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Complete biliary obstruction without jaundice due to an anatomic variation

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ABSTRACT

An aberrant right posterior hepatic duct is present in 4.8-8.4% of the population. It is one of the causes of bile duct injury during laparascopic cholecystectomy. Herein we present a patient with complete transection of the common hepatic duct during laparascopic cholecystectomy (Stewart-Way class 3). Interestingly, the patient had an intact aberrant right posterior duct draining into the common hepatic duct distal to the obstruction site that prevented early diagnosis of the biliary injury because of drainage of the liver sufficient to prevent the development of jaundice.

Keywords: Laparascopic cholecystectomy, biliary injury, aberrant hepatic duct

Case Report

INTRODUCTION

Laparoscopic cholecystectomy (LC) was first introduced in the United States in 1988 and has become the gold standard for the management of benign gallbladder disease because of its shorter hospital stay, decreased postoperative morbidity, lower postoperative pain, better cosmesis, and faster return to normal activity compared with laparotomy. Unfortunately, it is associated with a higher incidence of bile-duct injuries (0.5%) than open cholecystectomy (0.1-0.2%) (1,2).

The most common etiology of major duct injury during LC is the misidentification of the biliary anatomy during dissection of the cystic duct and artery. Mostly the common bile duct, or less commonly an aberrant duct, is mistaken to be the cystic duct. Bile duct injuries are associated with significant morbidity and even mortality. They require surgical, endoscopic or radiologic procedures and increase the medical cost while decreasing the quality of life. Early diagnosis is important in preventing the development of serious complications and obtaining successful repair. However, only 10% to 30% of bile duct injuries are recognized during the operation (3,4). Diagnosis relies on a low index of suspicion in patients with vague abdominal symptoms such as abdominal fullness, distension, nausea, vomiting, fever, chills, jaundice, and abdominal pain depending on the type of injury.

Herein we present a patient with complete transection of the common hepatic duct (CHD) during LC (Stewart-Way class 3) (5). Interestingly, the patient had only abdominal fullness because of the associated patent right posterior hepatic duct draining the liver sufficiently to prevent the development of jaundice. This case illustrates the variable anatomy of the bile ducts and alerts clinicians in interpreting symptoms after LC.

CASE PRESENTATION

A 45 year-old woman was referred to our hospital because of increased liver function tests and dilated intrahepatic bile ducts on hepatobiliary ultrasonography. She had complaints of gradually increasing epigastric fullness over the last 6 months. Her past medical history was significant only for an uneventful laparascopic cholecystectomy operation at another hospital because of cholelithiasis one year previously. Physical examination was completely normal. Liver tests revealed an increase in alanine aminotransferase 50 U/L (reference range: 10-49), aspartate aminotransferase 36 U/L (0-

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34), gamma-glutamyl transferase 448 U/L (0-38) and alkaline phosphatase 316 U/L (45-129) levels. Serum bilirubin was within normal limits. Abdomen ultrasonography demonstrated dilated intrahepatic bile ducts in the left lobe and right anterior segments of the liver. Intrahepatic bile ducts in the right posterior segments of the liver and the common bile duct were normal. Magnetic resonance cholangiopancreatography showed transection of the CHD (arrow) and aberrant drainage of the right posterior duct into the CHD at a point distal to the transection site (arrowhead) (Figure 1). Endoscopic retrograde cholangiopancreatography demonstrated complete transection of the CHD by surgical clips and an intact aberrant right posterior hepatic duct (Figure 2). The right anterior and left main duct could not be opacified. Repeated attempts to traverse the CHD were unsuccessful. Percutaneous transhepatic cholangiography confirmed total transection of the CHD that could not be crossed by a guidewire (Figure 3). With these findings the patient was consulted to surgery and underwent an uneventful hepaticojejunostomy.

DISCUSSION

Herein we present a patient with complete transection of the CHD (Stewart-Way class 3) during LC. An intact aberrant right posterior duct prevented early diagnosis of the completely transected CHD, because it provided biliary drainage of the liver sufficient to prevent the development of jaundice.

