

Case Report

Obstructive jaundice due to peripapillary diverticulum with enterolith compressing the choledochus

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Duodenal diverticula are relatively rare and cause subtle clinical signs and symptoms. Their diagnosis is often delayed until complications develop. We present herein a patient with duodenal diverticulum (enterolith within the diverticulum) mimicking a periampullary neoplasm, who presented with obstructive jaundice. Even if complications occur, an exact preoperative diagnosis may be very difficult especially in patients with previous cancer surgery at this site.

Keywords: Duodenal diverticulum, jaundice, abdominal pain, enterolith

INTRODUCTION

The duodenum is the second most common site of diverticula after the colon. Incidence of duodenal diverticula varies, from 1-6% on upper gastrointestinal contrast studies, 12-27% of endoscopic studies and up to 22% in postmortem analyses (Marhin and Amson, 2005). Most duodenal diverticula occur in the second or third portions of the duodenum, within 2.0 cm of the ampulla of Vater (Jayaraman et al., 2001). Symptomatic duodenal diverticula are rare, and their diagnosis is usually related to complications, which according to reports have included: common bile duct obstruction, acute or chronic recurrent pancreatitis, partial duodenal obstruction, diverticulitis, ulceration, hemorrhage, enterolith formation, malignant degeneration, and perforation (Whang et al., 1995). An exact preoperative diagnosis may be very difficult especially in patients with previous cancer surgery at this site. We present herein a patient with duodenal diverticulum (enterolith within the diverticulum) mimicking a periampullary neoplasm, who presented with obstructive jaundice.

CASE

A 56-year-old woman was admitted to the Department of General Surgery with the complaint of icterus and abdominal pain for five days. Her medical history was unremarkable except for operation for colon cancer six

years before. On review of the operation and follow-up reports, the operation involved extended right hemicolectomy, antrectomy, gastrojejunostomy, Braun anastomosis, and ileocolostomy for a tumor measuring 10x10 cm on the mid-right portion of the transverse colon that invaded the greater omentum and anterior surface of the stomach. According to the medical reports, she had received six courses of chemotherapy. Her first three years of follow-up were uneventful, but she had not been followed during the subsequent three years. Physical examination revealed pain in the right upper quadrant and epigastrium, and Murphy's sign was positive. Laboratory tests performed on admission revealed the following: total bilirubin: 9.8 mg/dL, direct bilirubin: 9.1 mg/dL, alkaline phosphatase: 669 U/L, gamma-glutamyl transpeptidase: 189 U/L, aspartate aminotransferase: 173 U/L, alanine aminotransferase: 319 U/L, leukocyte count: 11,100 mm³, and C-reactive protein: 85 mg/L. Tumor markers including carcinoembryonic antigen and CA 19-9 were in normal limits. Ultrasound examination revealed a hydropic gallbladder (97x51 mm) with multiple gallstones and dilated choledochus (12 mm in diameter), with no visible intraluminal pathology on the proximal 6 cm that could be visualized. However, the distal part of the choledochus could not be evaluated properly due to the gas artifact. Computed tomography (CT) scan of the abdomen revealed overt dilatation of the intrahepatic bile ducts and choledochus with a compression and left-side displacement at the level of the pancreatic head, with an intraduodenal, hyperdense nodular lesion. The lesion was suggestive of choledocholithiasis, calcified tumor or hematoma (Figure 1). Magnetic resonance (MR)

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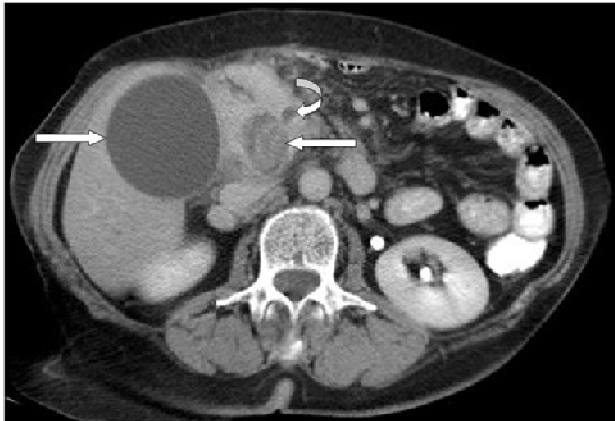


Figure 1. Computed tomography scan of the abdomen showing gallbladder hydrops (right arrow), overt dilatation of choledochus (curved arrow) with an intraduodenal, hyperdense nodular lesion (left arrow).

