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Surgery Quiz – Case 11

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An otherwise healthy 62-year-old male patient referred to our surgical department due to progressive jaundice over the preceding 20 days. Direct questioning revealed a history of vague abdominal pain, anorexia and weight loss of approximately 6 kg over the last 3 months. At initial presentation jaundice and palpable gallbladder were present on physical examination. Laboratory studies revealed a significant increase in serum total bilirubin (12.10 mg/dL), alkaline phosphatase (271 IU/L) and γ-glutamyl transferase (85 IU/L). Serum amylase (40 IU/L), IgG (982 mg/dL) and IgG4 (56 mg/dL) levels were normal. Serum CA 19–9 (60 IU/mL) was elevated. Transabdominal ultrasonography showed a dilated pancreatic duct, dilated intrahepatic and extrahepatic bile ducts without gallstones. Initially, an abdominal CT demonstrated interruption of the pancreatic duct in the head/neck of pancreas with upstream pancreatic ductal dilation and biliary dilation without any visible mass or nodule. Subsequently, a dynamic pancreatic CT with a 16-multidetector row scanner according to a dual-phase pancreatic protocol performed and failed to depict a pancreatic lesion of increased or decreased attenuation compared with the normal pancreatic parenchyma (fig. 1). A gadolinium-enhanced dynamic pancreatic magnetic resonance imaging (MRI) then obtained and arterial phase contrast-enhanced T1-weighted images depicted a hypoattenuating lesion at the pancreatic head/neck compared to the upstream pancreatic parenchyma (fig. 2). No evidence of metastatic disease and invasion into local structures depicted. Diagnostic endoscopic retrograde cholangiopancreatography (ERCP) revealed an irregular interruption of the pancreatic duct and narrowing in the distal common bile duct with upstream dilation; a plastic stent was placed across the biliary obstruction. EUS and endoscopic ultrasound-guided fine needle aspirate (EUS-FNA) were not available and radical pancreaticoduodenectomy was performed without biopsy proof 9 days after presentation (standard resection plus distal gastrectomy, single-loop Roux-en-Y reconstruction and retroperitoneal lymph node dissection extending from the right renal hilum to the left lateral border of the aorta and from the portal vein to the inferior mesenteric artery).

Comment

Histopathological examination revealed a stage IIB moderate differentiated pT3pN1MO negative margins pancreatic ductal adenocarcinoma. The mass fulfilled the criteria for being characterized as an isoattenuating pancreatic adenocarcinoma. The isoattenuating pancreatic adenocarcinoma is defined as a mass not directly visible on computed tomography (CT) and recognizable only by second-

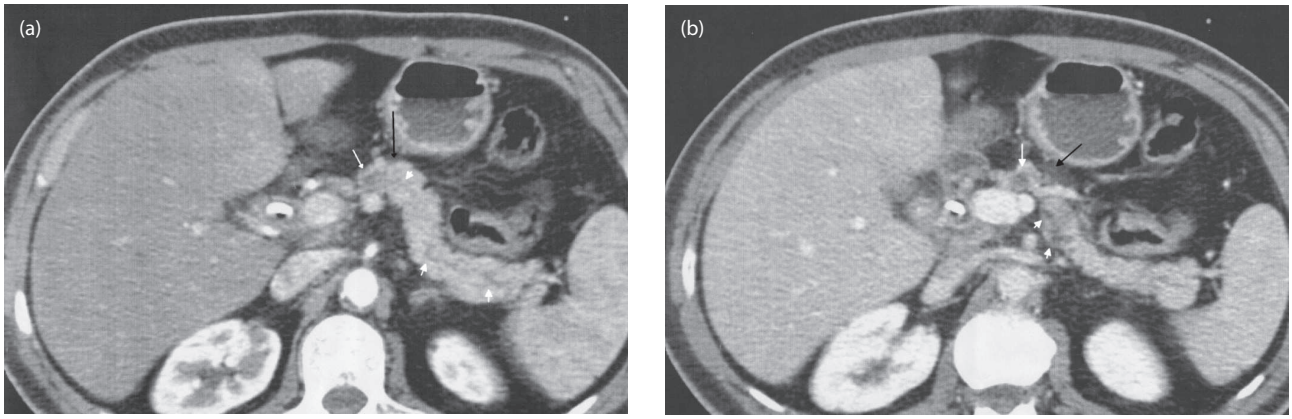

Figure 1. Transverse (a) arterial and (b) portal phase computed tomography (CT) images demonstrated interruption of the pancreatic duct in the neck portion along with downstream (white arrow) and upstream pancreatic duct dilatation (arrowheads). Images did not provide visualization of the mass (black arrow).

