

## **Editorial**

### **Common Bile Duct Stones in the Laparoscopic Era**

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Since the introduction of laparoscopic cholecystectomy (LC), there has been an upsurge in the number of endoscopic retrograde cholangiopancreatography (ERCP) procedures to identify common bile duct (CBD) stones preoperatively in patients with cholelithiasis. Many centers, using biochemical and radiological criteria<sup>1</sup> have adopted selective approach. Nevertheless, the number of preoperative ERCP remains enormous. Such criteria included: abnormal preoperative liver function test (elevated bilirubin or alkaline phosphatase), dilated CBD diameter (more than 8 mm) on ultrasound and recent history of jaundice or pancreatitis. By adopting these criteria, only 1.5% of our patients presented with symptomatic CBD stones after LC and they were mainly due to slipped rather than missed stones<sup>1</sup>. The great majority of such retained stones were dealt with endoscopically.

Endoscopic sphincterotomy was introduced in the 1970's and aimed to destroy the sphincter of Oddi to facilitate therapeutic procedures on the CBD. Its success rate is operator-dependent and exceeds 90%<sup>2</sup>. It has a complication rate of approximately 10% and a mortality rate of less than 1%<sup>3</sup>. Therefore, therapeutic ERCP is not without complications. Such complications include retroperitoneal duodenal perforation, bleeding, cholangitis and acute pancreatitis. A late complication of sphincterotomy is recurrent biliary sepsis due to duodenobiliary reflux as a result of permanent destruction of the sphincter of Oddi. To avoid this complication, some authors advocate surgical CBD exploration and cholecystectomy rather than ERCP for CBD stones in young (less than 60 years) fit patients<sup>4</sup>. Endoscopic balloon dilatation offers a safer alternative with a high success rate<sup>5,6</sup>. It has also an added advantage of preserving the function of the sphincter of Oddi, which recovers after the procedure; thereby preventing duodenobiliary reflux with its attendant risks of repeated biliary sepsis especially in younger patients<sup>5</sup>. At present, its use is limited to ductal stones not exceeding 10 mm and therefore, mechanical lithotripsy will be needed in more than 30% of cases with larger stones<sup>6</sup>.

To reduce the number of normal ERCP procedures performed to detect CBD stones before LC, several methods have been employed. Intravenous cholangiography (IVC) can be used as a screening test<sup>7</sup> and only patients with positive IVC findings are then subjected to therapeutic ERCP. There is however a small risk of false negative results and a greater workload may be added to a busy radiological department<sup>8</sup>. Endoscopic ultrasonography can accurately identify bile duct stones<sup>9</sup> with less procedure-related morbidity than ERCP and provides more information than cholangiography. Another relatively non-invasive new imaging technique,

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magnetic resonance cholangiopancreatography (MRCP) has been introduced<sup>10</sup>. It is hoped that its use will allow selection of patients who will require therapeutic ERCP; thereby limiting the number of normal ERCP studies. However, MRCP is only diagnostic and available only in limited number of hospitals.

No one can deny the important role played by operative cholangiography in the pre-laparoscopic era. The controversy over its routine use has continued into the laparoscopic era. While some surgeons advocate its use in selective cases especially those with abnormal preoperative liver function tests and those with difficult anatomy to avoid bile duct injury, others dismiss its role in preventing CBD injury in absence of any conclusive evidence<sup>11</sup>. Furthermore, the injury usually occurs before, or as cholangiography is performed<sup>12,13</sup>. Nevertheless, operative cholangiography allows proper definition of the extrahepatic ductal anatomy, which may allow safer dissection at Callot's triangle and will prevent further damage to the bile duct once injury is recognized. To avoid ductal injury, this should be combined with careful dissection. As laparoscopic cholangiography is associated with technical errors in 50% of cases, its films are unsatisfactory for decision making in 30% of cases and has a false-positive rate of 3% leading to unnecessary duct exploration<sup>14</sup>, it is considered unnecessary during LC<sup>15,16</sup>. A potential source of error for laparoscopic cholangiography and for that matter for laparoscopic ultrasound<sup>17</sup> is presence of air in the biliary tree following preoperative sphincterotomy. This is indeed a limiting factor in the usefulness of laparoscopic cholangiography and ultrasound in assessing complete clearance following duct exploration<sup>17,18</sup>. As laparoscopic cholangiography increases operating time and is technically demanding especially in the hand of the inexperienced, many surgeons now prefer selective preoperative ERCP to detect and treat CBD stones endoscopically before LC<sup>15,16,19</sup>. In the event of CBD stones declaring themselves after LC, endoscopic clearance is the treatment of choice with 90% success rate<sup>20</sup>. Nevertheless, operative cholangiography remains of valuable use in the laparoscopic era especially in cases with difficult anatomy and in centers where no ERCP facilities exist. If CBD stones are detected intraoperatively, the surgeon will be faced with the difficult decision of either to convert to conventional open procedure or to remove the gallbladder laparoscopically and later refer the patient for postoperative endoscopic duct clearance. The first option certainly underestimates the credibility of minimally invasive surgery and the second carries a potential risk of ERCP failure and the need for another operation to explore the CBD. This task of decision making is abolished if expertise and facilities for laparoscopic bile duct exploration are available. Laparoscopic bile duct exploration can be conducted either via the cystic duct (transcystic approach) or directly via the CBD. The transcystic route achieves 96% duct clearance<sup>21</sup>; it is recommended for duct stones of less than 1 cm in diameter and does not usually need a T-tube placement. However, it is sometimes difficult to pass instruments down the spiral cystic duct and the intrahepatic ducts are usually inaccessible. On the other hand, the direct CBD exploration achieves 92% clearance<sup>22</sup> and is suitable for stones greater than 1 cm in diameter and for common hepatic duct stones. Both routes offer a minimally invasive option for CBD clearance with very low morbidity. As with every new surgical technique, laparoscopic duct exploration has a 'learning curve' that needs to be passed to achieve speed and accuracy. The initial technical difficulties encountered are soon overcome with suitable equipment and increasing expertise if the laparoscopic exploration is conducted on regular basis. Unfortunately, the sudden surge of ERCP application for duct clearance in the laparoscopic era meant confinement of laparoscopic duct exploration to certain laparoscopic centers and some enthusiastic laparoscopic surgeons hence it is not widely available in every hospital. Therefore, every effort should be made to identify patients with CBD stones and endoscopic clearance is achieved prior to LC. For the

time being and until laparoscopic duct exploration becomes universal, preoperative ERCP should be performed selectively in patients with suspected CBD stones before undergoing LC. Superselectivity to reduce the number of normal ERCP procedures can be achieved by performing IVC, endoscopic ultrasonography or MRCP. ERCP is the method of choice for preoperative detection and treatment of ductal stones and does indeed obviate the need for laparoscopic operative cholangiography in absence of facilities and expertise for laparoscopic duct exploration. This policy certainly reduces the number of patients undergoing LC with undetectable CBD stones to less than 2%. Even if laparoscopic duct exploration becomes widespread, the demand for ERCP will continue especially for patients with retained CBD stones. Our fear of endoscopic sphincterotomy in younger patients has been recently allayed by the fact that short-term complications of the procedure are not age related<sup>23</sup>.

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