Colon Cancer Metastatic to the Pancreas Presenting as of Diabetic Ketoacidosis

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ABSTRACT
Most of the malignant pancreatic lesions are primary pancreatic tumors with only a small percentage due to metastases. Pancreatic malignancies often present with symptoms such as jaundice and weight loss. Less commonly, new-onset diabetes mellitus has been seen in the setting of pancreatic adenocarcinomas. Although colon cancer commonly presents with metastatic disease, it typically spreads to the liver, lung, and peritoneum. We present a rare case of colon cancer metastatic to the pancreas presenting as diabetic ketoacidosis.

INTRODUCTION
Although pancreatic lesions have many etiologies, the most concerning are symptomatic masses with features of malignancy on radiographic studies. Most (94%) malignant pancreatic masses are primary tumors, but rarely, pancreatic malignancies are from metastatic disease. When there is no evidence of metastatic disease, masses can often be surgically removed without pathologic confirmation. When pancreatic masses are found with associated signs of metastatic disease, tissue sampling is important to establish a diagnosis and confirm staging. The most common presenting symptoms of pancreatic masses are due to obstruction of the biliary or pancreatic ducts such as jaundice and pale stools, but atypical presentations such as diabetes, pancreatitis, or gastrointestinal bleeding can occur.1,2 Symptoms of diabetic ketoacidosis (DKA) were the presenting features of a colon cancer metastatic to the pancreas.

CASE REPORT
A 69-year-old man with a 70 pack-year tobacco use history and hypertension presented to the emergency department with a few months of progressive shortness of breath, fatigue, weight loss, and abdominal pain. Laboratory tests demonstrated a white blood cell count of 11.8 × 10^9/L, a hemoglobin level of 8.0 g/dL, a sodium level of 125 mmol/L, and a glucose level of 656 mg/dL, with positive serum ketones indicating DKA. His transaminases, bilirubin, and alkaline phosphatase were normal. His hemoglobin A1c was 11.7% on admission. The patient was treated with insulin and intravenous crystalloids, with resolution of his DKA and symptomatic improvement.

A thoracic x-ray was performed that showed multiple lung nodules. Thoracic, abdominal, and pelvic computed tomography revealed bilateral lung masses, a pancreatic head mass, multiple hypodense liver lesions, and thickening of the sigmoid colon. It was suspected that the findings were either because of a primary lung cancer or from metastatic disease from a primary pancreatic malignancy, so a bronchoscopy was performed in an effort to establish a diagnosis and stage of disease. Cytology revealed metastatic adenocarcinoma with a suspected colonic, hepatobiliary, or upper gastrointestinal etiology for the primary malignancy. A positron emission tomography showed an ill-defined pancreatic head mass that measured approximately 5.2 × 6.9 cm, a circumferential nodular wall thickening and strictureing of the sigmoid colon that measured approximately 5.7 cm in length, and multiple lung and liver masses.
On further search for a primary malignancy, esophagogastroduodenoscopy, endoscopic ultrasound, and a flexible sigmoidoscopy were performed. The endoscopic ultrasound demonstrated a 40 x 36 mm oval and hypoechoic mass at the head of the pancreas (Figure 1). Fine needle aspiration using a slow-pull technique was performed with a 22 G needle. Three passes were performed. Cytotec was present, and they confirmed adequate cellularity. On the flexible sigmoidoscopy, a fungating, friable mass was seen in the sigmoid colon that was circumferential and partially obstructed the lumen (Figure 2). Biopsies of the pancreatic mass showed poorly differentiated carcinoma of unclear primary source. Biopsies of the sigmoid mass revealed adenocarcinoma consistent with a primary colon cancer. On the same day as the procedure, cancer antigen 19-9 level returned 1 U/mL and carcinoembryogenic antigen level returned 140.6 ng/mL. Given the widely metastatic nature of his disease, he was offered fluorouracil, oxaliplatin, and leucovorin + bevacizumab as well as a palliative care referral. He declined chemotherapy, and the patient died 6 weeks after his initial presentation.

DISCUSSION

Most malignant pancreatic lesions are primary pancreatic tumors, with only a small percentage representing metastases. When malignant pancreatic lesions become symptomatic, they often present in an advanced stage with obstruction of the pancreatic and/or biliary ducts. The size, location, and spread of the lesion have a significant impact on available therapies and prognosis. New-onset diabetes mellitus has been associated with pancreatic adenocarcinomas, although the exact mechanism of the relationship is unknown. Proposed mechanisms include a paraneoplastic effect from the pancreatic adenocarcinoma, inflammation-altering islet function, and deficiency pancreatic polypeptide response. In review of the literature on PubMed, we have not found another case of DKA because of pancreatic metastases.

