

## Double Common Bile Duct with Ectopic Drainage into the Stomach Found in Asymptomatic

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The case of a patient with asymptomatic double common bile duct that was identified by chance is presented. A 41-year-old man underwent esophagogastroduodenoscopy (EGD) as part of a regular health checkup, during which he was found to have an elevated lesion in the lesser curvature of the upper gastric corpus with bile draining from its tip. Further examination led to a diagnosis of double common bile duct from the left intrahepatic bile duct to the opening into the stomach. Morphological abnormalities of the biliary tree are commonly encountered in everyday gastroenterological practice, but a double common bile duct with an ectopic opening into the stomach is comparatively rare. It is also associated with an increased risk of developing cancer of the stomach or bile duct, and as such is a biliary abnormality that must be treated with caution. This case is reported together with a discussion of the literature.

**Key words:** Bile duct abnormality, Double common bile duct, Ectopic biliary drainage

### INTRODUCTION

Morphological abnormalities of the biliary tree are commonly encountered in everyday gastroenterological practice, but double common bile duct is comparatively rare [1]. It may reportedly cause symptoms, including epigastric and right hypochondriac pain, or be associated with a malignant tumor [2]. The case of a patient with asymptomatic double common bile duct that was identified by chance is presented.

### CASE REPORT

A 41-year-old man underwent esophagogastroduodenoscopy (EGD) as part of a regular health checkup at another hospital, during which he was found to have an elevated lesion in the lesser curvature of the upper gastric corpus with yellowish bile draining from its tip. He was then referred to our hospital for further investigation. The patient was receiving treatment for bronchial asthma. He was 176 cm tall and weighed 82 kg, and physical examination revealed nothing of note. Other than mildly elevated T-Bil 1.2 mg/dl, blood tests were all normal.

EGD revealed an opening in the lesser curvature of the upper gastric corpus from which bile was draining (Fig. 1). There was no erosion or ulceration of the gastric mucosa.

During this EGD, a catheter was inserted into the opening in the lesser curvature of the upper gastric corpus, and contrast agent was injected (Fig. 2). This showed a lumen extending from the lesser curvature of the upper gastric corpus to the left hepatic lobe that

was continuous with the left intrahepatic bile duct. There were no signs of any obvious defects within this lumen.

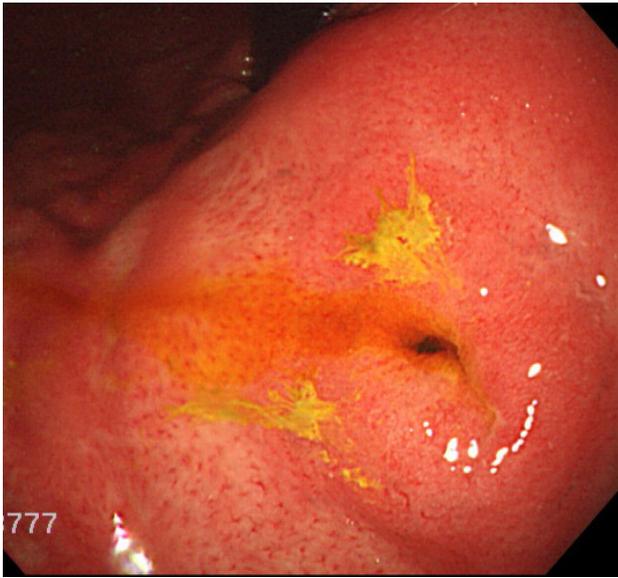
Computed tomography (CT) showed a low-density continuous tubular structures extending from the left hepatic lobe to the stomach (Fig. 3a). CT after contrast agent was injected into the tubular structure also showed the left intrahepatic bile duct extending continuously to the lesser curvature of the gastric corpus (Fig. 3b).

Magnetic resonance cholangiopancreatography (MRCP) showed a bile duct extending continuously from the lateral segment of the liver to the lesser curvature of the gastric corpus (Fig. 4). There was no evident communication with the bile duct in the right lobe or anomalous arrangement of the pancreaticobiliary ducts. The common bile duct that is open to the papilla was visible, but narrow.

