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CASE REPORT | PANCREAS

Pancreatic Malakoplakia: A Rare Pathology Associated With Acute Pancreatitis

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ABSTRACT

Malakoplakia is a rare granulomatous tumor-like inflammatory condition, most frequently involving the genitourinary system and occurring in immunosuppressed patients. The gastrointestinal tract is the second most common site, where it is usually seen involving the colon. We report a case of malakoplakia presenting as a pancreatic mass. Imaging showed soft tissue along the pancreatic tail/greater curvature concerning for infiltrating tumor, but endoscopic ultrasound with biopsy showed malakoplakia. Our case discusses malakoplakia at an uncommon site, which was appropriately treated with antibiotics.

KEYWORDS: malakoplakia; acute pancreatitis; pancreatic mass; granulomatous inflammatory mass; macrophage dysfunction

INTRODUCTION

Malakoplakia is a rare granulomatous tumor-like inflammatory condition occurring most commonly in immunosuppressed patients, resulting from a defect in macrophage function that results in failure to kill and digest targeted bacteria.[1–4] It is more common in women than in men, with an average age at presentation of 50 years.[5] In approximately 75% of reported cases, the genitourinary tract is the main site of involvement.[1–3] The luminal gastrointestinal tract is the second most common system, with reported cases most often involving the sigmoid colon and rectum.[4] Common symptoms of gastrointestinal malakoplakia include diarrhea, abdominal pain, and hemorrhage.[3] Despite several prior reports of malakoplakia associated with the pancreas, there has been no report to date of gastrointestinal malakoplakia associated with necrotizing pancreatitis.[6–8] We report a case of pancreatic malakoplakia diagnosed in the setting of idiopathic severe acute pancreatitis complicated by necrosis and bacteremia.

CASE REPORT

A 74-year-old man with a history of coronary artery disease, hypertension, and hypothyroidism controlled with thyroid hormone supplementation presented for a planned coronary artery bypass graft procedure. He experienced mild abdominal pain and nausea after his procedure, but this resolved within 48 hours, and he was discharged home.

He presented to the emergency department 2 weeks later with fevers, chills, and dyspnea. Initial evaluation revealed leukocytosis of 22.3 k/μL (3.2–10.6) and lactic acidosis. Abdominal computed tomography showed a pancreatic head acute necrotic collection (Figure 1). The lipase level was not elevated at the time of his presentation. He was started on piperacillin-tazobactam and placed on bowel rest. Blood cultures grew *Escherichia coli*, for which he completed 14 days of cefazolin and cefuroxime for treatment. He was started on nasojejunal tube feeding for nutritional support to allow for pancreatic rest, but developed recurrent abdominal pain, nausea, and vomiting 4 weeks later. Repeat abdominal imaging revealed improvement of pancreatic head inflammation but persistent tail inflammation with new pseudocyst in the lesser sac abutting the stomach (Figure 1). Subsequent imaging 9 weeks later

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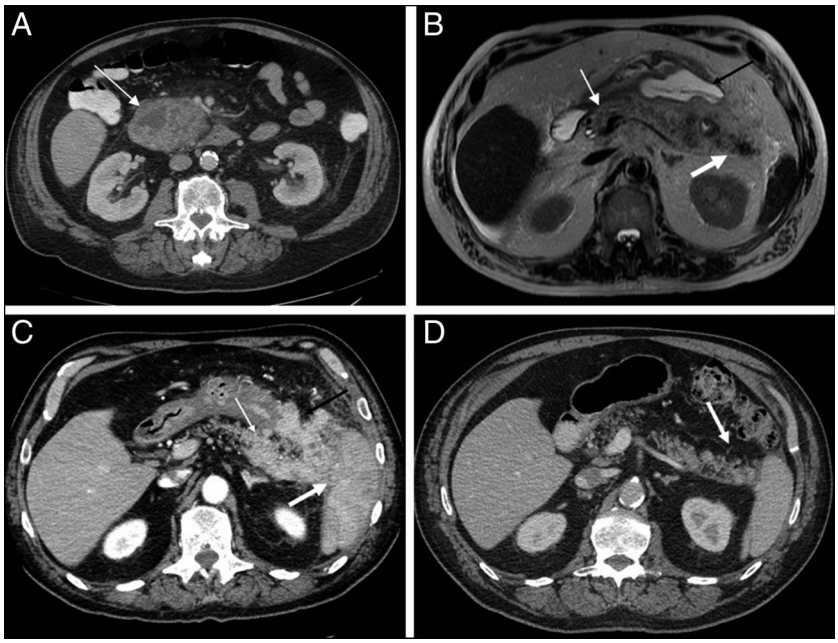