Although pancreatic metastases are rare, the most common tumor to metastasize to the pancreas is renal cell carcinoma. Management of malignant pancreatic lesions from metastatic disease is dependent on the source of the primary disease and extent of other metastatic disease. Renal cell carcinoma is more likely to have an isolated pancreatic metastasis, so surgery may be an option. Reports of other sites of primary malignancies spreading to the pancreas (lung, melanoma, colon), as we saw in our patient, frequently have widely metastatic disease on presentation requiring systemic therapy. The prognosis in patients with pancreatic metastases is correlated directly with the type of primary malignancy. Metastatic renal cell carcinoma, breast cancer, and colon cancer have higher survival rates than metastatic sarcoma and lung cancer.

Colon cancer is the third leading cause of cancer worldwide. The most common symptoms of colon cancer are change in bowel habits, rectal bleeding, and abdominal pain. On presentation, 20% of patients will have metastatic disease, and the most common sites for metastatic colon cancer are liver, lung, and peritoneum. Rarely seen is metastatic colon cancer to the pancreas. One study of patients with colon cancer and biopsy-proven metastatic disease to the pancreas showed that nearly all had symptoms of obstructive disease from the pancreatic mass, from biliary, pancreatic, or intestinal obstruction. All of the primary malignancies were from the transverse or right side of the colon. There were no reported left-sided colon cancers metastasizing to the pancreas, and no reports of DKA symptoms at presentation, making our patient’s presentation even more uncommon.
As is common practice, when radiologic studies are concerning for widely metastatic malignancy on presentation, areas of potential malignancy should undergo tissue sampling. This is performed to obtain pathologic confirmation of the primary tumor and confirmation of metastatic disease. The pathology helps to determine therapeutic options and prognosis. Although there are typical patterns of metastatic spread of different malignancies that can direct the evaluation of tissue sampling, rare presentations occur. In our case, based on imaging and new-onset diabetes, the initial concern was either for a pancreatic adenocarcinoma, given known pattern of metastasis to both the lungs and the liver vs a primary lung cancer. However, ultimately, it was with flexible sigmoidoscopy and discovery of a sigmoid mass that the diagnosis of primary colon cancer with diffuse metastases was made.

DISCLOSURES

Author contributions: All authors contributed equally to this manuscript. A. Bush is the article guarantor.

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Informed consent could not be obtained from the family of the deceased. All identifying information has been removed from this case report to protect patient privacy.

REFERENCES

1. Holly EA, Chaliha I, Bracci PM, Gautam M. Signs and symptoms of pancreatic cancer: A population-based case-control study in the san francisco bay area. Clin Gastroenterol Hepatol. 2004;2(6):510–7.
2. Adsay NV, Andea A, Basturk O, et al. Secondary tumors of the pancreas: An analysis of a surgical and autopsy database and review of the literature. Virchows Arch. 2004;444:527.
3. Andersen DK, Korc M, Petersen GM, et al. Diabetes, pancreatogenic diabetes, and pancreatic cancer. Diabetes. 2017;66(5):1103–10.
4. Iokim KJ, Sydney GI, Michaelides C, et al. Evaluation of metastases to the pancreas with fine needle aspiration: A case series from a single centre with review of the literature. Cytopathology. 2020;31:96–105.
5. Ito T, Takada R, Oimoto S, et al. Analysis of prognostic factors in pancreatic metastases. Pancreas. 2018;47(8):1033–9.
6. Riihimäki M, Hemminki A, Sundquist J, Hemminki K. Patterns of metastasis in colon and rectal cancer. Sci Rep. 2016;6.29765.
7. Geramizadeh B, Kasihkoo A, Nikgehabalam S, Malek-Hosseini S. Metastatic tumors to the pancreas, a single center study. Arch Iranian Med. 2019;22(1):50–2.
8. Charnsangavej C, Whitley NO. Metastases to the pancreas and peri-pancreatic lymph nodes from carcinoma of the right side of the colon: CT findings in 12 patients. Am J Roentgenolgy. 1993;160(1):49–52.

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