

# Pancreatic Fungal Ball Presenting as Pseudomass

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## ABSTRACT

Fungal infections of the pancreas have been shown to occur most commonly in the setting of necrotizing pancreatitis, pancreatic cysts, or pancreatic abscesses. Pancreatic fungal infections are rare without these predisposing factors, and may present similarly to pancreatic neoplasm. We report the case of a 48-year-old man who presented with epigastric abdominal pain, nausea, vomiting, and weight loss, with a potential mass in the head of the pancreas. The mass was resected via the Whipple procedure and was found to be a fungal collection with inflammatory cells and no malignancy. The patient's clinical course improved after the resection.

## INTRODUCTION

Pancreatic fungal infections have been described when the inflamed gland has lower resistance to the invasion of fungus, such as in the setting of necrotizing pancreatitis, pancreatic pseudocyst, or pancreatic abscess.<sup>1</sup> There are rare case reports of isolated pancreatic fungal infections mimicking a pancreatic mass in immunocompetent individuals with species of *Histoplasmosis* and *Coccidiomycosis*. Many of these patients had previous histories of abdominal surgeries, which, although common in these cases, have not been shown to be a risk factor for fungal pancreatitis.<sup>2-4</sup> One case from 2015 reported a patient who had pancreatic candidiasis that mimicked a pancreatic cystic tumor with pathological evidence of *Candida* found in multiple focal pancreatic abscesses and fungus in the ductal lumen.<sup>5</sup>

## CASE REPORT

A 48-year-old man with a past medical history of high cholesterol, hypertension, tobacco, alcohol and drug use, and gastroesophageal reflux presented with chronic, intermittent epigastric abdominal pain, nausea, vomiting, and weight loss that had been occurring for a number of years. The nausea and vomiting were associated with greasy food intake and binge-drinking alcohol. Prior to referral, a computed tomography (CT) scan showed a potential mass in the head of the pancreas with upstream pancreatic ductal dilation.

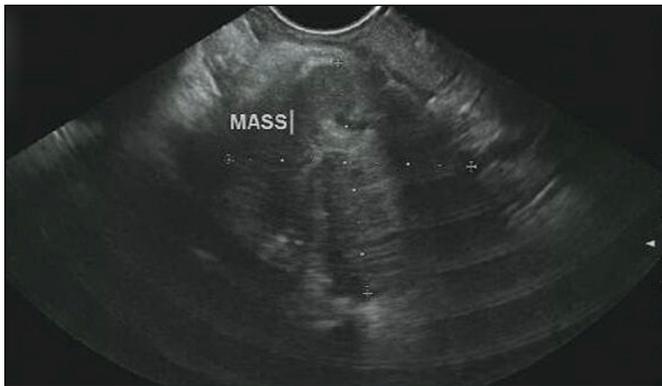
On referral, the patient appeared healthy without palpable lymphadenopathy and had no remarkable findings on physical exam. The patient's lab workup was notable for a mildly elevated carcinoembryonic antigen of 5.9 ng/mL. Pertinent normal labs were CA 19-9, immunoglobulin G4 (IgG4), and hepatic function panel. An endoscopic ultrasound (EUS) showed an irregular mass (3.8 x 4.1 cm) in the head of the pancreas with abutment to the superior mesenteric artery and superior mesenteric vein (SMV), pancreatic ductal dilation, and atrophy of the remaining pancreas (Figure 1). Fine-needle biopsy at that time was not diagnostic, showing rare atypical cells in a background of fungal organisms, bacteria, and abundant acute inflammation without a definitive diagnosis of malignancy. Special stain for acid-fast bacilli was negative. Given the clinical concern for malignancy, a second EUS fine-needle biopsy was performed, which resulted in a cytology reading of marked acute pancreatitis in a background of chronic pancreatitis with suspicion for type-2 autoimmune pancreatitis (type-2 AIP). Specifically, IgG4 stain appeared to stain approximately 25 plasma cells across 2 high-power fields. However, the definitive characterization of type-2 AIP was difficult given the small

