

# MR cholangiopancreatography findings of heterotopic pancreatic tissue in the distal common bile duct

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## ABSTRACT

Heterotopic pancreas is defined as the presence of pancreatic tissue at sites other than the pancreas. Involved sites may be the stomach, duodenum, proximal jejunum, ileum, congenital duodenal web, Meckel's diverticulum, ampulla of Vater, and the main pancreatic duct. We report the magnetic resonance cholangiopancreatography findings of a patient who had biliary obstruction due to heterotopic pancreas tissue at the distal common bile duct.

*Key words:* • heterotopic tissue • pancreas • common bile duct • magnetic resonance imaging

**B**iliary obstruction is a common entity caused by benign and malignant lesions. The level of obstruction may be intrahepatic or extrahepatic. Common entities are pancreatic head carcinoma, cholangiocarcinoma, periampullary tumors, metastases, common bile duct stones, and inflammatory and iatrogenic strictures (1, 2). Rare causes are tuberculosis, sarcoidosis, celiac disease, and Crohn's disease (3, 4).

Biliary obstruction due to heterotopic pancreatic tissue at the major duodenal papilla has been reported in 17 patients (5, 6); however, there are only a few references to patients with heterotopic pancreatic tissue in the common bile duct (7). In this paper, we present the magnetic resonance cholangiopancreatography (MRCP) findings of a patient who had biliary obstruction due to heterotopic pancreatic tissue at the distal common bile duct.

## Case report

A 67-year-old man presented to the general surgery outpatient clinic with abdominal pain, back pain, and jaundice. The total and direct bilirubin levels were 5.0 and 3.7 mg/dl, respectively, and his alkaline phosphatase level was 2000  $\mu$ l. The levels of alpha-fetoprotein, carcinoembryonic antigen, carbohydrate antigen 19-9, carbohydrate antigen 15-3, and amylase were within normal limits. Ultrasonography (US) demonstrated hydrops of the gallbladder and dilation of the intrahepatic bile ducts, common bile duct, and Wirsung duct. MRCP was performed with a 1.5-T scanner (Gyrosan Intera, Philips Medical Systems, The Best, Netherlands).

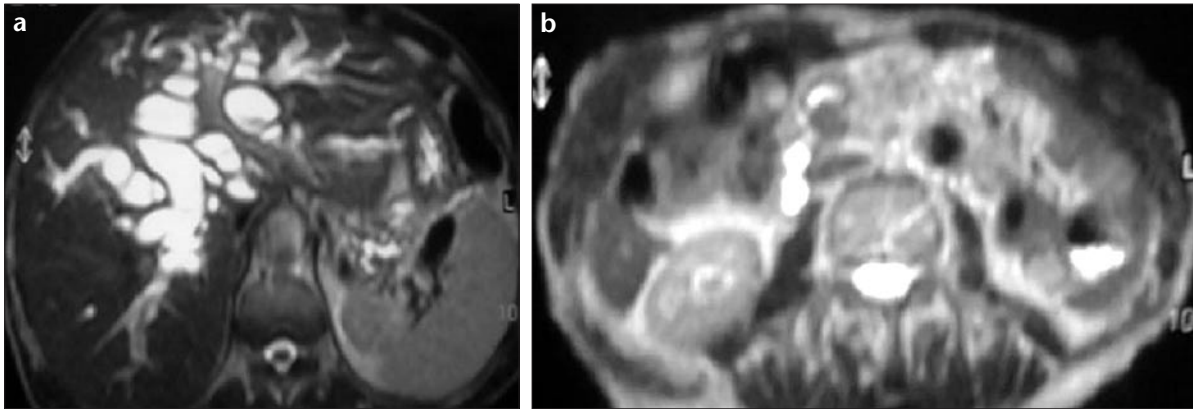
In addition to US findings, MRCP showed a 1-cm hypointense filling defect in the distal common bile duct, which was considered to be compatible with a soft tissue mass, rather than a stone, because of its signal intensity (Figs. 1 and 2). The lesion's contour was smooth and had low signal intensity compared to the pancreas on magnetic resonance (MR) imaging. Neither an enlarged regional lymph node nor a metastatic liver lesion was present. Pathologic examination of preoperative endoscopic biopsy specimen was nondiagnostic. Radiological and pathologic findings were not adequate to differentiate heterotopic pancreatic tissue from other tumors of the distal choledochal tumors. Laparotomy was performed. A peroperative frozen section showed heterotopic pancreatic tissue. Biliary drainage was accomplished with a Roux-Y choledochojejunostomy. Microscopic examination showed ectopic pancreatic tissue under the mucosal epithelium; tumoral tissue was not observed (Fig. 3).

## Discussion

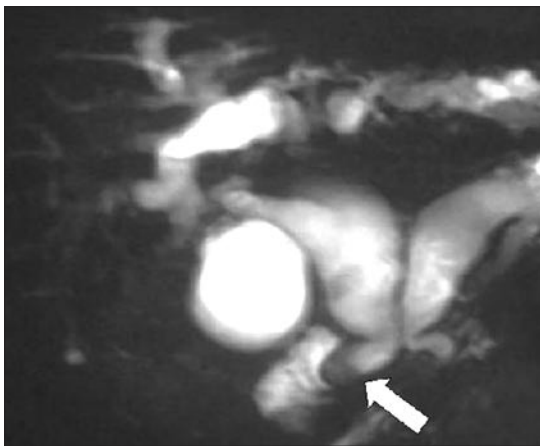
Biliary obstruction at various levels may be due to malignant and benign causes. Leading causes are sclerosing cholangitis and space-occupying lesions at the intrahepatic level; cholangiocarcinoma, sclerosing

