

CASE REPORT

A rare anatomical variation of the biliary tree

Ioannis D. Kostakis*, Themistoklis Feretis, Paraskevas Stamopoulos, Zoe Garoufalia, Dimitrios Dimitroulis, Stylianos Kykalos, Gregory Kouraklis, and Gerasimos Tsourouflis

Second Department of Propedeutic Surgery, National and Kapodistrian University of Athens, Medical School, 'Laiko' General Hospital, Athens, Greece

*Correspondence address. 27 Achridos Street, Kato Patissia, 11144 Athens, Greece. Tel: +30-210-223-0855; Fax: +30-210-381-3822; E-mail: i.d.kostakis@gmail.com

ABSTRACT

A 31-year-old woman was admitted to our department in order to undergo a laparoscopic cholecystectomy. The operation was converted to open due to cholorrhea during the dissection in the hepatocystic triangle. The cholorrhea came from a transected bile duct, which was 2 mm in diameter, came out of the hepatoduodenal ligament, ran along the common hepatic duct and drained into the cystic duct, in proximity to the neck of the gallbladder. The gallbladder was removed and an intraoperative cholangiography revealed that the aberrant bile duct was originated from the right posterior sectoral duct (RPSD). The RPSD continued its typical course up to its confluence with the right anterior sectoral duct and the formation of the right hepatic duct. This is a rare type of aberrant bile duct, which is added to the long catalogue of the anatomical variations of the biliary tree.

INTRODUCTION

The anatomy of biliary tree is complex and is characterized by the frequent presence of anatomical variations of either the intrahepatic or extrahepatic bile ducts, which can be found in ~50% of general population [1–6]. Anatomical variations of the extrahepatic bile ducts may incommode the surgeon and make the dissection in the hepatocystic triangle challenging, resulting in injuries of the extrahepatic bile ducts [1, 3, 6]. Herein, we present a case of cholecystectomy in a patient with a rare anatomical variation of the biliary tree.

CASE REPORT

A 31-year-old woman was admitted to our department in order to undergo a laparoscopic cholecystectomy. She had a medical history of symptomatic cholelithiasis with an episode of acute

cholecystitis 6 months before and several other episodes of biliary colic before and after this. The rest of her medical history was unremarkable. No preoperative assessment of patient's biliary anatomy with magnetic resonance cholangiopancreatography (MRCP) had been performed. The operation started laparoscopically with division of adhesions between the gallbladder and the greater omentum. During the dissection of the cystic duct and the cystic artery in the hepatocystic triangle, a transected bile duct with small caliber was noticed. The operation was converted to open. It proceeded with retrograde dissection of the gallbladder from the liver bed, identification, dissection, ligation and division of the cystic duct and the cystic artery and removal of the gallbladder from the operating field. During the cholecystectomy, it was recognized that the initially transected bile duct, which was 2 mm in diameter, came out of the hepatoduodenal ligament, ran along the common hepatic duct (CHD) and drained into the cystic duct, in proximity to the

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neck of the gallbladder. In order to identify the exact nature of the injury, an intraoperative cholangiography was performed by injecting an iodine-containing contrast medium through the common bile duct (CBD). The intraoperative cholangiography revealed that the aberrant bile duct was originated from the right posterior sectoral duct (RPSD). The RPSD continued its typical course up to its confluence with the right anterior sectoral duct (RASD) and the formation of the right hepatic duct (RHD) (Fig. 1). The small caliber of the aberrant bile duct and the fact that it drained less than a liver segment led to the decision of its ligation (Fig. 2). A drain was placed under the surface of the liver. The postoperative course was uneventful and the patient was discharged on the third postoperative day and remains free of symptoms 6 months later. The histopathological examination of the gallbladder revealed the presence of stones and chronic inflammation of its wall. Figure 3 depicts the patient's biliary tree along with the part of the extrahepatic biliary tree that was removed during the operation (the gallbladder, part of the cystic duct and part of the aberrant duct). An informed consent was taken from the patient in order to publish the aforementioned information.

DISCUSSION

A great number of anatomical variations of the bile ducts have been reported [1–6]. Among the most common variations are the following: the draining of the RPSD into the RASD, the trifurcation of the CHD into the RPSD, the RASD and left hepatic duct (LHD), the draining of the RASD into the LHD, the draining of the RPSD into the LHD, CHD, CBD or even cystic duct, the insertion of the cystic duct into the RHD, the presence of a very short or very long cystic duct, etc. [1–6]. Furthermore, another type of variation of the biliary tree is the presence of hepaticocholecystic ducts and Luschka ducts, which connect intrahepatic ducts to the gallbladder or its fossa [6, 7]. In our case, the RPSD joined the RASD to form the RHD, which in turn joined the LHD to form the CHD, as it is common [4, 5], but there was also an aberrant bile duct which connected the RPSD with the cystic duct. What is rare in our case is the coexistence of the common type of the RHD and CHD formation with the

mentioned type of aberrant bile duct, which is added to the long catalogue of the anatomical variations of the biliary tree. MRCP can detect the anatomical variations of intrahepatic and extrahepatic bile ducts [8]. However, as in our case, it is not routinely used prior to cholecystectomy due to its high cost and the fact that, despite the very frequent existence of anatomical variations of the biliary tree, most of them are not encountered during cholecystectomy if the surgeon dissects carefully in the hepatocystic triangle [9]. On the other hand, MRCP is very useful for the preoperative assessment of patients with suspected choledocholithiasis [10]. When the surgeon is concerned with the anatomy of the biliary tree during a cholecystectomy, an intraoperative cholangiography can be performed, as in our case, in order the biliary anatomy to be clarified and an injury to the extrahepatic bile ducts to be

