

CASE REPORT

Adenocarcinoma of the Pancreas Undetected by Multidetector CT, Endoscopic Ultrasound, or Intraoperative Ultrasound

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ABSTRACT

Context Patients with known or suspected pancreatic adenocarcinoma are typically evaluated with noninvasive imaging studies and endoscopic ultrasound. Rarely, patients require intraoperative evaluation with intraoperative ultrasound to identify mass lesions. Some patients have pancreatic adenocarcinomas that cannot be detected using any of these methods. **Case report** A 58-year old female presented with a distal common bile duct stricture seen on ERCP with negative brushings. Multiple endoscopic ultrasound and triple phase pancreatic protocol CT exams were negative for a mass lesion and revealed a normal pancreas. Intraoperative ultrasound of the pancreas was also felt to be normal. Intraoperative biopsy of the head of the pancreas revealed a small, moderately to poorly differentiated adenocarcinoma, not visible on any of her imaging studies. **Conclusion** Some pancreatic adenocarcinomas may defy detection using modern imaging modalities. This case illustrates how extensive imaging failed to detect a malignancy prior to surgery. Patients with a high clinical suspicion for malignancy but no visualized mass should undergo operative evaluation with definitive tissue sampling.

INTRODUCTION

Modern imaging modalities are able to detect most pancreatic adenocarcinomas, but none of these has a 100% sensitivity or specificity. We present a case of a patient with a small adenocarcinoma in the head of the pancreas that defied detection using multidetector CT scans, endoscopic ultrasound, and intraoperative ultrasound.

CASE PRESENTATION

A 58-year-old woman presented with painless jaundice for one month. Past history includes a gastric lap band placement, lumpectomy of ductal breast carcinoma, and distant cholecystectomy. She denied any tobacco, alcohol, or drug use.

On exam, she was afebrile with stable vital signs. Her weight was stable. She was jaundiced with scleral icterus. Her abdomen was soft and non-distended without tenderness, guarding, or organomegaly. Laboratory findings included total bilirubin 8.2 mg/dL (reference range: 0.2-1.3 mg/dL); direct bilirubin 7.0

mg/dL (reference range: 0-0.4 mg/dL); aspartate transaminase (AST), 65 U/L (reference range: 14-50 U/L); alanine transaminase (ALT), 66 U/L (reference range: 9-52 U/L); alkaline phosphatase, 397 U/L (reference range: 38-126 U/L). Her serum carbohydrate antigen 19-9 (CA 19-9) was 105 U/mL (reference range: 0-37 U/mL).

Initial CT scan performed at an outside institution showed intrahepatic biliary dilation and common bile duct distention measuring 2 cm. The CT was negative for pancreatic mass, pancreatic lesions, pancreatic ductal dilation, or pancreatic abnormalities of any kind. EUS performed with 160 series radial and linear echoendoscopes (Olympus Endoscopy, Center Valley, PA, USA) and an ProSound Alpha Five processor (Aloka, Wallingford, CT, USA), revealed a normal appearing ampulla and pancreas without celiac or peripancreatic adenopathy and a normal pancreatic duct. The peripancreatic vasculature was normal with normal tissue planes. ERCP confirmed a normal appearing ampulla and demonstrated a tight, 4 mm long distal common bile duct stricture. Biliary sphincterotomy was performed and multiple biopsies from within the ampulla were negative for malignancy, as were common bile duct brushings. A biliary stent was placed with rapid improvement in jaundice.

Over the next 3 months, two subsequent ERCPs with brushings revealed identical findings, without improvement in the stricture. A second EUS also failed to identify any pancreatic abnormality or peripancreatic adenopathy. Her CA 19-9 level fell to 40 U/mL.

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Testing for autoimmune pancreatitis or sclerosing cholangitis were negative. Nonetheless, the suspicion for underlying malignancy was high given her presentation and lack of improvement. The patient was made aware of these concerns but was reluctant to see a surgeon. Two additional triple-phase, pancreatic protocol CT scans obtained at our institution using a 128 Somatom Definition AS scanner (Siemens Medical Solutions USA, Malvern, PA, USA) during this time were interpreted as revealing a normal pancreas without mass lesion or adenopathy (Figure 1).

Three and a half months after presentation the patient developed cholangitis requiring emergent ERCP with stent exchange. The stricture remained unchanged from baseline. The patient was referred to a surgeon for surgical exploration, intraoperative ultrasound of the pancreas, and a definitive biliary drainage procedure. The surgeon was a dedicated surgical oncologist with extensive experience with intraoperative ultrasound.

Visual examination of the pancreas was felt to be negative for abnormality or mass lesion. Careful intraoperative ultrasound examination was performed. The entire pancreas, including the head of the pancreas with specific attention to the region of the distal common bile duct and pancreatic duct, was felt to be normal. Given the patient's overall situation, random transduodenal core biopsies of the head of the pancreas near the distal common bile duct were performed, frozen sections of which demonstrated moderately to poorly differentiated adenocarcinoma. Subsequently a pancreaticoduodenectomy was performed.

The pathology revealed a small focus of invasive adenocarcinoma measuring approximately 1 cm (Figure 2). No malignancy was found in the common bile duct, remaining pancreatic parenchyma, or 11 lymph nodes. She has done well postoperatively and has begun adjuvant chemotherapy with gemcitabine. Her CA 19-9 level has fully normalized.

