Advanced laparoscopic management of gallstones

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Gallstones disease typically presents with upper abdominal or epigastric pain (biliary colic), infection (cholecystitis), obstructive jaundice or pancreatitis (choledocholithiasis). In this era of advanced laparoscopic surgery, for cases of suspected common bile duct (CBD) stone, the traditional ERCP followed by laparoscopic cholecystectomy is no longer the "gold standard". Instead, laparoscopic cholecystectomy should be the first management step and if intraoperative cholangiogram demonstrates a CBD stone, then this is removed laparoscopically. Postoperative ERCP is reserved for the few failed cases.

Background

Cholelithiasis is being diagnosed more often in younger people, perhaps a reflection of dietary changes. The pathophysiology of gall stone formation – supersaturation of cholesterol crystals in the bile salt and phospholipids solution – may not be the whole story. Researchers have shown that the gall bladder produces a mucoprotein in its wall that may be the critical catalyst to initiate stone formation. (This may be the reason why stone dissolution therapy and laser or ultrasound lithotripsy have been found wanting and have since been abandoned.)

The first laparoscopic cholecystectomy in Australia in 1990 revolutionised the management of cholelithiasis. The procedure is now performed with <1% mortality and 2-3% morbidity. The Upper Gastrointestinal Surgical unit in Fremantle Hospital has a conversion to open procedure in 7–8% of cases since 2003, including acute cholecystectomies.

Common bileduct (CBD) stones

Common bile duct stones are found in 10–15% of patients undergoing cholecystectomy. This rate increases with age.

Endoscopic Retrograde Cholangio-Pancreatogram (ERCP) has been the mainstay for the management of a CBD stone. In the pre-cholecystectomy setting, suspicion is raised by an increased CBD size or stones in the CBD on ultrasound, along with abnormal liver function tests. However, the positive predictive value of these tests for choledocholithiasis is only 40–60%.

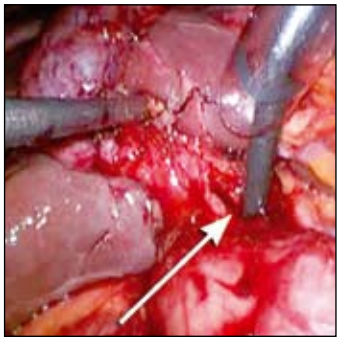
Removing stones endoscopically during ERCP has proven useful in managing complicated gallstone disease. It should be remembered that up to 70% of 2-3mm stones (the most common size) will pass spontaneously from the CBD into the duodenum thus making the ERCP unnecessary. If a CBD stone is present at ERCP, it is cleared in 80–95% of cases.

However, ERCP has an overall acute complication rate of 3–5%. This includes pancreatitis, bleeding and perforation. This complication rate is significantly higher (morbidity up to 20%; mortality up to 1.5%) if ERCP is performed in a normal sized duct. What is not well recognized is the medium to long term complication rates: ampullary stricture 5–10% of cases; stone recurrence 5%; recurrent cholangitis 3-5%; and there is an increased incidence of dysplasia in the distal CBD mucosa that may lead to cancer.

Laparoscopic common bile duct exploration

Laparoscopic common bile duct exploration (lapCBDE) is done through the same ports that are used in routine laparoscopic cholecystectomy. A CBD stone can be removed using either the transcystic or choledochotomy approach.

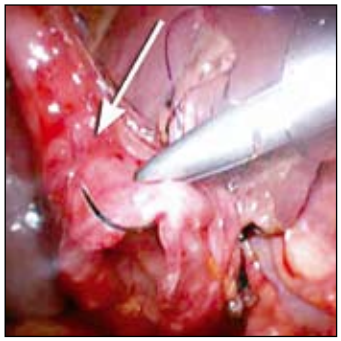
In the transcystic approach, the cystic duct is dilated using balloon dilator prior to insertion of a variety of stone retrieving baskets, graspers and catheters. For the choledochotomy approach, the CBD is laparoscopically dissected and a small incision made. A choledochoscope is then inserted into the CBD and stone(s) visualized before it is removed using equipment passed through the choledochoscope.



Choledochoscope being fed into an incision in the CBD (arrow).

Stone grasped after removal via incision in the CBD.

Stone (arrow) being retrieved in a dormia basket.



Suturing of the common bile duct (arrow).

Once the CBD is cleared of stone a percutaneous biliary stent is then passed through the ampulla. The CBD is then closed laparoscopically. Typically patient who underwent lap. CBDE stays an average of 2 - 3 days as an inpatient.

Methods compared

LapCBDE has results comparable with pre-cholecystectomy ERCP: stone clearance rate of 85–90% and morbidity of <5%; long-term biliary anatomical complication in <1% of cases; and long-term stone recurrence rate of 1–3.2%.

In two randomised studies comparing lapCBDE with a combination of laparoscopic cholecystectomy and ERCP, similar stone clearance and morbidity rates have been recorded. The overall time in operating theatre was shorter for the lapCBDE group, which also had a shorter inpatient duration. In another study, the inpatient stay for laparoscopic cholecystectomy and ERCP was 3.3 days compared to 1.7 days for lapCBDE.

References available on request

Main advantages of lapCBDE over pre-cholecystectomy ERCP

- Avoids the significant negative ERCP rate (i.e. stone passed).
- Single procedure avoids two GAs.
- Shorter overall operating time.
- Shorter inpatient stay.
- Avoids the acute and medium to long term ERCP complications.

Main drawback of lapCBDE

It requires a surgeon proficient in advanced laparoscopic techniques, especially laparoscopic suturing and biliary stenting. However, these skills can be acquired with proper training.