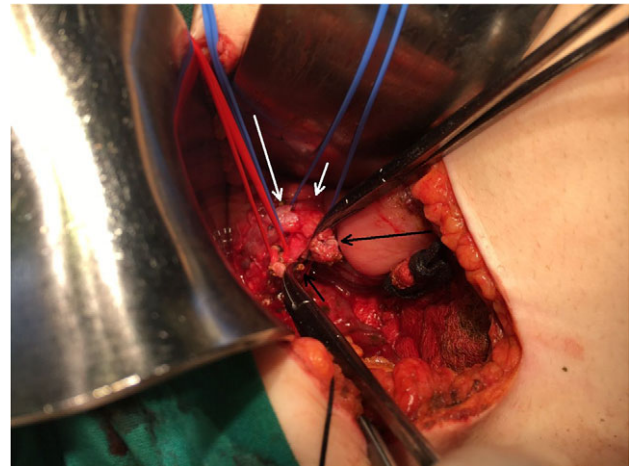


Figure 2: Operating field after the removal of the gallbladder. Short black arrow: the stump of the aberrant bile duct. Long black arrow: the stump of the cystic duct. Long white arrow: CHD. Short white arrow: CBD.

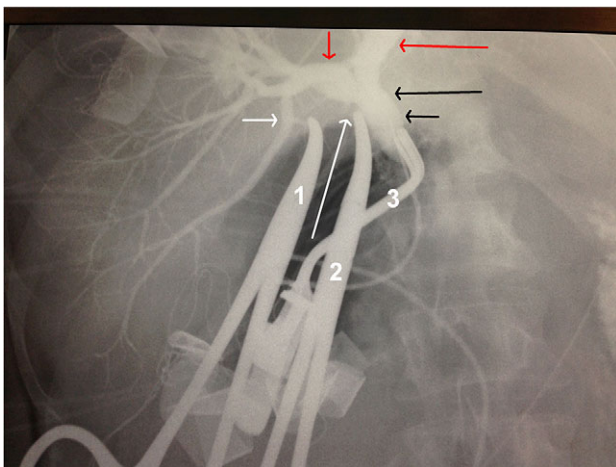


Figure 1: Intraoperative cholangiography. Short white arrow: the origin of the aberrant bile duct from the RPSD. Long white arrow: the stump of the cystic duct. Short red arrow: RHD. Long red arrow: LHD. Long black arrow: CHD. Short black arrow: CBD. Forceps 1 holds the stump of the aberrant bile duct. Forceps 3 blocks the CBD for the intraoperative cholangiography.

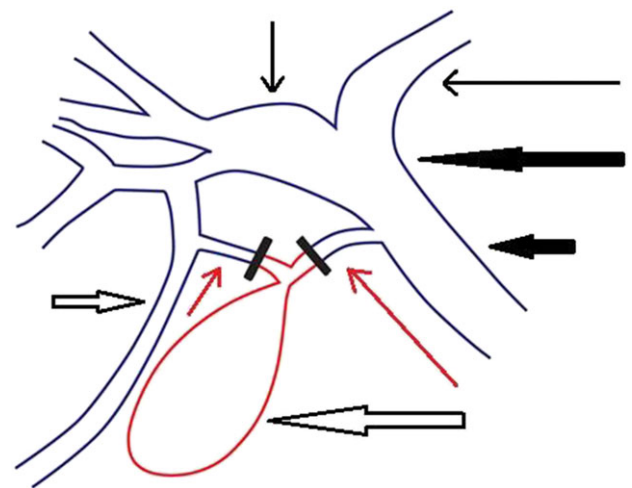


Figure 3: Schematic representation of the patient's biliary tree. The part of the extrahepatic biliary tree that was removed during the operation (the gallbladder, part of the cystic duct and part of the aberrant duct) is illustrated with red color. Short thin red arrow: the aberrant bile duct. Long thin red arrow: cystic duct. Long thick white arrow: gallbladder. Short thick white arrow: RPSD. Short thin black arrow: RHD. Long thin black arrow: LHD. Long thick black arrow: CHD. Short thick black arrow: CBD.

prevented [11]. Surgeons should always keep in mind that when they perform a cholecystectomy, either laparoscopically or open, they operate in an area with many anatomical variations and the inadvertent dissection may lead to severe bile duct injuries [1, 3, 6].

CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

FUNDING

There is no funding regarding this article.

ETHICAL APPROVAL

No approval is required.

CONSENT

The patient gave her informed consent in order the aforementioned information to be published.

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