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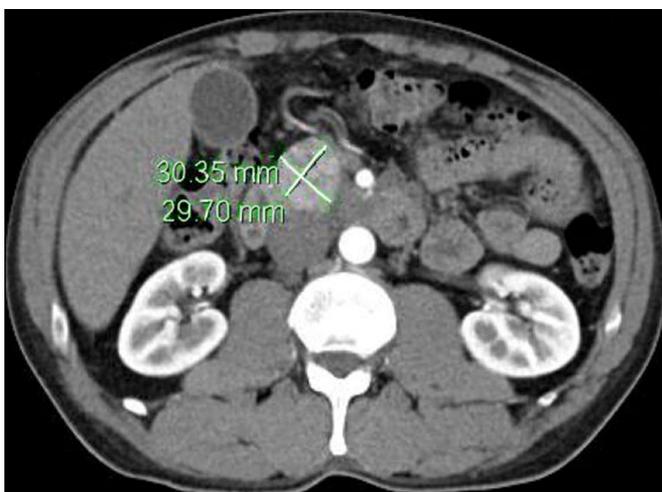
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**Figure 1.** EUS showing a hypoechoic irregular mass in pancreatic head measuring 3.8 x 4.1 cm in maximal cross-sectional diameter.

fragmented sample and marked obscuring of acute inflammation in areas. Repeat CT showed an ill-defined pancreatic head mass measuring 2.9 x 3 cm (previously measured 2.8 x 3 cm 5 months earlier), with mild decreased pancreatic and biliary ductal dilation, portal vein abutment <180 degrees, and multiple enlarged veins in the peripancreatic mesentery suggestive of SMV occlusion near the confluence (Figure 2). The patient's initial symptoms were clinically concerning for pancreatic cancer. Given the clinical concern for malignancy and the ambiguous but worrisome findings on imaging, the decision was made to proceed with surgical resection with a Whipple procedure. No evidence of metastatic disease or SMV invasion was found during the operation.

Upon gross examination of the pancreas, no distinct mass was identified. The final histological analysis of the pancreas revealed chronic pancreatitis with pancreatic duct dilation and associated intraluminal inspissated mucus admixed with fungal and bacterial organisms (Figure 3). Surrounding the



**Figure 2.** CT scan with contrast showing possible pancreatic head mass measuring 2.9 x 3.0 cm.

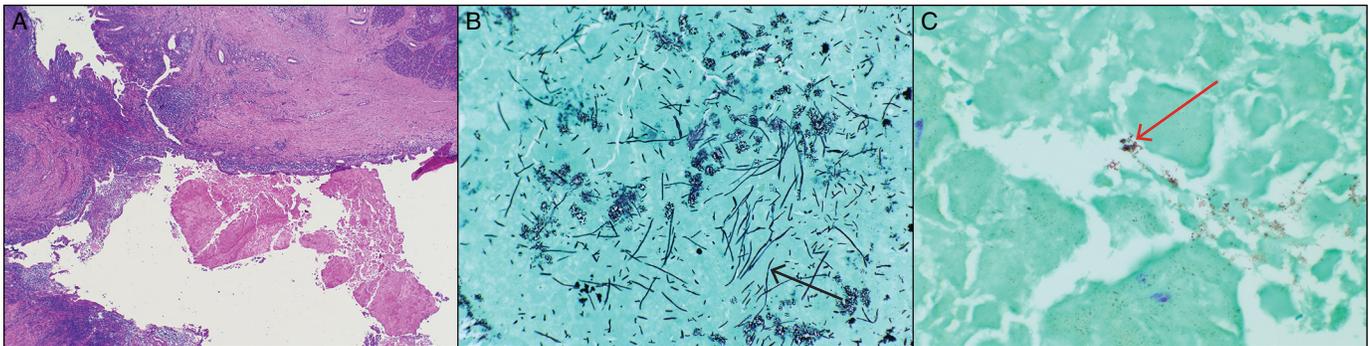
dilated pancreatic duct was a dense acute inflammatory and lymphoplasmacytic cell infiltrate. Immunostains for IgG and IgG4 highlighted up to 30 IgG4-positive plasma cells per high-power field in this area. However, no other well-developed histological features of autoimmune IgG4-related pancreatitis were identified. Moreover, the presence of the inflammatory infiltrate around the dilated pancreatic duct and the history of prior biopsies rendered this finding nonspecific on pathological grounds. No microbiological or fungal cultures were performed on the pancreatic specimen or juice. There was no evidence of malignancy following complete submission of the pancreas for histological examination.

The patient recovered well with an appropriate postoperative course without systemic antifungal treatment. He was discharged on postoperative day 4.

