Mycotic Superior Mesenteric Artery Pseudoaneurysm Following Infective Endocarditis in a Patient with Rheumatic Heart Disease: A Case Report

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Case Report

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Abstract

This case report presents a rare case of a 25-year-old female patient with a known history of rheumatic heart disease who developed a pseudoaneurysm of the superior mesenteric artery (SMAPA) after infective endocarditis (IE). The patient presented with chest pain, shortness of breath, and fever, and was diagnosed with IE and severe mitral valve regurgitation (MVR). After receiving appropriate medical treatment for six weeks, the patient developed a vague and dull abdominal pain, initially attributed to septic emboli of the mitral valve vegetations. However, subsequent evaluation revealed a mycotic SMAPA, which was treated with open surgical repair due to unfavorable anatomical characteristics and infectious etiology. This case highlights the importance of maintaining a high level of clinical suspicion of mycotic pseudoaneurysms in patients with risk factors and the importance of using CTA as the gold standard imaging modality for accurate patient evaluation.

Introduction

Visceral artery aneurysms (VAAs) and visceral artery pseudoaneurysms (VAPAs) are defined as aneurysms that affect the celiac, superior, or inferior mesenteric arteries and their branches. VAAs and VAPAs are relatively rare, with a reported incidence of 0.1 to 0.2 percent, although the true incidence is not known as many are asymptomatic. Of all visceral artery aneurysms, 60% are found in the splenic artery, 20% in the hepatic artery, and 5.5% in the superior mesenteric artery. VAA and VAPA can be life-threatening conditions with high incidences of rupture and bleeding. The clinical features of symptomatic disease differ for each anatomic location; however, clinical symptoms and signs are not specific. VAA and VAPA are often not initially suspected in patients with abdominal complaints due to their rarity, which can lead to a delay in diagnosis. Consequently, these often present with life-threatening hemorrhage due to a high incidence of rupture. Here, we present a rare case of a 25-year-old patient with a known history of rheumatic heart disease (RHD), who developed vague abdominal pain after infective endocarditis.

Case presentation

A 25-year-old female patient with a known history of rheumatic heart disease since childhood came to the emergency department (ER) with complaints of chest pain, shortness of breath, and fever that had been ongoing for one week. Upon admission, she was diagnosed with infective endocarditis (IE) and severe mitral valve regurgitation (MVR). The patient received appropriate medical treatment for IE in the cardiac care unit (CCU) for six weeks, during which her presenting symptoms improved.

However, one week after finishing treatment, the patient developed a new vague, dull aching abdominal pain with an insidious onset, gradually worsening over time. The pain was mild to moderate intensity, aggravated by meals, and partially relieved by analgesia, without associated symptoms. There was no history of constipation, bleeding per rectum, jaundice, fever, hematuria, or dysuria. Reviewing the
symptoms of other systems was unremarkable. The patient had no history of similar disease or previous hospitalization. There was no history of chronic disease, and the family history was unremarkable.

During the physical examination, the patient was conscious, oriented, and mildly pale with no jaundice, cyanosis, or edema of the lower extremities. Vital signs were stable and bilateral chest auscultation revealed good air entry. Normal first and second heart sounds were heard, along with a diastolic murmur. On abdominal examination, there was generalized slight abdominal tenderness without guarding or rigidity at deep palpation.

Initial evaluations, including color Doppler of the mesenteric vessels, showed normal mesenteric arteries without occlusion or stenosis. However, CT angiography revealed localized infarctions in the spleen and left kidney due to embolism in small branches of the left renal artery and splenic artery. Echocardiography revealed severe eccentric mitral regurgitation (grade IV/IV), thickened and restricted mitral valve leaflets with oscillating masses (infective vegetation), dilated left atrium, mild left ventricular dilation, and secondary severe tricuspid regurgitation. Moderate pericardial effusion was also observed.