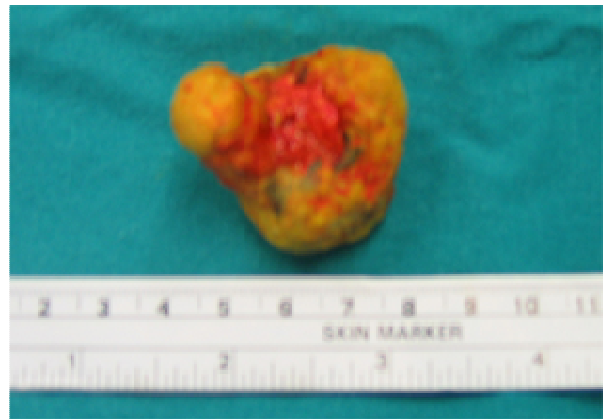


Figure 3. The enterolith that is removed from duodenal diverticulum.

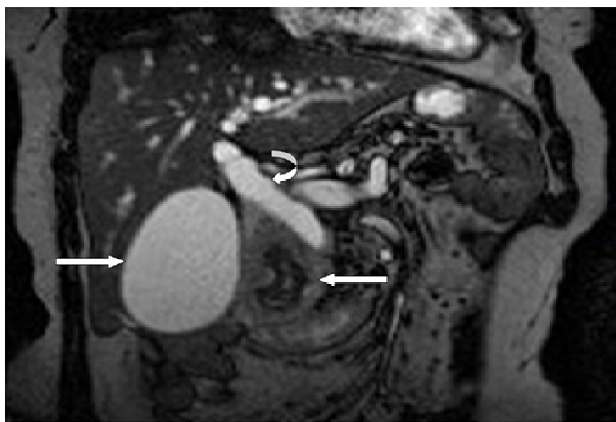


Figure 2. Magnetic resonance cholangiography scan of the abdomen showing gallbladder hydrops (right arrow), overt dilatation of choledochus (curved arrow) with an intraduodenal, hyperdense nodular lesion (left arrow).

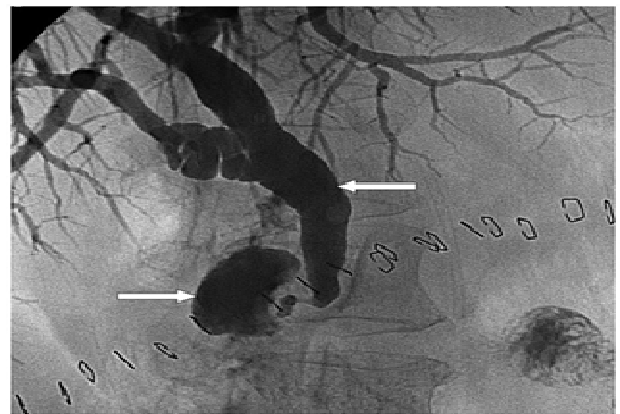


Figure 4. Postoperative percutaneous transhepatic cholangiography view of choledochus (left arrow) and duodenal diverticulum (right arrow).

