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CASE REPORT | SMALL BOWEL

Acute Mesenteric Ischemia Caused by Rare Cardiac Tumor Embolus

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Abstract

Acute mesenteric ischemia (AMI) is a rare vascular emergency associated with a high mortality rate. The most common cause of AMI is cardiac emboli from thrombi associated with atrial fibrillation or following myocardial infarction. We present a case of AMI caused by a unique source of emboli, confirmed as an embolization of a cardiac sarcoma to the small bowel by matching biopsies obtained from the superior mesenteric artery (SMA) and the embolic source.

Introduction

Acute mesenteric ischemia (AMI) is a rare vascular emergency that presents a diagnostic challenge for physicians and is associated with a high mortality rate of 60–80%. The diagnosis relies on a high index of clinical suspicion based on a careful and detailed assessment of an individual's history, risk factors, and clinical picture. The most common cause of AMI is arterial embolism to the superior mesenteric artery (SMA), which accounts for 40–50% of the cases. Arterial emboli typically originate from a cardiac source.[1,2]

Case Report

A male in his fifth decade presented with acute abdominal pain, vomiting, and diarrhea. Three weeks prior to admission, the patient experienced a syncopal event while completing yard work. Work-up included a transthoracic echocardiogram, which revealed a large, mobile 5.7 x 1.9-cm left ventricular (LV) mass along the anteroseptum, inferoseptum, and apex, protruding into the LV cavity. Cardiac catheterization was planned but delayed due to his gastrointestinal symptoms.

On the night of presentation, after eating pizza, the patient developed a sudden onset of diffuse, crampy abdominal pain associated with bilious, non-bloody vomiting and watery, non-bloody diarrhea. None of his family members experienced similar symptoms. He denied fevers, sick contacts, recent travel, or antibiotic use prior to hospitalization. He was aggressively hydrated and started on antibiotics for a presumed intra-abdominal infection. Abdominal and pelvic computed tomography (CT) showed findings consistent with acute enteritis without evidence of obstruction. He also developed new-onset atrial fibrillation. Intravenous heparin and diltiazem drips were initiated. His abdominal pain evolved to a periumbilical "jabbing" pain exacerbated by movement and palpation. Physical exam revealed tachycardia, normal blood pressure, hypoactive bowel sounds, and tenderness to palpation across the lower abdomen, most significantly in the left lower quadrant with rebound. Lab work was significant for leukocytosis, elevated blood urea nitrogen to creatinine ratio, and an elevated troponin. Lactic acid level peaked at 19.5 mmol/L. CT angiography (CTA) showed occlusion of the distal SMA with ischemic necrosis, infarction of multiple loops of small bowel, and mesenteric venous gas (Figure 1).

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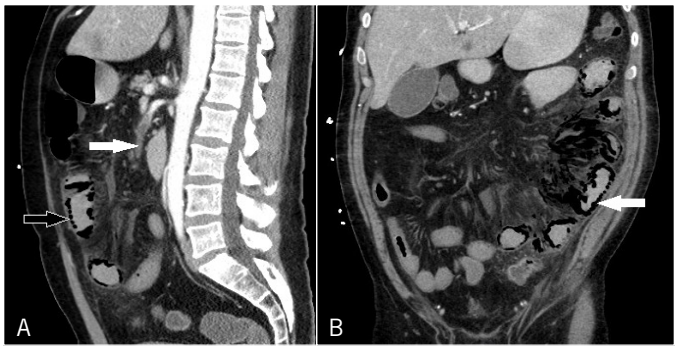

Figure 1. (A) CTA sagittal view showing an SMA thrombus (white arrow) and pneumatosis intestinalis (black arrow). (B) CTA coronal view showing pneumatosis intestinalis (white arrow).

The patient was urgently taken to the operating room for SMA embolectomy, small bowel resection, and abdominal washout. Post-operatively, he remained intubated and was transferred to the surgical intensive care unit. Cardiac magnetic resonance imaging (MRI) confirmed the presence of an LV mass, which was subsequently excised by cardiothoracic surgery (Figure 2). Biopsy of the SMA thrombus revealed viable and necrotic malignant tumor cells (Figure 3) that were also present in the LV mass (Figure 4). Two pathologists at separate institutions examined the pathology from the LV mass biopsy and confirmed the diagnosis of cardiac sarcoma. Following excision of the LV mass, hospitalization was complicated by respiratory failure, seizure disorder, renal failure requiring continuous veno-venous hemodialysis, multiple infections, and rapid atrial fibrillation. The sarcoma was aggressive, metastasizing to the brain, which resulted in intraparenchymal hemorrhage. The patient died 35 days following his initial presentation.

