



## Case report

## Cystic duct entering to right hepatic duct; a case report with literature review

Mahmoodreza Khoonsari<sup>a</sup>, Mohsen Reza Mansoorian<sup>a,b</sup>, Abolfazl Namazi<sup>a</sup>, Ali Kabir<sup>c,\*</sup><sup>a</sup> Gastrointestinal and Liver Disease Research Center, Firoozgar Hospital, Iran University of Medical Sciences, Tehran, Iran<sup>b</sup> Department of Surgery, Transplantation Research Center, Namazi Hospital, Shiraz University of Medical Sciences, Tehran, Iran<sup>c</sup> Minimally Invasive Surgery Research Center, Iran University of Medical Sciences, Tehran, Iran

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## ABSTRACT

**Introduction and importance:** Surgeons may mistakenly consider the right hepatic duct as cystic duct, ligate, and divide it.

**Case presentation:** A 58-year-old woman presented with right upper quadrant (RUQ) abdominal pain, nausea, and RUQ tenderness, but negative Murphy's sign. Common bile duct was 10 mm based on abdominal ultrasound. Common hepatic duct and intrahepatic ducts consist of multiple common bile duct (CBD) stones with sludge and multiple small gallstones. Different diagnostic procedures (Computed tomography (CT) scan, magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP)) showed the connection of the cystic duct to the right hepatic duct. Balloon sweeping for stones extraction and then laparoscopic cholecystectomy was successfully done.

**Clinical discussion:** Radiologic evaluations like MRCP, CT scan, ERCP or sonography before or during the surgery/ endoscopic interventions seem logical at least for selected patients.

**Conclusion:** Before endoscopic/surgical interventions we need to be sure about the anatomy of biliary tree by a suitable para-clinic evaluation.

## 1. Introduction

This case study is reported in line with SCARE guidelines [1]. Knowledge about any anatomical variation in bile duct helps surgeons and endoscopists to decrease the chance of iatrogenic complication during the procedure [2]. Surgeons may mistakenly consider the right hepatic duct as cystic duct, ligate, and divide it [3]. Therefore, the patient may present with biliary fistula, biliary peritonitis, or cirrhosis of the liver at a later stage [4].

## 2. Presentation of case

The patient is a 58-year-old woman presented with right upper quadrant (RUQ) abdominal pain and nausea for ten days before being admitted to the hospital. Physical examination revealed tenderness in the RUQ without peritoneal signs. Murphy's sign was negative. The temperature was 36.5 °C and other vital signs were normal. Laboratory values showed a WBC: 12,100 (PMN: 75 %), total and direct bilirubin were 7.3 mg/dL and 4.1 mg/dL, respectively. Alanine aminotransferase

was 162 U/L, aspartate aminotransferase: 101 U/L, alkaline phosphatase: 1090 U/L, amylase: 392 U/L, and lipase was 38 U/L. Abdominal ultrasound showed dilatation of common bile ducts (10 mm) and common hepatic duct and intrahepatic ducts consist of multiple common bile duct (CBD) stones with sludge and multiple small gallstones.

Computed tomography (CT) scan, magnetic resonance cholangiopancreatography (MRCP) (Fig. 1), and endoscopic retrograde cholangiopancreatography (ERCP) (Fig. 2) showed the connection of the cystic duct to the right hepatic duct.

ERCP was requested and revealed choledocholithiasis with cystic duct variation (cystic duct was inserted to right hepatic duct) (Fig. 2).

Balloon sweeping for stones extraction and then laparoscopic cholecystectomy was successfully done.

Our literature review of similar cases showed both young and old involved patients, either black or white, with no preference in sex, with different clinical presentations like abdominal pain, fever, and/or jaundice and different accompanying symptoms and signs suspicious to pancreatitis, evidence of gall stones, with different laboratory findings like elevated serum amylase, evidence of cholestasis, either

\* Corresponding author at: Firoozgar Hospital, Beh-Afarin St., Valiasr Ave., Tehran, Iran.

E-mail address: [kabir.a@iums.ac.ir](mailto:kabir.a@iums.ac.ir) (A. Kabir).

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Fig. 1. Magnetic resonance cholangiopancreatography (MRCP) showing the connection of the cystic duct to the right hepatic duct.



Fig. 2. Endoscopic Retrograde Cholangiopancreatography (ERCP) showing the connection of the cystic duct to the right hepatic duct.

preoperatively or intraoperatively or both and with different diagnostic tools like sonography, CT scan, ERCP or MRCP [2,3,5–9].

### 3. Discussion

Drainage of the main right hepatic duct into the cystic duct is extremely rare and ranges from 0.3 to 0.4 % of patients [10]. Previous studies reported the prevalence of biliary duct anomalies as 12 %, with anomalous right hepatic duct emptying into the common hepatic or cystic duct as the most common one [11]. Although there are some reports about such aberrancies from the cystic duct to the right hepatic duct [2,3,5–9], cystic duct into the left hepatic duct [12–14], and even from the cystic duct to common hepatic duct [15,16]. It seems important evaluating the biliary duct preoperatively and intraoperatively of probable aberrant biliary duct variations for preventing bile duct injury.

According to our literature review, there is no specific pattern or preferred diagnostic approach or tool in cases with biliary tree diseases for diagnosis of probable abnormalities, yet.

Studies on cadavers or livers before transplantation may better justify the exact prevalence of anomalies of the biliary tree [15].

Considering the common prevalence of anatomic variations in the biliary tree as mentioned in previous and newer studies [11,17], cholecystectomy as the most prevalent surgery worldwide [18], many case reports of different anomalies as mentioned above [2,3,5–9,12–16], variations of the cystic duct as the most important form of anomalies from the surgical point of view [19], elective nature of surgery or endoscopic diagnostic/therapeutic interventions in most cases of biliary tree diseases [20], and preventable disasters without knowing the anatomy of the biliary tree, it may be the time to reinforce radiologic evaluations like MRCP, CT scan, ERCP or sonography before such interventions before or during the surgery/endoscopic interventions.

### 4. Conclusions

It seems logical that physicians implement radiologic evaluations like MRCP, CT scan, ERCP or sonography, before either surgery or endoscopic interventions, at least for some selected patients.

### Abbreviations

CBD	Common bile duct
CT	Computed tomography
dL	Decilitre
ERCP	Endoscopic retrograde cholangiopancreatography
mg	Milligram
MRCP	Magnetic resonance cholangiopancreatography
PMN	Polymorph nuclear
RUQ	Right upper quadrant
WBC	White blood cell

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Ethical approval

Ethical approval is exempt at our institution.

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AN and AK: primary drafted  
MK and MRM: critical revision.

All of them designed, revised and finally drafted the manuscript and guaranteed the manuscript.

### Conflicts of interest

N/A.

## Data availability statement

All data will be available by direct request from corresponding author.

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