Based on the findings and after multidisciplinary team discussion, the decision was made to go for open cardiac surgery to replace the severely regurgitated mitral valve and remove the infective vegetation to prevent further embolization and complications. So, the patient underwent surgery, and a replacement of the mitral valve was performed using a prosthetic valve by cardiac surgeons. Following surgery, the patient initially showed signs of recovery. However, one week after surgery, her abdominal pain intensified and became excruciating.

Reevaluation one week after cardiac surgery, echocardiography revealed successful implantation of a mechanical bi-leaflet prosthesis in the mitral valve area with good cusp excursion, acceptable pressure gradients, and trivial paravalvular leakage. Normal cardiac dimensions preserved systolic function and absence of significant abnormalities in the aortic and right-sided cardiac chambers. However, abdominal CT revealed the presence of a superior mesenteric artery aneurysm (SMAA) (Fig. 1), which was further confirmed by CT angiography, revealing a pseudoaneurysm in the superior mesenteric artery measuring approximately 32x30x30mm (Fig. 2).

Subsequently, the patient was prepared for exploration through an open laparotomy. Intraoperative findings revealed a partially thrombosed pseudoaneurysm located in the mid-part of the superior mesenteric artery (Fig. 3). The small intestine was healthy without compromising its blood supply (Fig. 4). Resection of the pseudoaneurysm (Fig. 5) and lateral aneurysmorrhaphy of the superior mesenteric artery was performed successfully using prolene 7/0 sutures (Fig. 6).

After surgery, the patient experienced a significant improvement in abdominal pain and was closely monitored throughout the postoperative period. The patient’s recovery was uneventful, with no notable complications. She was discharged on the fifth postoperative day with appropriate follow-up instructions.

Discussion
SMAAs and SMAPAs are visceral arterial aneurysms that can be mycotic, often associated with infective endocarditis, and present with nonspecific symptoms. These include abdominal pain, which can be intermittent or severe, a throbbing mass in the abdomen, shock, and in rare cases obstructive jaundice. However, it can also be initially asymptomatic, leading to delayed diagnosis. Early diagnosis and treatment are crucial to reduce the risk of intestinal infarction and mortality and to prevent life-threatening complications such as mesenteric ischemia, thrombosis, and rupture with massive bleeding. The rupture of a pseudoaneurysm can have severe consequences, with mortality rates ranging from 25 to 70%. 

The diagnosis of mycotic aneurysms and pseudoaneurysms is based on a combination of clinical symptoms, imaging findings, and microbiological culture results, if available. Given the lack of specific symptoms, a high index of suspicion is needed in patients with risk factors such as intravenous drug use, prosthetic valves, or other conditions that predispose to infection. Computed tomography (CT) angiography is the recommended diagnostic tool of choice for mycotic pseudoaneurysms, as it allows enhanced visualization of the lesion. Contrast-enhanced CT scans reveal the pseudoaneurysm as an enhanced lesion. Mesenteric angiography, although less commonly used than CT, can provide a detailed visualization of the vasculature and help confirm the diagnosis and preoperative planning for SMA aneurysm repair. These imaging techniques play a vital role in the timely and accurate diagnosis and preoperative planning for the repair of mycotic SMA pseudoaneurysms.

Treatment indications are generally recommended for all identified SMAA / SMAPA, regardless of the size of the lesion or the presence of symptoms, according to the recently published clinical practice guidelines on the management of VAA / VAPA. The choice of treatment option depends on various factors, such as the specific anatomy of the aneurysm, the expertise of the medical team, the overall condition of the patient, and the presence of infection as a cause of the aneurysm. For mycotic pseudoaneurysm, surgery remains the mainstay of treatment. Resection of the infected tissue and subsequent vascular reconstruction with autogenous conduit are preferred. However, vascular reconstruction by aneurysmorrhaphy or ligation has been reported. On the other hand, endovascular techniques, including coiling, glue embolization, or the placement of covered stents, may also be used in some cases with a recommendation to use preoperative broad-spectrum antibiotics.