## DISCUSSION

We describe a rare case of an occult fungal and bacterial collection mimicking a pancreatic head mass. Pancreatic fungal infections most commonly occur when the pancreas is more susceptible to fungal invasion, such as when the host's defense mechanism is altered or from an iatrogenic intervention. Thus pancreatic fungal infections most commonly occur in the setting of pancreatic necrosis, an infected pseudocyst, or pancreatic abscesses.<sup>6</sup> The incidence of fungal infection in critically ill patients with pancreatic necrosis has been found to be 37%. Diagnosis of pancreatic fungal infection occurs through surgical specimen or abdominal drain effluent. Fungal infections of the pancreas have also been shown to mimic pancreatic cyst tumors or pancreatic neoplasms on imaging, in which the patient had underlying risks of having pancreatic fungal infections or had signs of systemic fungal infections.<sup>7</sup> Most patients with rare instances of pancreatic fungal infection imitating masses without history or signs of systemic fungal infections have a previous history of gastrointestinal surgeries such as ampullectomy or Roux-en-Y gastric bypass.<sup>3-5</sup>

Upon diagnosis, pancreatic fungal infections are treated with surgical debridement with antifungal therapy or systemic antifungal therapy without surgery.<sup>1,4</sup> For the latter case, symptoms and mass reduction were tracked through follow-up appointments and imaging.<sup>4</sup> Systemic antifungal therapy was not given to our patient because he did not have any symptoms of systemic fungal infection, and pathology isolated *Candida* and miscellaneous bacteria in a "fungal ball" in the pancreatic duct without invasive fungus present in the pancreatic parenchyma. A previous case report that also reported *Candida* pancreatitis mimicking a pancreatic head mass with systemic antifungal medical treatment showed pathology involving the pancreatic parenchyma and peripancreatic tissue with the formation of multiple abscesses.<sup>5</sup>



**Figure 3.** (A) Hematoxylin and eosin stain at 2x magnification showing the dilated pancreatic duct with inspissated mucus and an adjacent dense inflammatory cell infiltrate (upper left). (B) Gomori methenamine silver stain at 20x magnification showing fungal hyphae (arrow) within the inspissated mucus. (C) Brown-Brenn stain at 40x magnification showing coccoid bacterial organisms (arrow).

Cases of AIP or IgG4 disease have also been shown to present as an inflammatory pseudotumor, where tumor-like swelling can occur from the infiltration of inflammatory cells with or without obstructive jaundice.<sup>8</sup> When there is higher clinical suspicion that the pancreatic lesion is due to AIP, such as with serum levels of IgG4 >135 mg/dL (which is 95% sensitive and 97% specific for AIP), AIP can be effectively treated with corticosteroids rather than resection.<sup>9</sup> Histological features of AIP include diffuse lymphoplasmacytic infiltration, obliterative phlebitis, and interstitial fibrosis with immunohistochemical staining revealing CD8+ and CD4+ T lymphocytes with few B lymphocytes.<sup>10</sup> Our patient had normal serum IgG4 levels of 9.8 mg/dL, which indicated that the dense lymphoplasmacytic cell infiltrate found on surgical pathology was more likely an inflammatory reaction to his previous two EUS biopsies performed within a few months of the resection rather than AIP.

Although cases of both pancreatic fungal infections and AIP have mimicked pancreatic masses, no case in the recent literature has shown a pancreatic fungal lesion with the possible presence of both fungus and AIP, no signs or history of systemic fungal infection, or no predisposing factors for pancreatic fungal infection, such as previous history of abdominal surgery, pancreatic infections, or pancreatic abscesses.<sup>1-3</sup> This is why we chose to report this rare case of an occult fungal mass presenting as a possible pancreatic neoplasm. Unfortunately, the true pathology of the lesion was only diagnosed through invasive resection and histological analysis. Similar scenarios under different circumstances do not appear to be uncommon; for example, in major high-volume medical centers, up to 10.6% of Whipple resection cases have been found to be negative for neoplastic disease, when 85% of those cases were performed under the clinical suspicion of malignancy.<sup>11</sup> In this case, an earlier diagnosis of the nonmalignant cause of the pancreatic enlargement may have resulted in less invasive treatment of the fungal mass and prevented the Whipple resection.

## DISCLOSURES

Author contributions: N. Chou wrote the manuscript. R. Burbidge edited the manuscript and is the article guarantor. S. Karram wrote the manuscript and provided the images.

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Informed consent was obtained for this case report.

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