Figure 1. (A) Axial post contrast CT image demonstrates necrotizing inflammation of the pancreatic head (white arrow). (B) Axial T2-weighted magnetic resonance image shows improvement in the pancreatic head inflammation (white thin arrow) with new pseudocyst in the lesser sac (black arrow). There is persistent inflammation at the pancreatic tail (white thick arrow). (C) Axial post contrast CT image demonstrates infiltrative a hyperenhancing soft tissue mass at the pancreatic tail (white thin arrow), greater curvature of the stomach (black arrow), and splenic hilum (white thick arrow). The pseudocyst had resolved. (D) Axial post contrast CT image demonstrates complete resolution of the hyperenhancing soft tissue mass (white arrow). CT, computed tomography.

revealed resolution of the pseudocyst but a new infiltrating mass with enhancing soft tissue at the pancreatic tail, greater curvature of the stomach, and splenic hilum (Figure 1). Endoscopic ultrasound showed a cystic lesion suggestive of pseudocyst in the pancreatic head and an infiltrating mass-like lesion in the perigastric/peripancreatic area, as well as multiple small perigastric lymph nodes. Fine-needle aspiration of the mass lesion was performed, and histology revealed sheets of macrophages, many of which contained Michaelis-Gutmann bodies, consistent with malakoplakia (Figure 2). A repeat endoscopic ultrasound showed a persistent hypoechoic inflammatory mass, and repeat fine-needle aspiration showed macrophages with Michaelis-Gutmann bodies again. A culture of the biopsy specimen was performed, which grew *E. coli* and *Enterococcus faecium*. The patient was treated with 19 weeks of amoxicillin-clavulanate, during which imaging showed a steady decrease in the size of the infiltrative pancreatic/perigastric mass to its eventual resolution 1 year later (Figure 1). He remained symptom-free at 1 year after completion of antibiotic therapy.

DISCUSSION

Malakoplakia is a benign inflammatory disease that is believed to result from a defect in phagolysosome activity of the macrophages leading to impaired ability to kill bacteria.[9–11] It usually imitates a malignant tumor but can also accompany malignancy, making it necessary to carefully consider both diagnoses during examination of any pathologic specimen.[12] Although much about the pathogenesis remains unknown, inflammatory or neoplastic processes are believed to lead to immune dysregulation with abnormal lysosome function and subsequent chronic bacterial infection.[5,13,14] Immunocompromise secondary to malignancy, steroids, chemotherapy, HIV, poorly controlled diabetes, and solid-organ transplant has been seen to facilitate this phenomenon.[3,4,13,15] This case reported here is a unique presentation of pancreatic malakoplakia in a patient without any prior evidence of immunocompromise developing after bouts of necrotizing pancreatitis.

Malakoplakia in the gastrointestinal tract has previously been associated with colorectal malignancy, but has also been described in the liver, stomach, and pancreas.[4,14,16] Although imaging is helpful, the diagnosis must be confirmed by histologic examination. Cross-sectional imaging of the abdomen and pelvis, including computed tomography scan, often shows a nonspecific inflammatory process or tumor-like mass.[17] In our case, the patient was seen to exhibit enhancing soft tissue along the pancreatic tail, a finding associated with a broad differential diagnosis.[3] Endoscopic appearance of luminal malakoplakia varies widely and can include flat lesions, strictures, fistulae, and plaques; endoscopic ultrasound often shows mass-like lesions imitating malignancy and involving lymph nodes.[3,4] Given the prominent histiocytic proliferation, the differential diagnosis is broad and includes Whipple disease, sarcoidosis, crystal-storing histiocytosis, and mycobacterial infections, among others. The presence of Michaelis-Gutmann bodies, which are inclusions resulting from aggregates of undigested bacteria and bacterial components within the cytoplasm of histiocytes and