cholangiography revealed dilated choledochus with nodular lesion of 38x21 mm that was isointense to the gallstone at the level of the duodenum. The duodenal portion around the lesion was somewhat thicker than normal and led us to suspect gallstone, hematoma, or least likely, a tumoral mass (Figure 2). Further evaluation with percutaneous transhepatic cholangiography was decided, which showed dilated intrahepatic and common bile ducts terminated in a blunt end with no passage to the duodenum. An attempt to access the duodenum with a guidewire was unsuccessful. The upper gastrointestinal endoscopic examination showed resection of the stomach at the level of the antrum. A laparotomy was planned with a probable diagnosis of gallstone and less likely of a tumor. On operation, a diverticulum on the posterior aspect of the duodenum was found, containing

a 5x3 cm enterolith (Figure 3). The enterolith was extracted, cholecystectomy was performed and the duodenum was repaired primarily. Because of the adhesions from the previous surgery and the location of the duodenal diverticulum, diverticulectomy was not considered. She was discharged on the seventh postoperative day. On postoperative cholangiography, intrahepatic and common bile ducts were normal with passage of contrast media to the duodenum, and a diverticulum of 2.5 cm was detected at the level of the ampulla of Vater (Figure 4). She was given ursodeoxycholic acid, and was free of signs and symptoms over the course of a ten-month follow-up.

DISCUSSION

The frequency of duodenal diverticula increases with age, and the overall estimated incidence is 5-22% in a healthy population (Duarte et al., 1992). Most duodenal diverticula are acquired, rather than congenital, abnormalities. Approximately 90% of duodenal diverticula are solitary. Most are actually pseudodiverticula, resulting from increased intraluminal pressure causing herniation of the mucosa through the muscularis at weak points in the wall, usually where mesenteric vessels enter (Hariri et al., 2005). Although duodenal diverticula can be symptomatic – most often causing abdominal pain or bleeding – the majority are asymptomatic (Chiu et al., 2000). The most frequent complications are inflammation, hemorrhage, pancreatitis, and common bile duct obstruction. Duodenal diverticula may complicate cannulation of the common bile duct during an endoscopic retrograde cholangiopancreatography or may become impacted with debris, leading to duodenal diverticulitis (Marhin and Amson, 2005). Complications of hemorrhage and increased prevalence of choledocholithiasis have been described (Marhin and Amson, 2005). Lemmel reported the presence of juxtapapillary diverticula with hepatocholangiopancreatic diseases, excluding cholelithiasis, in terms of Papillen syndrome or Lemmel's syndrome (Lemmel, 1934). Patients with juxtapapillary diverticula are likely to suffer regurgitation of their duodenal contents with intestinal bacteria into the bile duct and pancreatic duct, the result being that hepatocholangiopancreatic disease may later occur.

The most uncommon complication is the enterolith formed within the diverticulum. More than likely this is a form of enterolith formed by prolonged cholestasis and food within the diverticulum (Franzen et al., 2002). Duodenal enteroliths are rare but may cause perforation of a diverticulum or biliary obstruction. The duodenal blind loop created by a Billroth II gastrectomy, as in our case, provides a static environment for the formation of enteroliths in duodenal diverticula (Tsukamoto et al., 1999).

The diverticula are easily recognized on upper gastrointestinal barium examinations as collections of gas and barium in round or oval sack-like protrusions that usually arise from the medial aspect of the peripapillary duodenum (Macari et al., 2003). The typical CT appearance of a duodenal diverticulum has been described as a thin-walled rounded collection of gas and oral contrast material situated along the medial border of the junction of the second and third portions of the duodenum (Macari et al., 2003). On T2-weighted MR imaging, duodenal diverticula may contain both high-

(related to the presence of fluid) and low- (related to the presence of gas) signal intensity areas. Misinterpretation of a duodenal diverticulum on CT as a pancreatic tumor, metastatic lymph node, pancreatic pseudocyst, or pancreatic abscess has been reported (Macari et al., 2003; So et al., 1997). The differential diagnosis of a cystic lesion in the region of the head of the pancreas includes cystic pancreatic neoplasms, inflammatory processes (such as pseudocysts) and duodenal diverticula. Although surgical intervention is the standard treatment, conservative therapy is also an option. Balloon enteroscopy could have provided the preoperative diagnosis and potentially allowed non-operative treatment using electrohydraulic lithotripsy (Nishida et al., 1995). Preoperative diagnosis was not made definitively, so we did not use balloon enteroscopy or extracorporeal shock wave lithotripsy.

The duodenal diverticulum in this case report presented a diagnostic dilemma. Despite the technological progress, exact diagnosis remains difficult in some conditions.

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