

## A rare anatomical variation of the bile ducts: Cystic duct draining to the right hepatic duct

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Dear Editor,

Laparoscopic cholecystectomy is the most commonly performed elective surgery worldwide. It is important to know the anatomy of the hepatobiliary system and its potential variations in order to avoid possible complications before hepatobiliary surgery (1). The developmental variations of intrahepatic and extrahepatic bile ducts in the biliary system are observed in 42%-58% of the population (2,3).

A 77-year-old male patient, who was admitted to the clinic due to complaints of swelling and dyspepsia, was diagnosed with a tumor of the ampulla of Vater. After obtaining informed consent from patient and completing the preoperative preparation, Whipple procedure was performed. During the procedure, the left and right hepatic bile ducts were fused after forming a long segment, and the cystic duct was observed to be draining to the right hepatic duct (Figure 1).

Congenital anatomical variants of extrahepatic bile ducts have been described by Benson and Page and classified into five main types (2). Our patient was type D according to Benson-Page classification (Figure 2). The patient underwent cholecystectomy, followed by Whipple procedure. The main hepatic duct that is required to dissect right above the cystic duct, was dissected after the fusion (Figure 1), and continuity was provided with hepaticojejunostomy. The patient was discharged without any post-operative complications on day 8.

The anatomical variations of the extrahepatic bile ducts are very important during laparoscopic surgery and liver surgery and transplantation (1,2). Among these variations, the incidence of the cystic duct draining to the right hepatic duct is 0.7% (2). Although it is rarely observed, it

has the potential for significant complications and can cause morbidity, such as biloma, biliary fistula, and sepsis, and occasionally mortality (1). Ultrasonography, i.v. cholangiography, percutaneous transhepatic cholangiography, endoscopic retrograde cholangiopancreatography, magnetic resonance cholangiopancreatography (MRCP),



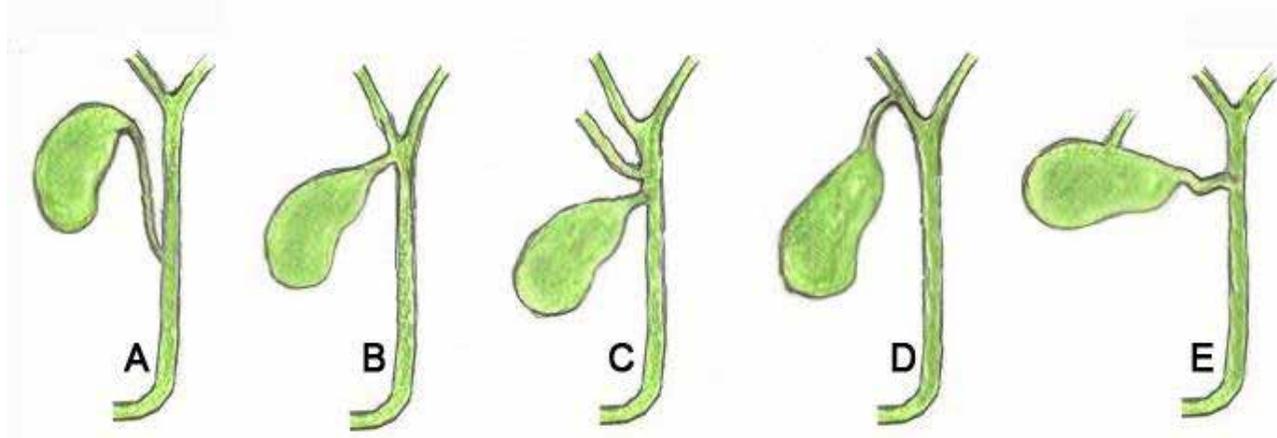
**Figure 1.** Preoperative image; right hepatic duct (R), left hepatic duct (L), cystic duct (C, tied and cut), main bile duct (M), and resection line for Whipple procedure (dash style)

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**Figure 2.** Benson-Page classification for anatomical variations of the cystic duct insertion (3)

computed tomography, and scintigraphy can be used for imaging (3,4). Although there are advanced imaging modalities, such as MRCP, for the preoperative presentation of the anatomy of the biliary system, it is not routinely used in surgery except for liver transplantation or the exploration of choledochal stones and other similar processes. However, preoperative MRCP has been reported to be inadequate in detecting the cystic duct's drainage to the right hepatic duct, and this variation is often detected during surgeries due to the surgeon's attention (3,4). Approximately 15 cases have been reported in literature. However, there is only one case reporting the entering of the cystic duct to the right hepatic duct in literature (3). Mariolis-Sapsakos et al. (5) reported that the branching pattern of the right hepatic duct was atypical in 24 of 74 cadaveric dissection cases (34.25%), and this situation may be important in surgical cases.

Although the cystic duct's drainage to the right hepatic duct is a rare anomaly, surgeons should consider it as a potential biliary variation, and it can be protected by conforming to the rules of anatomical dissection. Also, preoperative MRCP and intraoperative cholangiography should be performed when in doubt.

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