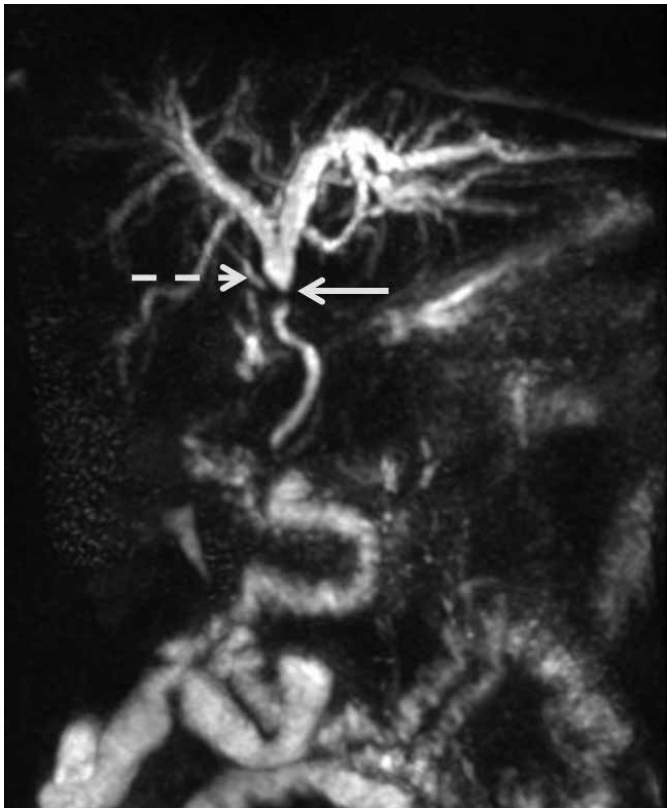

Figure 1. Magnetic resonance cholangiopancreatography showing transection of the common hepatic duct (arrow) and aberrant drainage of the right posterior duct into the common hepatic duct at a point distal to the transection site (arrowhead).

Cholecystectomy is one of the most frequently performed surgical operations in the Western world. Bile duct injuries are one of its most dreaded complications. Initially, there was a concomitant increase in the incidence of iatrogenic bile duct injury after the introduction of LC and it was primarily attributed to the inexperience of the surgeons. However, subsequent studies have failed to confirm the learning curve effect and the incidence of bile duct injuries have remained stable

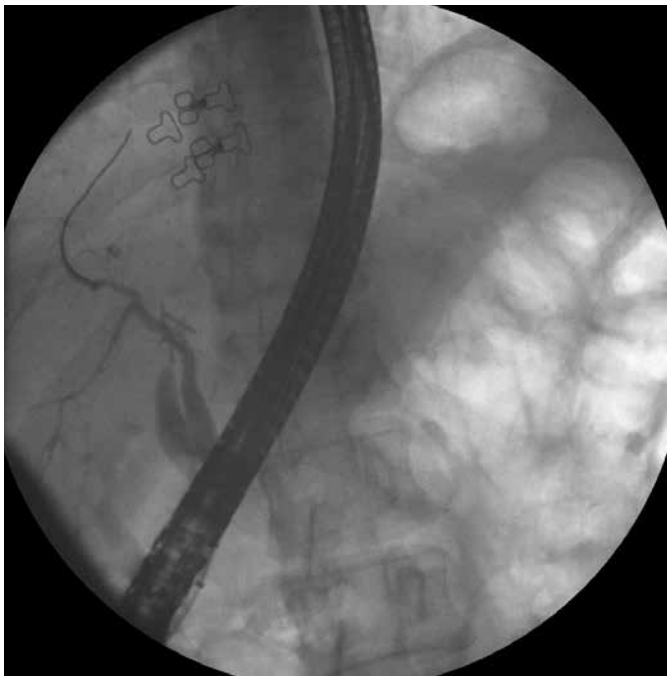

Figure 2. Endoscopic retrograde cholangiopancreatography demonstrating complete transection of the common hepatic duct by surgical clips and an intact aberrant right posterior hepatic duct.

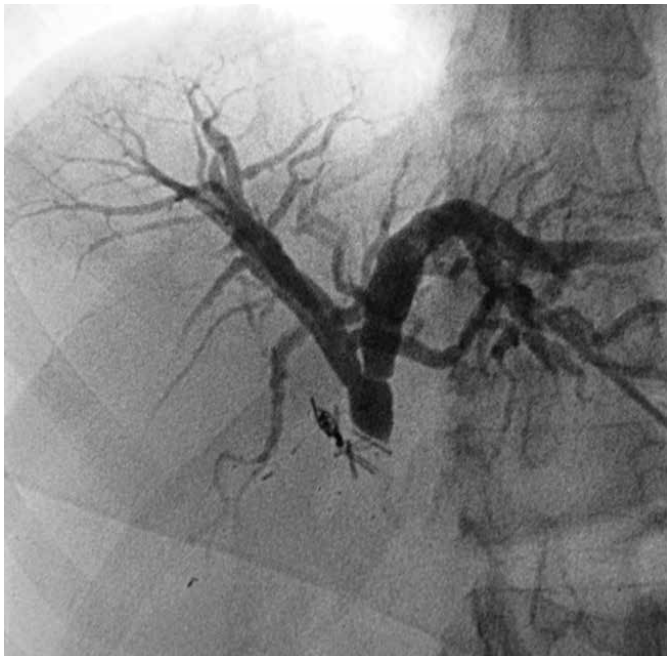

Figure 3. Percutaneous transhepatic cholangiography confirming total transection of the common hepatic duct, which could not be crossed with a guidewire.

