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CASE REPORT | BILIARY

An Unusual Case of Dual Pancreatic Tumors

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ABSTRACT

We report a simultaneous occurrence of pancreatic adenocarcinoma and pancreatic neuroendocrine tumor. A 64-year-old woman presented with abdominal pain and weight loss. Abdominal computed tomography revealed a pancreatic head mass with a mesenteric artery encasement. Endoscopic ultrasound revealed a second mass in the tail of the pancreas. Pathology reported adenocarcinoma of the head of the pancreas and a neuroendocrine tumor in the tail of the pancreas. The neuroendocrine tumor was nonfunctional, with no symptoms or signs present on assessment. The patient had advanced unresectable carcinoma, so she was treated with chemotherapy.

KEYWORDS: pancreatic cancer; dual pancreatic cancer; pancreatic adenocarcinoma; pancreatic neuroendocrine tumor

INTRODUCTION

Pancreatic adenocarcinoma (PDAC) is the second most common gastrointestinal cancer in the United States after colon cancer.[1,2] By contrast, pancreatic neuroendocrine tumor (PNET) is rare, constituting only 1%–2% of all pancreatic neoplasms.[3] The incidence of distinct but coexisting pancreatic exocrine and endocrine tumors is very low, with only a few reported cases. We present the case of a 64-year-old woman who presented with a clinical syndrome that subsequently led to a diagnosis of isolated exocrine and neuroendocrine tumors of the pancreas.

CASE REPORT

A 64-year-old White woman presented with a month's history of mild epigastric pain and fatigue. Her pain was intermittent, which improved with eating. She denied melena, hematochezia, or hematuria. The patient was a nonsmoker with no family history of malignancy. At the time of the presentation, she was afebrile and hemodynamically stable. The physical examination was consistent with epigastric abdominal tenderness without organomegaly, guarding, or rigidity. Laboratory findings were significant for normocytic anemia with a hemoglobin of 11.1 g/dL, hematocrit of 35.1%, mean corpuscular volume of 84.4 fL, ferritin of 12 ng/mL,

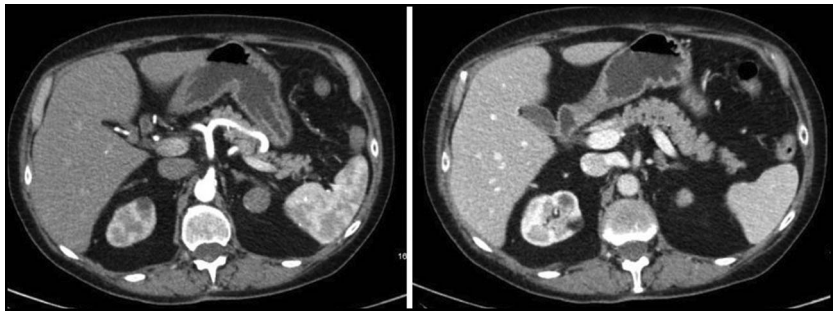

Figure 1. Abdominal computed tomography with contrast showing a 5.4 cm necrotic mass at the uncinate process of the pancreas with complete encasement of the superior mesenteric artery and approximately 50% encasement of branches of the superior mesenteric vein.

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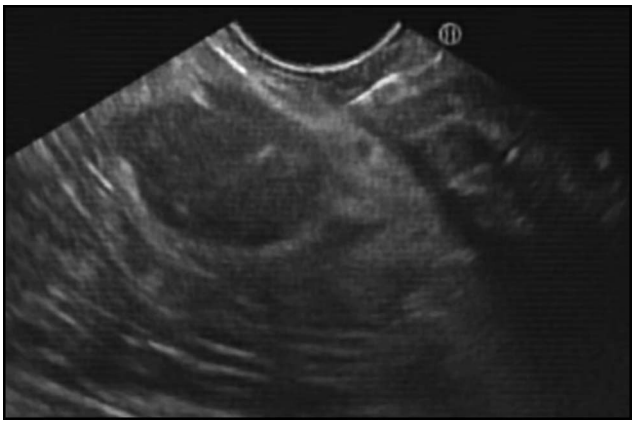

Figure 2. 5.4 × 4.4 × 4.7 cm heterogeneously enhancing mass at the uncinate process with internal hypoattenuation.

and lipase of 49 U/L. Her electrolytes were within normal limits. She received a trial of proton pump inhibitor therapy for 8 weeks without much relief of symptoms. She continued to have abdominal pain, with radiation to her back. She had noticed decreased appetite, early satiety, and bloating and had lost 14 pounds within 2 months of her initial presentation.