In our particular case, the patient presented nonspecific abdominal pain after six weeks of treatment for infective endocarditis. Initial evaluation by CT angiography revealed multiple infarctions in the spleen and kidney, which were attributed to septic emboli originating from mobile vegetations found on the severely regurgitated mitral valve. Consequently, a decision was made to proceed with surgical replacement of the valve and to remove vegetation to prevent further embolic episodes, which could potentially lead to serious complications. Despite the intervention, the patient's abdominal pain persisted and intensified. Subsequent evaluation revealed the presence of a pseudoaneurysm in the superior mesenteric artery (SMA), most likely of mycotic origin, located approximately 9 cm distal to its origin. Due to the unfavorable anatomical characteristics of the site and the infectious etiology of the pseudoaneurysm, it
was decided to pursue open surgical repair rather than endovascular repair options. Diagnostic challenges encountered in identifying the mycotic pseudoaneurysm as the underlying cause of the patient’s nonspecific abdominal pain underscore the critical importance of maintaining a high level of clinical suspicion, particularly when there are risk factors for such a diagnosis. Furthermore, this case highlights the importance of using gold standard imaging modalities for accurate patient evaluation. The successful outcome observed in our case supports the current guidelines for managing mycotic pseudoaneurysms of SMA, particularly in situations involving unfavorable anatomy and infectious etiology. These findings emphasize the need to adhere to established protocols and treatment recommendations in similar clinical scenarios.5,14

Conclusions

Mycotic SMA pseudoaneurysms are rare but life-threatening complications of infective endocarditis, particularly in patients with underlying heart disease. Early diagnosis and treatment are crucial to preventing intestinal infarction and mortality. CTA plays a vital role in the timely and accurate diagnosis of mycotic SMA pseudoaneurysms. Surgical resection of the infected tissue and subsequent vascular reconstruction is the mainstay of treatment for mycotic pseudoaneurysms. This case underscores the importance of maintaining a high level of clinical suspicion of mycotic pseudoaneurysms in patients with risk factors and the importance of utilizing CTA as the gold standard imaging modality for accurate patient evaluation.

Abbreviations

VAAs: Visceral artery aneurysms; VAPAs: Visceral artery pseudoaneurysms; SMA: Superior mesenteric artery; SMAA: Superior mesenteric artery aneurysm; SMAPA: Superior mesenteric artery pseudoaneurysm; ER: Emergency department; RHD: Rheumatic heart disease; IE: Infective endocarditis; MVR: Mitral valve regurgitation; CCU: Cardiac care unit; MDCT: Multidetector Computed Tomography.

Declarations

Acknowledgments

Not applicable.

Disclosure

Ethics approval and consent to participate

This case report was approved by the Ethics Committee of Sana’a University and the Al-Thawra Hospital Academy. The consent for publication was also obtained from the patient.
Consent for publication

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials

The data sets used and analyzed during the current case report are available on the FigShare platform on the following DOI number: https://doi.org/10.6084/m9.figshare.25558920.v1.

Competing of interest

Non-financial competing interests

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References


**Figures**
Figure 1

An abdominal CT scan with I.V. contrast (coronal view) shows abnormal aneurysmal dilation of the superior mesenteric artery filled with contrast (white arrow) and multiple splenic infarctions (red arrow).
Figure 2

Abdominal CT angiography (coronal view) shows a pseudoaneurysm in the superior mesenteric artery located 9cm distal to its origin, measuring approximately 32x30x30mm (blue arrow).
Figure 3

An intraoperative image shows a partially thrombosed pseudoaneurysm of the superior mesentric artery (white arrow).
Figure 4

An intraoperative image shows a healthy small bowel with no signs of bowel ischemia (green arrow)
Figure 5

An intraoperative image shows pseudoaneurysm evacuation and resection.
Figure 6

Intraoperative repair of the superior mesentric artery wall defect through lateral aneurysmorrhaphy using a prolene 7-0 suture.