3. Segura type baskets (4-wire, flat, straight in-line configuration)
4. 0.035 inch diameter long guide wire
5. Mechanical “over-the-wire” dilators (7 to 12 French)
6. High pressure “over-the-wire” pneumatic dilator
7. IV tubing (for saline instillation through the choledochoscope)
8. Atraumatic grasping forceps (for choledochoscope manipulation)
9. Flexible choledochoscope with light source (smaller (3mm) diameter, with (1.1 mm) working channel preferred)
10. Second camera
11. Second monitor (or second viewing area on the primary laparoscopic monitor)
12. Video switcher (for simultaneous same monitor display of choledochoscopic and laparoscopic images)
13. Waterpik
14. Electrohydraulic lithotripter
15. Absorbable suture (polyglycolic acid suture, 4-0 or 5-0 size)
16. T-tube (transductal) or C-tube (transcystic)
17. Stent (straight, 7 French or 10 French)
18. Sphincterotome (for antegrade sphincterotomy)

For most efficient performance, this equipment should be available on a separate cart near the OR and specific items arranged on a separate sterile cart or Mayo stand near the surgeon (Fig. 3.1).

Techniques of LCDE

Cholangiography and Preparation of the Porta Hepatis

Intraoperative imaging of the ductal system is an integral part of managing choledocholithiasis. The surgeon should be facile with his or her favorite