Esophagogastroduodenoscopy showed normal gastric, duodenal, and esophageal mucosa, and biopsies showed mild chronic gastritis. Colonoscopy showed pandiverticulosis. An abdominal computed tomography (CT) scan showed a lobulated 5.4 cm necrotic mass at the uncinate process of the pancreas with complete encasement of the superior mesenteric artery and 50% encasement of branches of the superior mesenteric vein (Figure 1). CA-125 was 23 U/mL. Endoscopic ultrasound (EUS) showed a 4.5 × 5 cm hypoechoic irregularly shaped mass in the head of the pancreas, which was seen in CT (Figure 2). In addition, EUS identified a second 3 × 3.5 cm hypoechoic irregularly shaped mass in the pancreatic tail, which was not evident on the abdominal CT.

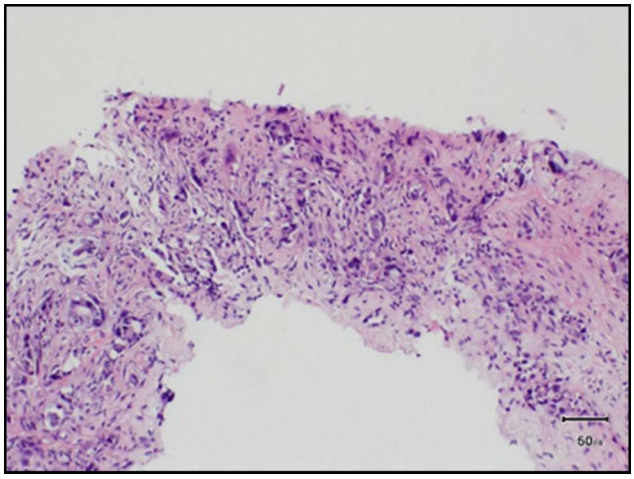

Figure 3. Biopsy of the pancreatic head lesion showing significant nuclear pleomorphism consistent with pancreatic adenocarcinoma.

A biopsy of the pancreatic head mass showed adenocarcinoma (Figure 3), and the pancreatic tail mass showed tumor cells diffusely positive for synaptophysin and negative for chromogranin and S100, consistent with a well-differentiated neuroendocrine tumor (Figure 4). She was diagnosed with T4N0, stage III PDAC. The adenocarcinoma was locally advanced and unresectable. Chemotherapy was initiated with oxaliplatin, irinotecan, leucovorin, and 5-fluorouracil, with the patient requiring gemcitabine radiation therapy in the year postdiagnosis. After about one and a half years of initial diagnosis, the patient developed chronic diarrhea, bloating, hypokalemia, and severe weight loss, for which she was rehospitalized multiple times. The symptoms were suspected because of pancreatic exocrine insufficiency in the setting of unresectable pancreatic cancer and chemotherapy. Pancreatic elastase-1 was 134 μg/g (>200 μg/g is normal), representing moderate pancreatic insufficiency. The stool fat screen was negative. She started pancrelipase enzyme supplementation and antimotility agents. Eventually, she chose comfort care and died approximately 2 years after her initial pancreatic cancer diagnosis.

DISCUSSION

The pancreas is composed of exocrine ductal and acinar cells and endocrine islet cells. Pancreatic cancers can be classified based on the cells of origin—ductal, acinar, or endocrine. Ductal adenocarcinoma accounts for more than 75% of pancreatic cancers. Neuroendocrine carcinomas account for 7%, and acinar cell carcinomas account for as little as 1%.[4] The incidence of PNETs is only 1% to 2% of all pancreatic neoplasms.[5] The incidence of dual pancreatic cancers involving both endocrine and exocrine cell lines is rare, and the current literature is scarce.

In this report, we present a unique case of 2 concurrent but histologically distinct pancreatic tumors: ductal adenocarcinoma of the pancreatic head and a neuroendocrine tumor of the

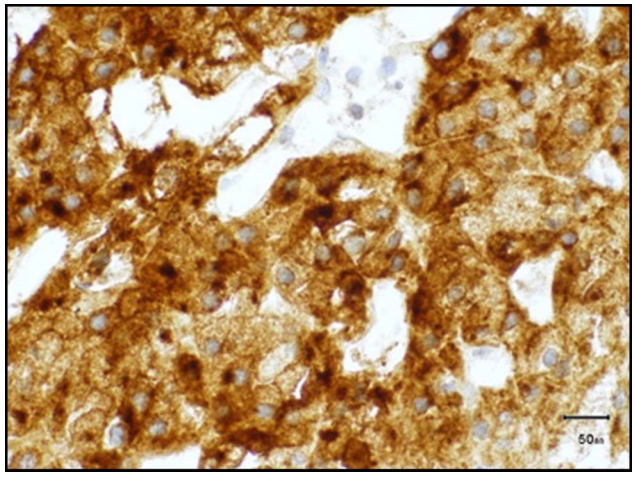

Figure 4. Fine-needle aspiration sample of pancreatic tail lesion showed tumor cells diffusely positive for synaptophysin and negative for chromogranin and S100, consistent with a well-differentiated neuroendocrine tumor.