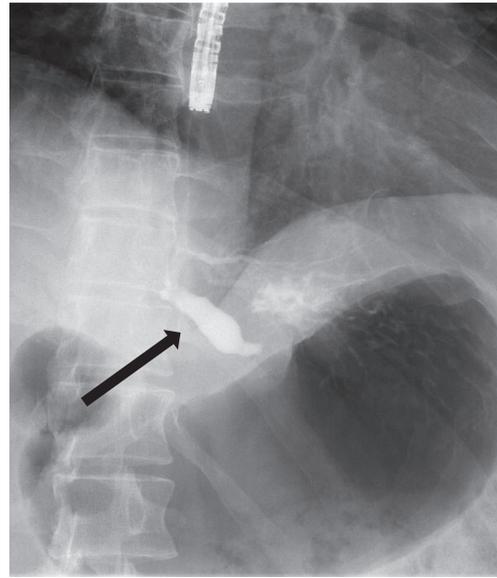
On the basis of these findings, double common bile duct opening into the lesser curvature of the upper gastric corpus was diagnosed. We explained the risk of complications with cholangitis or cancer to the patient and recommended that surgery be performed, but the patient did not agree, and he is currently being monitored regularly by EGD.

### DISCUSSION

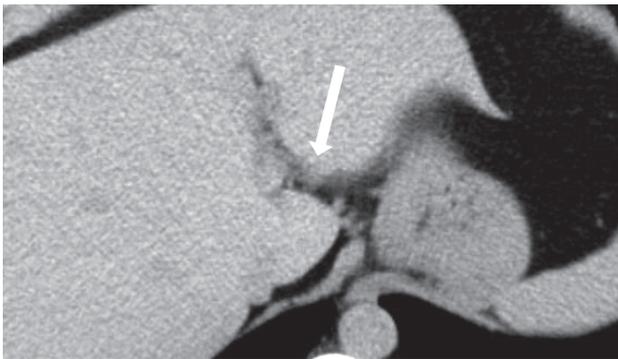
Double common bile duct is defined as a congenital deformity in which two patent bile ducts open separately into the gastrointestinal tract. It is an uncommon anomaly of the biliary tree that was first described by Vesalius in 1543 [3]. According to Boyden [4], this



**Fig. 1** Esophagogastroduodenoscopy showing an elevated lesion in the lesser curvature of the upper gastric corpus with bile draining from its tip.



**Fig. 2** Contrast agent was injected into the opening in the lesser curvature of the upper gastric corpus. This showed a lumen extending from the lesser curvature of the upper gastric corpus to the left hepatic lobe that was continuous with the left intrahepatic bile duct. There were no signs of any obvious defects within this lumen.

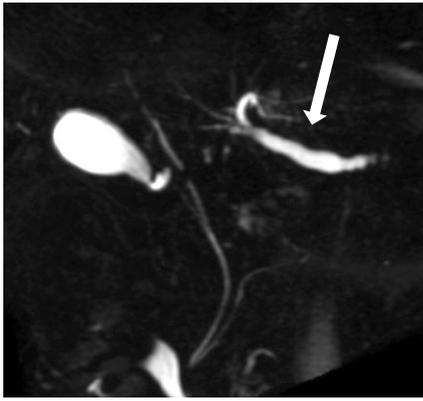


**a**



**b**

**Fig. 3** a: CT showed a low-density continuous tubular structures extending from the left hepatic lobe to the stomach.  
b: CT after contrast agent was injected into the tubular structure also showed the left intrahepatic bile duct extending continuously to the lesser curvature of the gastric corpus.

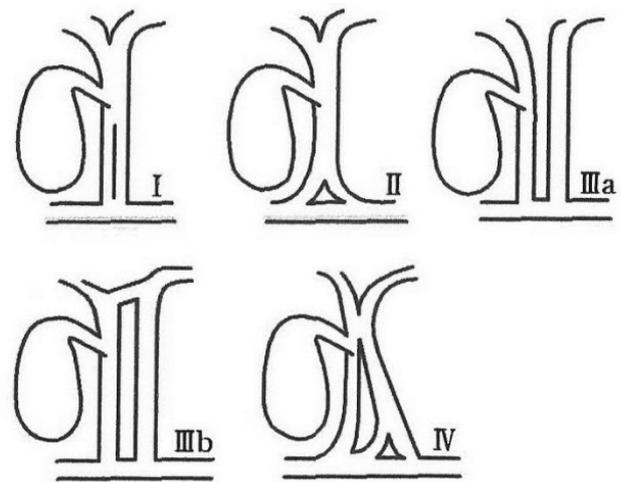


**Fig. 4** MRCP showed a bile duct extending continuously from the lateral segment of the liver to the lesser curvature of the gastric corpus. There was no evident communication with the bile duct in the right lobe or anomalous arrangement of the pancreaticobiliary ducts. The common bile duct that is open to the papilla was visible, but narrow.

