Concept: When to Explore the Common Bile Duct (CBD)

As pointed out by Way, Admirand, and Dunphy, the true incidence of CBD stones in patients undergoing surgery for gallstones is probably between 12% and 15% in the United States. By using indications essentially identical to those stated below and by performing routine preexploratory cystic duct cholangiography, Way performed CBD explorations in only 21% of 952 cholecystectomies. These explorations were positive for calculi in 65% of the patients explored. Of the 952 cholecystectomy cases, 14% had CBD stones. In 6 additional reports collected by Way in which routine cystic duct cholangiography was employed, the results were similar. On the other hand, the same author cited 3 other reports from the Lahey Clinic of cases in which preexploratory cholangiography was not performed. Here, of 33% of patients undergoing CBD exploration only 30% of the ducts contained stones. Whereas the use of routine cystic duct cholangiograms resulted in the recovery of CBD stones in over 14% of the cholecystectomies reported by Way and colleagues, the authors who omitted preexploratory cholangiography were able to discover CBD stones in only 10% of their cholecystectomy cases. In other words, routine preexploratory cholangiography markedly reduces the number of CBD explorations performed yet achieves a higher recovery rate of CBD stones (see Table 50–1).

In the absence of cystic duct cholangiography, opening the CBD for the indication that the duct is dilated or that the gallbladder contains many small stones will yield no more than 10%–14% positive explorations. The presence of jaundice, with serum bilirubin below 7 mg/dl as the only indication for exploring the CBD yielded, in Way’s series, positive results in 35% of explorations. Consequently, we do not consider the presence of many small stones, of mild jaundice, or of a dilated CBD to be an absolute indication for duct exploration if the preexploratory cystic duct cholangiogram is negative.

Counterbalancing the advantage of a greater yield of CBD calculi for a smaller number of duct exploration is the fact that cholangiography does produce an occasional false positive result. Most often this is due to inexperience on the part of the surgeon in that air bubbles are permitted to enter the system causing the false positive interpretation. With increasing experience, the incidence of false positives should be no more than 2%–3%.

**TABLE 50–1 Detection of CBD Stones during Routine Cholecystectomy**

<table>
<thead>
<tr>
<th>Routine Cholecystectomy</th>
<th>CBD Stones Retrieved (%)</th>
<th>CBD Explorations Undertaken (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With preexploratory cholangiogram (N = 952)</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>Without preexploratory cholangiogram (N = 4,187)</td>
<td>10</td>
<td>33</td>
</tr>
</tbody>
</table>

Source: Adapted from Way et al., 1972
Common Bile Duct Exploration

Even when there is an absolute indication for CBD exploration, we prefer to do preexploratory cystic duct cholangiography. Not only does this delineate the anatomy and anomalies of the ductal system but also it may provide the only opportunity to visualize radiographically the distal CBD and ampulla. Often, following instrumentation of the CBD, sphincter spasm prevents the passage of dye into the distal CBD and the duodenum during the postexploratory T-tube cholangiogram. Preexploratory cholangiography is omitted in patients suffering acute suppurative cholangitis.

Patients presenting with signs of suppurative cholangitis often will require emergency surgery after only a few hours or preoperative preparation because without CBD drainage the disease is often fatal within 24 hours. In the classical case, the patient will experience chills, fever, jaundice, some degree of mental confusion and septic shock due to Gram-negative bacteraemia. Occasionally, a *Clostridium* is involved. After inserting a central venous or pulmonary artery pressure monitor, pursue vigorous fluid replacement and antibiotic therapy.

At operation, the typical case will demonstrate purulent material in a dilated CBD obstructed by calculi. The most important feature of surgery is to drain the CBD with a large T-tube. Remove all of the calculi if this step can be accomplished safely. In some cases satisfactory drainage can be accomplished by the percutaneous transhepatic or the ERCP approach.

Concept: How to Manage Multiple and “Primary” CBD Stones

Multiple CBD Stones

Some surgeons advocate performance of either choledochoduodenostomy or sphincteroplasty in patients who have multiple calculi in the bile ducts. They reason that the surgeon who has removed 10 stones from the bile ducts has a high likelihood of having overlooked 1 or 2 additional calculi. On this basis, these enthusiasts advocate biliary-intestinal bypass or sphincteroplasty so that the residual stones may pass into the duodenum without obstructing the bile ducts. It is true that the patients who suffer from retained CBD calculi are most often those who have had a large number of stones removed from their CBDs rather than those who have had a negative CBD exploration or whose CBD was not explored at all.

Nevertheless, we are not convinced that there is sufficient data to mandate that every patient who has more than, say, 8 or 10 stones should automatically have a bypass or a sphincteroplasty. Neither of these operations is free of complications. Even though experts with a large experience, like Madden and Jones, can perform choledochoduodenostomy or sphincteroplasty with a mortality rate of 1%–2%, such favorable results as these will not be achieved by a large number of surgeons. Furthermore, with the aid of cholangiography and choledochoscopy in the operating room, it is possible to reduce the incidence of retained bile stones to 0–2%. It does not seem logical to perform bypass surgery or sphincteroplasty for the 2% of patients who will have retained bile stones if the other 98% do not require this additional surgery.

On the other hand, when there is evidence of one or more retained stones in the bile ducts that cannot be retrieved in the operating room, bypass or sphincteroplasty may be indicated. This is so even though it is sometimes simple to remove some of these stones by ERCP-papillotomy or by instrumentation through the T-tube tract 6 weeks after the operation. In patients with Caroli’s hepatic duct lithiasis, where intrahepatic stones are present, bypass is indicated.