Discussion

AMI is a rare vascular emergency that often carries a fatal prognosis. Delayed diagnosis rapidly results in declining survival rates, with 50% survival when diagnosed within 24 hours of symptom onset, and 30% survival when diagnosed beyond this time frame.[1] Timely diagnosis of AMI remains difficult due to the rapid progression of the disease and the lack of specificity of symptoms, laboratory values, and imaging modalities. SMA embolism typically presents with acute onset of severe periumbilical abdominal pain, vomiting, and diarrhea. If bowel infarction occurs, patients will deteriorate to hemodynamic instability, peritoneal signs, and sepsis with multi-organ failure. Common risk factors for SMA embolism include arrhythmia, myocardial infarction, valvular disease, cardiomyopathy, and a history of embolic events. Nonspecific laboratory findings include leukocytosis, elevated lactate, hemoconcentration, and metabolic acidosis. Plain abdominal radiography and CT have low sensitivity and specificity for diagnosis of AMI.[1,2] Mesenteric angiography remains the gold standard for diagnosis; however, multi-slice CTA has demonstrated increasing efficacy at diagnosis and presents a less invasive, safer, and more cost-effective alternative to angiography if the need for intervention is uncertain.[3] Once AMI is suspected, appropriate therapy can be initiated ranging from conservative to invasive, depending on the severity of the case.[1,2]

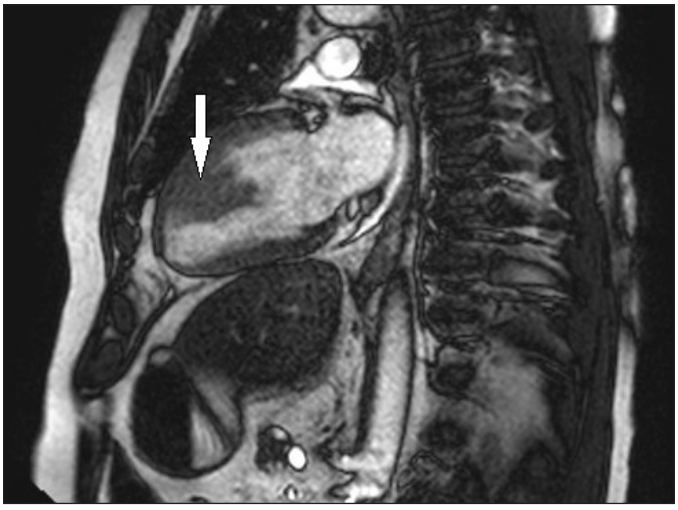

Figure 2. Cardiac MRI showing a left ventricular mass (white arrow).

This case of AMI is unique due to its uncommon etiology. The prevalence of primary cardiac tumors, excluding atrial myxomas, is 0.001–0.28%.[4,5] Malignant tumors represent 25% of primary cardiac neoplasms, the majority being sarcomas.[6] The presentation can include arrhythmia, heart failure, or pericardial effusion, depending on the tumor's location within the heart. Systemic complications such as stroke may occur when a tumor has metastasized to other organs. Only 2 reports have described embolization of a cardiac tumor to the small bowel.[7,8] The distinguishing feature in our case is the matching histology of the SMA tumor embolus and the excised cardiac tumor, showing a rare, undefined cardiac sarcoma. Matching biopsies to confirm embolization were unavailable in prior case reports.

Despite our patient's poor prognosis and outcome, this case reiterates the essential lesson of incorporating the clinical context during formulation of a differential diagnosis. Physicians should

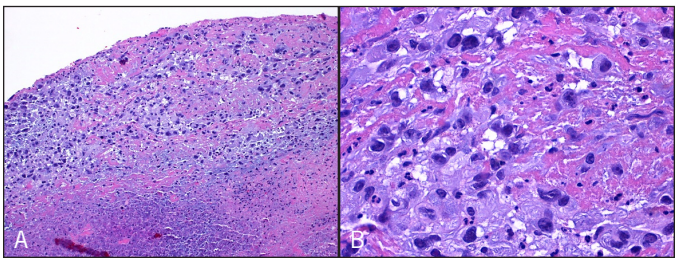

Figure 3. Viable and necrotic malignant tumor cells shown on SMA thrombus biopsy, (A) 100x and (B) 400x.

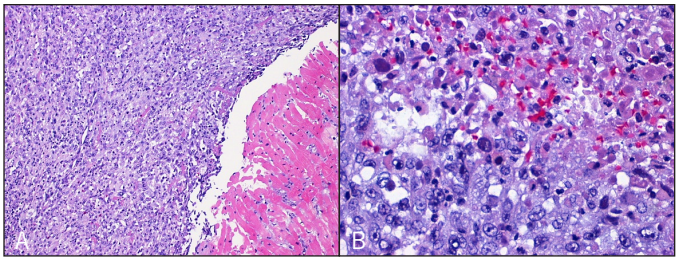

Figure 4. Viable and necrotic malignant tumor cells also shown on LV mass biopsy, (A) 100x and (B) 400x.

always attempt to uncover a unifying diagnosis before making an assumption that simultaneous signs and symptoms from different organ systems are unrelated.

Disclosures

Author contributions: MJ Clores drafted and critically revised the manuscript, obtained the images, and is the article guarantor. F. Monzur critically revised the manuscript and obtained the images. R. Rajapakse critically revised the manuscript.

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The patient is now deceased, and the authors made every effort to contact his next of kin for informed consent, but the telephone numbers in the medical chart were no longer in service. However, the authors feel that the patient information is sufficiently anonymous and that the patient would not object to this publication.

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