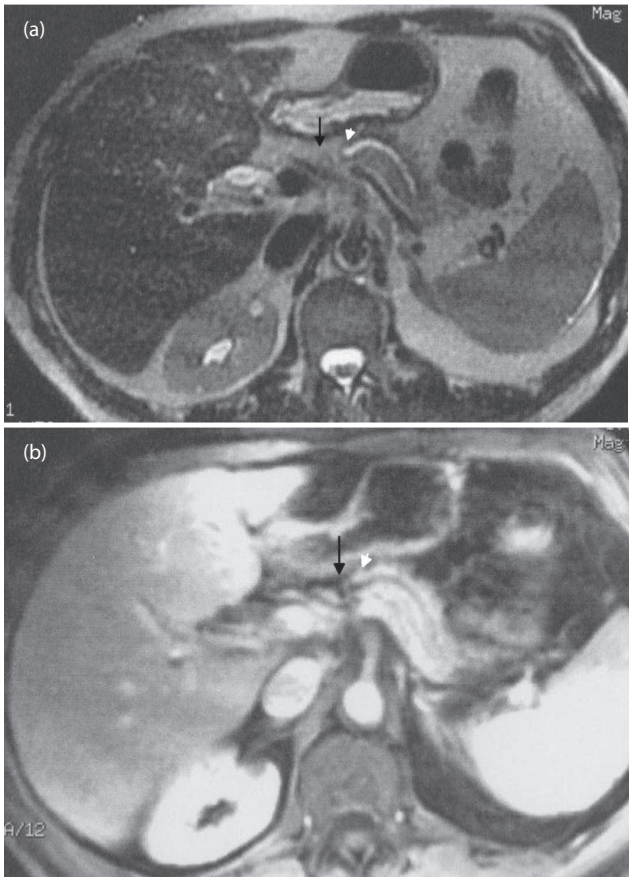

Figure 2. Transverse (a) non-enhanced T2-weighted MR images failed to reveal the mass (arrow), but (b) arterial phase contrast-enhanced T1-weighted magnetic resonance (MR) images revealed a hypoattenuating mass (arrow) compared to the upstream pancreatic parenchyma (arrowheads: upstream pancreatic duct dilatation).

ary imaging signs when both of the following criteria are fulfilled: (a) No pancreatic lesion of increased or decreased attenuation compared with the pancreatic parenchyma is observed in both arterial and portal phases; (b) no CT findings of advanced chronic pancreatitis or severe obstructive pancreatitis are observed, and (c) secondary imaging findings such as interruption or obstruction of the pancreatic duct, pancreatic parenchymal atrophy, narrowing in the distal common bile duct, mass effect and or convex contour abnormality are present.

The isoattenuating pancreatic adenocarcinoma patients represent a small but meaningful subset of patients with pancreatic cancer. In one of the limited number of studies that have been referred in the literature, showed that the incidence of isoattenuating tumors was 5.4%. In their study, the median survival after curative-intent surgery was longer in isoattenuating pancreatic adenocarcinoma patients (30 months vs 15.6 months, p=0.002). The adjusted hazard ratio for isoattenuating to usual pancreatic adenocarcinoma was 0.430, indicating that the isoattenuating pancreatic adenocarcinoma was independently associated with a 57% reduced risk of death after curative-intent surgery. The more favorable postsurgical survival of the isoattenuating pancreatic adenocarcinoma patients makes it even more imperative to correctly diagnose their cases at a stage when surgical resection is possible by performing a thorough diagnostic work-up.

The reported sensitivity of dynamic pancreatic CT in revealing pancreatic carcinoma is high, ranging between 89% and 97%. However, considerable limitations exist, like in our patient's case, as the frequency of isoattenuating pancreatic adenocarcinoma on dynamic-enhanced CT among pathologically proved pancreatic cancers has been reported to range from 5.4% to 14%. Dynamic pancreatic MRI has been reported to be superior to CT for depicting (a) small masses, and (b) isoattenuating masses as can aid visualization of approximately 80% of the isoattenuating pancreatic adenocarcinomas at CT. In our patient's case, MRI finally exposed the mass. Unfortunately EUS and EUS-FNA were not available.

Differential diagnosis includes benign focal pancreatic ductal stricture and the focal type of autoimmune pancreatitis. Considering the generally highly specific nature of MRI and positron emission tomography/computed tomography (PET/CT), the distinction between isoattenuating pancreatic adenocarcinoma and benign focal pancreatic ductal stricture should be straightforward. On the other hand, the distinction between the isoattenuating pancreatic adenocarcinoma and autoimmune pancreatitis can be problematic, as autoimmune pancreatitis can manifest as a mass or nodule at MRI and typically shows strong uptake at PET/CT. EUS-biopsy, serum IgG4 levels, and HISORt (histology, imaging, serology, other organ involvement, and response to therapy) are used for diagnosis. If autoimmune pancreatitis is suspected but not histologically confirmed, the response to a short course of steroids is helpful for diagnosis.

Once the diagnosis of an isoattenuating pancreatic adenocarcinoma is established management strategy should be developed and implemented as referred below. The isoattenuating pancreatic adenocarcinoma is not directly visible on dynamic CT. The majority of the isoattenuating tumors are recognized at CT by the presence of secondary imaging findings. These secondary findings are highly suggestive of malignancy. When dynamic CT fails to depict a definitive mass, dynamic MRI should be performed as it can unmask 80% of the isoattenuating pancreatic adenocarcinomas. Regardless of MRI findings, treatment decision is made in accordance with the resectability status based on CT findings. Surgery is performed in resectable isoattenuating pancreatic adenocarcinoma patients without EUS-FNA cytology, as in the presence of a solid mass suspicious for malignancy biopsy proof is not required before proceeding with resection. Biopsy is mandatory only for patients requiring a diagnosis, such as patients with borderline resectable disease initiating neoadjuvant therapy and patients highly suspected of autoimmune pancreatitis initiating a short course of steroid treatment. However, a non-diagnostic biopsy should not delay surgical resection when the clinical suspicion for pancreatic malignancy is high.

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