disorder arises embryologically when the common bile duct formed from the intersection of the cranial part of the hepatic diverticulum (*pars hepatica*), which goes on to form the hepatic cords and the hepatic duct, and the posterior part of the hepatic diverticulum (*pars cystica*), which goes on to form the gallbladder and the cystic duct, fails to fuse completely during the developmental phase, resulting in the persistence of their respective drainage routes and the consequent formation of two bile ducts. The drainage route is determined by differences in the timing of the separation of the stomach and duodenum, and is most often seen in the duodenum, followed by the stomach and then the pancreatic duct.

Morphologically, Goor categorized this condition into four categories in 1972 under the name “double drainage to the duodenum” [5]. Based on Goor’s classification, in 1988, Saito *et al.* [6] devised a revised classification into the following types: I, septate; II, branching; III, separate (IIIa, the left and right bile ducts open separately into the gastrointestinal tract, with no communication between them; IIIb, the left and right bile ducts open into the gastrointestinal tract after having formed a common bile duct, and the anomalous bile duct branches from either the left or right hepatic duct and opens separately into the gastrointestinal tract); and IV, mixed (Fig. 5). The present patient was type IIIa. Yamashita *et al.* [7] summarized the data for 47 cases of double common bile duct reported in Japan between 1968 and 2002, and they found that around half were type III. Several cases that could not be classed as belonging to any particular type have also been reported thanks to recent advances in diagnostic imaging.

In most cases, this condition is suspected on the basis of EGD, but CT [8, 9], MRCP [10, 11], and endoscopic retrograde cholangiopancreatography (ERCP) [12, 13] have also been reported as useful. ERCP is an invasive examination and was not performed in the present case because the double common bile duct had already been identified by MRCP. This method was also extremely useful because it enabled the double



**Fig. 5** Double common bile duct types: I, septate; II, branching; III, separate (IIIa, no communication; IIIb, with communication); IV, mixed.

common bile duct to be visualized directly by the injection of contrast agent via a catheter into the opening. According to Yamashita *et al.* [7], 80.1% of patients with double common bile duct experience symptoms including epigastric or right hypochondriac pain, but the present patient was asymptomatic, and the condition was discovered only by chance, a comparatively rare occurrence.

One issue with double common bile duct is carcinogenesis. Kondo reported two cases of patients with double common bile duct opening into the stomach who developed stomach cancer [14], and it is believed that patients may be at increased risk of stomach cancer, because chronic irritation of the gastric mucosa by bile causes the development of pyloric gland-like ducts from which stomach cancer may later arise [15]. In the present case, endoscopy did not reveal any signs of irregularity in the gastric mucosa around the opening, and there were no histological signs of malignancy on biopsy. This condition is also believed to be associated with a higher risk of bile duct cancer because of chronic cholangitis caused by constant retrograde flow of bile in the double common bile duct [16]. The duplicated bile duct has a normal structure with histologically normal mucosa, but because its opening lacks a sphincter, there is also a high probability of calculus formation inside the duct as a result of the retrograde flow of gut contents or bile duct infection [17]. When the duplicated bile duct opens into the duodenum or the pancreatic duct, an anomalous arrangement of the pancreaticobiliary ducts may also be present in addition to the double common bile duct, and this may result in cytotoxic pancreatic juices flowing back into the bile duct and building up within the gall bladder or bile duct, which may potentially cause cancer. In the present case, to date no signs of calculi or masses in the duplicated bile duct, common bile duct, or intrahepatic duct have been evident on diagnostic imaging, including with contrast enhancement, MRCP.

In conclusion, a case of asymptomatic double common bile duct draining into the stomach was described. The patient will require careful monitoring

for calculus or tumor formation within the duplicated bile duct and for tumor formation around the ectopic bile duct opening in the stomach.

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