despite increased surgeon experience (6,7). There are several risk factors for bile duct injury, which can be grouped under patient related factors, local factors, and extrinsic factors. Patient related factors include advanced age, obesity, male sex, and presence of surgical adhesions. Local factors include past or ongoing inflammation and/or infection, fibrosis, variant ductal anatomy, and hemorrhage. Extrinsic factors include surgeon experience and properly functioning equipment. Misidentification of the common bile duct, the common hepatic duct, or an aberrant duct is the most common cause of bile duct injury, followed by technical failures such as thermal injury to the common bile duct, tenting of the common duct during clip placement, and slippage of clips placed on the cystic duct (8).

Anatomic variations of the biliary tree are present in 14-28% of patients, with aberrant right hepatic ducts being the most common (9,10). An aberrant right posterior hepatic duct is present in 4.8-8.4% of the population and drains segments 6 and 7 of the right liver into the CHD, the common bile duct or the cystic duct (11). Injuries to an aberrant right posterior hepatic duct are likely underreported because complete ligation of an aberrant right posterior hepatic duct may be asymptomatic and often unrecognized as the injured area atrophies over time. The paucity of intrahepatic filling on ERCP and segmental dilation of intrahepatic branches on radiologic imaging are clues to the diagnosis of aberrant bile duct injury. Asymptomatic obstruction of an aberrant right hepatic duct does not necesssarily need any intervention. In patients with bile leak, either hepaticojejunostomy may be performed or the aberrant duct may be closed if its diameter is less than 3 mm (4).

There are two types of biliary injuries: biliary obstructions and leaks, and sometimes both. Patients with bile leak often present with non-specific symptoms such as abdominal pain, fullness, nausea, vomiting, fever and chills. If unrecognized, bilomas, biliary fistulas, cholangitis, sepsis, or multiorgan system failure may develop. Abdominal ultrasound or CT-scan may reveal perihepatic fluid collection. On the other hand, abdominal pain, anorexia, jaundice, and cholangitis are the presenting symptoms in patients with bile duct ligation and stricture formation. Patients develop a cholestatic pattern of abnormality on liver function tests. Delayed diagnosis may lead to secondary biliary cirrhosis. The outcome of therapy is based on early and exact diagnosis of the bile duct and accompanying vascular injuries. Therefore, patients who fail to recover after discharge or develop progressive vague abdominal symptoms should be evaluated for a bile duct injury.

Dowsett et al have shown that drainage of 25% of the liver volume can achieve adequate palliation with improvement in biochemical parameters and relief of symptoms (12). Our patient confirms this finding, having no increase in bilirubin levels because of ongoing drainage of segments 6 and 7 of the liver.

The treatment of bile duct injuries can be divided into operative (early, intermediate and delayed) and nonoperative repair. The method and timing of repair depends on the extent of injury, experience of the surgeon and the amount of acute inflammation in the area. Intraoperative and early repair (<1 week) are preferred in stable cases with a clear diagnosis and no infectious abdominal collection. Operation during the intermediate period (1-6 weeks) is not preferred because of a higher rate of complications and failure (13). Delayed repair (>6 weeks) is advised in patients with severe bacterial peritonitis and local infection or inflammation. Endoscopic therapies are chosen in cases with delayed diagnosis. The success of endoscopic therapy depends on the type of injury. The success rate approaches 100% in patients with Strasberg type A injury (14). The success rate of endoscopic therapy is greatly influenced by the size of the leakage in cases with Strasberg types D and C injury. The majority of patients with Strasberg type E injuries may be treated non-operatively due to recent advances in expertise, equipment and techniques, such as the rendezvous procedure (3,15). However, endoscopy is only used for diagnostic purposes if the common hepatic duct is completely transected or excised.

In conclusion, we present a relatively rare but clinically significant anatomic variation of bile duct anatomy. Anatomic variations may not only increase susceptibility to injury but also lead to different clinical presentations after bile duct injuries. A low index of suspicion in patients with vague symptoms is important for early diagnosis.

Conflict of Interest: No conflict of interest was declared by the authors.

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