pancreatic tail. There was no evidence of the intermixing of the 2 tumor masses. This case falls under the definition of collision tumors, according to the World Health Organization histological classification. The World Health Organization defines collision tumors as at least 2 malignant tumors located in the same organ or anatomic site without any mixed or transitional area.[6]

Interestingly, our patient's pancreatic tail PNET lesion was not identified on the initial abdominal CT and was visualized only during the EUS. The reported sensitivity of contrast-enhanced CT varies between 63% and 82% while the actual detection rate ranges between 39% and 94%. The high vascularity of the PNET makes it detectable in the late arterial-phase CT. However, some PNETs can be hypervascular, especially nonfunctioning tumors.[7] The nonfunctioning nature of our tumor explains the nondetection of our patients' pancreatic tail PNET on CT imaging.

Only 0.06% to 0.20% among all pancreatic tumors are combined neoplasms.[5,8] The most frequently reported combination of exocrine and endocrine pancreatic tumors is PNET with intraductal papillary mucinous neoplasm.[1] The literature on dual pancreatic tumors primarily reports concomitant neuroendocrine and intraductal papillary mucinous neoplasms.[5,9] The combination of PNET and PDAC is exceedingly rare.[5]

Our literature search resulted in the following reported PDAC and PNET collision tumor cases. In 2010, Chang et al[3] described a solitary concomitant pancreatic mass containing a poorly differentiated adenocarcinoma component separated from a neuroendocrine tumor by a fibrous band. The case of Chang et al is the first reported case of a solitary pancreatic mass with 2 separate cell populations. Another recent report by Liu et al[5] reported a case of the concomitant pancreatic pseudocyst, PDAC of the head, and pancreatic tail PNET. A case reported collision pancreatic tumor consisting of PDAC and NET associated with a jejunal gastrointestinal stromal tumor.[8] Recently, another case of pancreatic collision tumor with PDAC and PNET associated with MEN1 syndrome was reported.[10] Sabol et al[11] reported a fascinating case of PDAC surrounding a minor focal lesion of the well-differentiated PNET without any intermixing. Another similar case of PNET surrounding a small focus of PDAC without intermixing of cells was reported by Wang et al.[12]

The coexistence of 2 primary tumors in the same organ is a rare phenomenon, and the pathogenesis of dual pancreatic tumors remains unclear.[11] After reviewing the existing literature, we found a few possible explanations of the phenomenon. First, having 2 primary tumors in the same organ could be purely coincidental. A plausible explanation is that one of the primary tumors appeared first and created microenvironmental changes by inflammation and angiogenesis, thus facilitating the genesis of a second tumor.[13] Pour et al published a report that hypothesized that pancreatic tumors develop from totipotent cells distributed in both islet and ductal cells. Depending on their location and stimulation, these stem cells give rise to exocrine and endocrine cells. Primitive exocrine cells differentiate into ductal and acinar cells, whereas endocrine cells differentiate into islet cells.[3,14] Capella et al[15] hypothesized that dysfunction of multiple tumor-suppressor genes can cause inadequate repair of genes, leading to numerous types of malignancies.

As the authors of this case report, we hypothesize that a carcinogenic factor may have a variable effect on different tissue types and thus may give rise to varying kinds of neoplasms in the same organ. The same carcinogenic trigger may cause tumorigenesis in the pancreatic beta and ductal cells, giving rise to different types of tumors. The number of dual cancer cases has increased in the past decade because of improved diagnostic imaging techniques. However, preoperative diagnosis remains challenging.[11,16] In our patient, the abdominal CT showed only the pancreatic head mass, but did not identify the tail lesion. It was EUS that determined the pancreatic tail lesion. Determination of prognosis is difficult because the stages of both tumors need to be considered. Nevertheless, existing literature on mixed exocrine and endocrine pancreatic tumors leans toward basing the prediction on the stage of ductal adenocarcinoma.[3,15] Determination of the treatment regimen is difficult because of 2 different neoplasms, and no guidelines are available yet.

DISCLOSURES

Author contributions: T. Chatterjee and Y. Reddy reviewed the literature and formatted the manuscript. M. Badshah and S. Puli provided images and edited the manuscript. Y. Reddy is the article guarantor.

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