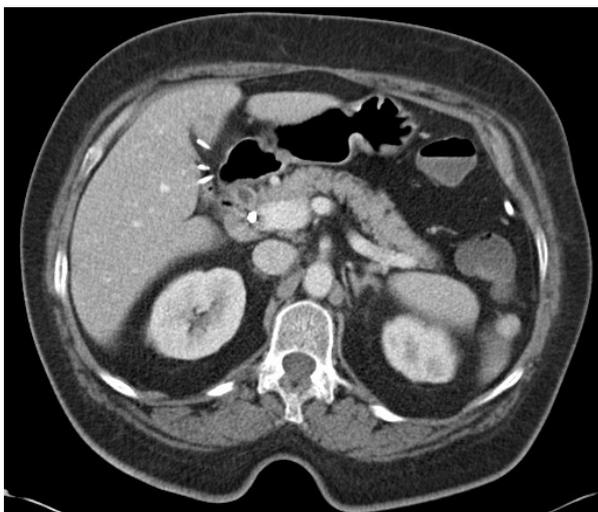


Figure 1. Initial contrast enhanced CT scan of the patient following ERCP demonstrating a normal appearing pancreas without mass or adenopathy. There is a stent present in the common bile duct.

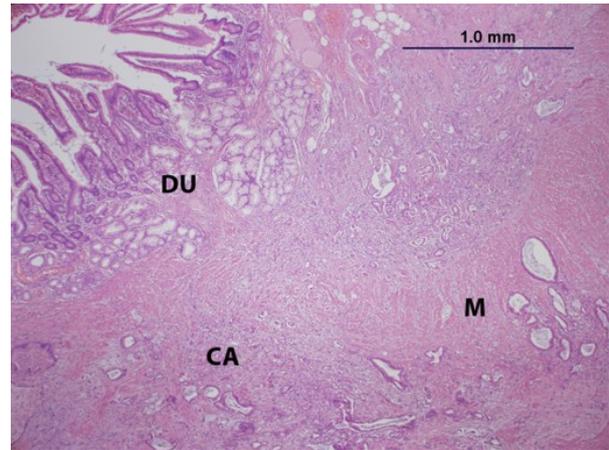


Figure 2. Photomicrograph of surgical specimen showing adenocarcinoma in the head of the pancreas infiltrating to the level of the muscularis propria of the duodenal wall. (H&E, magnification 4x).

CA: cancer; DU: duodenum; M: muscularis propria

DISCUSSION

Available imaging studies in patients with suspected pancreaticobiliary malignancy include CT, magnetic resonance imaging (MRI) with magnetic resonance cholangiopancreatography (MRCP), EUS, ERCP, and laparoscopy with or without intraoperative ultrasound.

None of these tests have 100% sensitivity and specificity for detecting pancreatic cancer. Multidetector CT, MRI, and EUS have rates sensitivity of 91%, 84%, 93%, respectively [1]. Intraoperative ultrasound is primarily used to stage lesions and evaluate vascular invasion in patients with known malignancy and has a sensitivity of 93% [2]. Ampullary lesions can be detected by CT, MRI, EUS, and ERCP in 19%, 81%, 95%, and 95% of patients, respectively [3, 4]. Ampullary biopsies are positive in up to 86% of patients, although some studies report lower rates [5].

This patient never underwent MRI or intraductal ultrasound (IDUS), and it is unknown if either of these tests would have detected her tumor. IDUS was not available at our institution at the time of the patient's evaluation. The patient was reluctant to undergo an MRI, although this had been discussed. A high clinical suspicion for malignancy prompted laparoscopy with core pancreatic head biopsies and ultimately yielded a diagnosis before the patient developed any nodal or distant metastases.

This case highlights the fact that small pancreatic tumors can defy detection using multiple imaging modalities and that surgical exploration is warranted if malignancy cannot be excluded. Modern means of detection such as EUS, triple phase CT scans, and intraoperative ultrasound all have limitations. This patient had the unusual finding of an isodense (on CT) and an isoechoic (on EUS and intraoperative ultrasound) tumor that made diagnosis a challenge.

Conflict of interest The authors have no potential conflicts of interest

References

1. Thirumurthi S and Adler DG. Pancreatic Adenocarcinoma. Hospital Physician 2006 Aug;42 (8):39-49.
 2. Long EE, Van Dam J, Weinstein S, Jeffrey B, Desser T, Norton JA. Computed tomography, endoscopic, laparoscopic, and intra-operative sonography for assessing resectability of pancreatic cancer. Surg Oncol. 2005 Aug;14(2):105-13. Review.
 3. Chen CH, Tseng LJ, Yang CC, Yeh YH, Mo LR. The accuracy of endoscopic ultrasound, endoscopic retrograde cholangio-pancreatography, computed tomography, and transabdominal ultrasound in the detection and staging of primary ampullary tumors. Hepatogastroenterology. 2001 Nov-Dec;48(42):1750-3.
 4. Chen CH, Yang CC, Yeh YH, Chou DA, Nien CK. Reappraisal of endosonography of ampullary tumors: correlation with transabdominal sonography, CT, and MRI. J Clin Ultrasound. 2009 Jan;37(1):18-25.
 5. Yamaguchi K, Enjoji M, Kitamura K. Endoscopic biopsy has limited accuracy in diagnosis of ampullary tumors. Gastrointest Endosc 1990; 36:588.
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