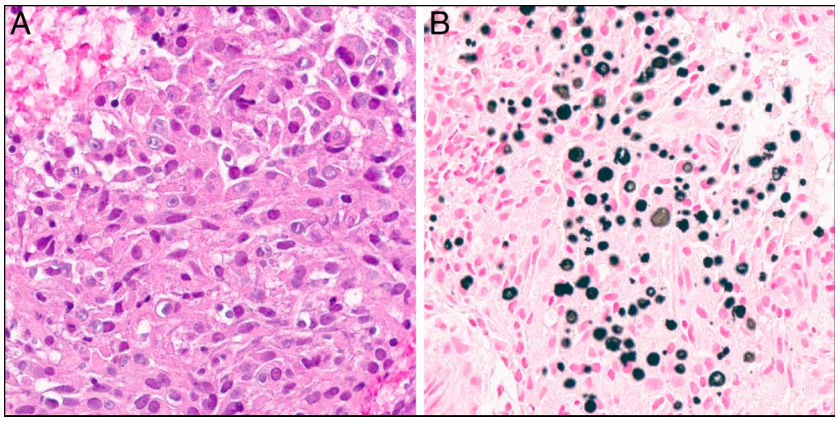

Figure 2. (A) Histiologic examination shows a proliferation of histiocytes with abundant pale cytoplasm, often containing intracytoplasmic targetoid inclusions known as Michaelis-Gutmann bodies. (B) von Kossa stain highlights numerous Michaelis-Gutmann bodies. Both images obtained with 40× magnification.

macrophages, is pathognomonic for malakoplakia.[1] These inclusions contain mucopolysaccharides, calcium, and iron, which are highlighted by periodic acid-Schiff, von Kossa, and Prussian blue, respectively.

The most common disease-causing organism isolated from patients with malakoplakia is *E. coli*; however, other gram-negative rod bacteria as well as *Mycobacterium avium*, *Mycobacterium tuberculosis*, *Shigella*, *Staphylococcus aureus*, and *Enterococcus* have also been identified.[5,13] Bacteria have been isolated from blood cultures or from cultures of malakoplakia tissue as was performed in our patient. In human immunodeficiency virus patients, *Rhodococcus equi* is commonly isolated.[13] Given the concern for underlying unrecognized immunocompromise in a patient with a new diagnosis of malakoplakia, additional testing for immunodeficiency, as well as opportunistic infection, should be considered based on the clinical circumstances.

There exist no management guidelines for the evaluation, treatment, or post-treatment monitoring after a diagnosis of malakoplakia. Treatment of the disorder is primarily targeted at treating the identified infectious pathogen. Antibiotic therapy is the cornerstone of treatment, and fluoroquinolones are often used because these agents achieve a therapeutic concentration within histiocytes.[18] Often, antibiotics alone can achieve resolution of multifocal disease, although some patients who do not adequately respond to antibiotic therapy or who have other symptoms related to a mass lesion may necessitate surgical resection.[7,14] Other treatment modalities include (i) cholinergic agonists, such as bethanechol, which increase intracellular cyclic guanine monophosphate levels and aid in digesting the bacteria, (ii) addition of ascorbic acid to improve macrophage function, and (iii) budesonide to reduce intestinal inflammation.[19,20] Malakoplakia can recur, and patients should be intermittently monitored for recurrence, especially if new symptoms develop after completion of the initial course of treatment.

Our case highlights the importance of considering malakoplakia in the differential diagnosis when a pancreatic mass is seen in the setting of atypical imaging findings and a clinical course. While underlying malignancy should be ruled out, treatment is ultimately aimed at resolving the infection.

DISCLOSURES

Author contributions: RM Afzal: drafting of the manuscript. B. Rangaswamy: review of the manuscript and analysis and interpretation of data. M. Landau: critical review of the manuscript and analysis and interpretation of data. I. John: critical review of the manuscript and analysis and interpretation of data. H. Singh: critical review of the manuscript and analysis and interpretation of data. AE Phillips: critical revision of the manuscript for important intellectual content, analysis and interpretation of data, and study design. All authors approved of the final version of the manuscript. AE Phillips is the article guarantor.

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Informed consent was obtained for this case report.

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