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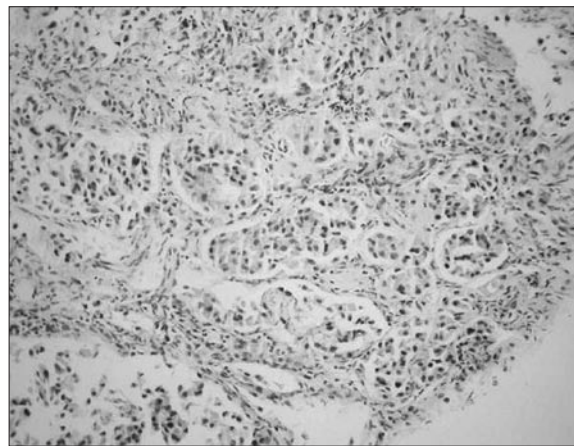
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**Figure 1. a, b.** Axial heavily T2-weighted MR image at the level of the portal hilus shows dilation of the intrahepatic biliary tree and the common bile duct (a). Axial T2-weighted MR image shows a 1-cm hypointense nodular mass arising from the posterior wall of the distal common bile duct and protruding into the lumen (b).



**Figure 2.** MRCP shows dilation of the intrahepatic biliary tree, common bile duct, and Wirsung duct, and a hypointense nodular filling defect in the distal common bile duct (arrow).



**Figure 3.** Microscopic examination of the pathological specimen reveals a heterotopic pancreas composed of acinar structures under the mucosal epithelium. No tumor tissue is observed (HE, x400).

cholangitis, gallbladder carcinoma and metastatic disease at the porta hepatis level; metastatic disease, cholangiocarcinoma and iatrogenic causes at the suprapancreatic level; pancreatic carcinoma, biliary stone disease, chronic pancreatitis, ampullary stenosis, and duodenal and ampullary carcinoma at the intrapancreatic level (1). Choledochal cysts and biliary atresia are congenital conditions that may cause obstructive jaundice (1, 8). Rare causes are tuberculosis, sarcoidosis, celiac disease, and Crohn's disease involving the biliary tree (3, 4). The presented patient had obstructive jaundice due to heterotopic pancreatic tissue in the distal common bile duct.

Imaging findings should play a central role in diagnosis and treatment planning. Common bile duct stones may be detected with US, computed tomography (CT), MR imaging, or

MRCP. MRCP is an effective non-invasive screening method (9). On MRCP, bile duct stones appear as hypointense, filling defects in high-intensity bile ducts. Their cornered shape, location in the common bile duct, and encasement with a high signal intensity area are useful in differentiating them from tumors (9). Tumoral lesions give rise to radiological findings compatible with their locations. Hilar cholangiocarcinomas (Klatskin tumor) cause an abrupt discontinuity at the hilus and dilation of the biliary tree. Cholangiocarcinomas in the distal common bile duct may be difficult to differentiate from pancreatic carcinomas (10). Pancreatic and distal common bile duct carcinomas cause sudden interruption in the middle or distal common bile duct and long-segment strictures. Similar findings may be caused by ampullary and duodenal carcinomas. Periampullary

carcinomas may present as irregular polypoid masses at the junction of the common bile duct and the duodenum, or may protrude into the duodenal lumen (9–11).

Hepatocellular carcinomas may cause dilation of the intrahepatic biliary tree or dilation of the extrahepatic biliary tree by extending beyond the porta hepatis and with direct compression (11). Gallbladder carcinomas may cause malignant strictures by involving the intra- and extrahepatic bile ducts. Metastatic lesions may cause sclerosing-type stenotic lesions at any level in the biliary tree (10).

Secondary benign biliary strictures due to iatrogenic injury, radiation fibrosis, congenital malformation, infection, and sclerosing cholangitis are focal areas with smooth contours and are accompanied by dilation of the proximal biliary tree (12).

Heterotopic pancreatic tissue is defined as the presence of tissue that is located outside the pancreas, but has all the histological features of pancreatic tissue (pancreatic acini, pancreatic duct, and Langerhans cells) (13). The frequency of this lesion in autopsy series varies between 0.5% and 13%, the most common locations are the stomach, duodenum, or the proximal jejunum (5). Other reported locations are the ampulla of Vater, common hepatic duct, ileum, Meckel's diverticulum, and congenital duodenal web. There exist only a few references to patients with heterotopic pancreatic tissue in the common bile duct (6, 7, 14, 15).

A heterotopic pancreas is generally an asymptomatic malformation of the gastrointestinal system (GIS); however, it may become symptomatic due to chronic inflammation or enlargement. Large lesions may cause obstruction of the GIS. Inflammation and ulceration may result in nausea, vomiting, epigastric pain, and weight loss (16). The diagnosis is made by endoscopic biopsy, or more frequently, histopathological examination of the surgically resected specimen. In the presented case, because of the absence of regional lymph node involvement, and local and distant metastases on MR imaging, it was thought to be a benign lesion; however, preoperative diagnosis is difficult, especially in cases of heterotopic pancreatic tissue in the biliary tree. Resection is required for definite diagnosis and treatment planning (14, 16). The

MRCP images of our patient suggested a tumoral process.

In conclusion, although it is a rare entity, heterotopic pancreatic tissue should be considered in the differential diagnosis of biliary obstruction in which a tumoral pathology cannot be differentiated by MRCP.

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