

Case of Mycotic Coronary Aneurysm Treated with Percutaneous Coil Embolization

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Abstract

Mycotic coronary aneurysms are rare, with potentially fatal complications. The treatment of choice is surgical intervention. We present a case of a mycotic coronary aneurysm secondary to a catheter-related bloodstream infection, failed surgical treatment, and eventual treatment with percutaneous coil embolization.

Keywords

Coronary aneurysm, mycotic aneurysm, coil embolization, coronary angiography, coronary bypass

Abbreviations and Acronyms

CAA = coronary artery aneurysm

CT = computed tomography

ECG = electrocardiogram

HD = hemodialysis

MCA = mycotic coronary aneurysm

MRSA = methicillin-resistant *Staphylococcus aureus*

TEE = transesophageal echocardiography

TTE = transthoracic echocardiography

Introduction

Coronary artery aneurysms (CAA) are a localized dilatation of a coronary artery segment and have a reported incidence of up to 5%.¹ Most cases of CAA are asymptomatic and diagnosed incidentally on imaging. The underlying mechanisms leading to the formation of CAAs are not well understood. Proposed etiologies include Kawasaki disease, congenital causes, concomitant atherosclerotic coronary disease, and iatrogenic causes from intracoronary instrumentation.² In contrast, mycotic coronary aneurysms (MCA), resulting from an underlying infection, are an exceedingly rare entity and have been reported to comprise less than 3% of all CAAs.³ Surgical intervention is the preferred treatment for MCAs.⁴

Case Report

A 61-year-old man presented to the hospital with sepsis secondary to methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infection. His medical history was notable for end-stage renal disease on hemodialysis (HD) via a left upper extremity arteriovenous fistula, diabetes mellitus type 2, hypertension, and hyperlipidemia.

The patient had multiple hospitalizations over 6 months for recurrent MRSA septicemia. His initial hospitalization was due to an infected left upper extremity arteriovenous fistula malfunctioning and required placement of a right internal jugular vein tunneled catheter. He was re-hospitalized 6 months later for recurrent MRSA sepsis secondary to infection originating from his right internal jugular tunneled catheter requiring catheter removal. During both hospitalizations, transthoracic echocardiography (TTE) studies were unremarkable. For each infection, the patient was treated with intravenous vancomycin for one month.

During his third admission, he was found to have persistent induration and mild tenderness around his former tunneled catheter site. Laboratory data was notable for elevated erythrocyte sedimentation rate >130 mm/hour (normal range, 0–20 mm/hour) and C-reactive protein 182.6 mg/L (normal range, 0–10 mg/L). Blood cultures again grew MRSA in 2 out of 2 sets.

Further workup was pursued with a transesophageal echocardiography (TEE). The TEE showed a well-circumscribed echolucent mass adjacent to the right atrium initially thought to be a possible abscess (Figure 1). Cardiac computed tomography (CT) scan showed a large distal right coronary artery aneurysm that was partially thrombosed and measured 4.7 x 5.2 x 3.9 cm (Figure 2). The aneurysm was suspected to be mycotic as the patient had a prior coronary angiogram 2 years earlier that did not show any evidence of an aneurysm. Cardiac catheterization confirmed a large aneurysm of the distal right coronary artery with complete occlusion of the distal artery and collateralization from the left coronary circulation (Figure 3).

Given the risk for rupture and persistently positive blood cultures, the patient was referred for surgical intervention. Intraoperative assessment of the coronary anatomy revealed that the aneurysm had an intramyocardial location with a slight bulge on the epicardial surface. Due to the aneurysm's intramyocardial position, the risks of attempting surgical ligation were felt to be too high to proceed. Medical therapy alone would have been insufficient to mitigate the risk for rupture, so the decision was made to pursue percutaneous intervention. A covered stent could not be deployed across the aneurysm, as all antegrade flow in the right coronary artery terminated within the large aneurysm with no flow distally. He underwent successful percutaneous coiling of the coronary aneurysm with a total of 33 coils inserted into the aneurysm (Figure 4).

The patient tolerated the procedure well without complications. He was seen in the outpatient clinic after his procedure and continued to do well. His repeat blood cultures have been negative. He completed eight weeks of intravenous antibiotic therapy with vancomycin and currently remains on life-long oral doxycycline therapy.

Discussion

MCAs have been associated with cardiac complications, including myocardial infarction, rupture, fistula formation, pericardial effusion, or tamponade.⁵ First described in a post-mortem case by Morgagni in 1761,⁶ the reported cases of MCA have increased with the advent of CT imaging and coronary angiography. However, MCA remains an elusive entity, with most current knowledge derived from case reports. The largest systematic review to date by Baker et al⁷ found that MCA has a significant male predisposition (80.2%) and a predilection for the right coronary artery (40.6%) and left anterior descending artery (31.3%). The most common causative organism was *Staphylococcus aureus* (55.8%). End-stage renal disease was also noted to be a significant risk factor for MCA. The most commonly reported complications were myocardial infarction (39.8%), pericardial effusion (37.3%), and aneurysm rupture (28.9%). Less common complications included fistula formation (4.8%) and sinus node dysfunction (1.2%).⁷

Currently, there are no established guidelines for the management of MCA. While antibiotic therapy alone may be sufficient to treat small aneurysms, larger aneurysms carry an increased risk for complications, such as rupture, and may require early invasive intervention. Surgery is the preferred approach to treatment due to the infectious nature of the aneurysm. Aneurysm resection and distal bypass is the most commonly pursued surgical method.^{5,7} Percutaneous intervention may be considered in addition to long-term antibiotic treatment in patients who are not surgical candidates. Percutaneous treatment options include placement of a covered stent across the affected segment of the coronary artery.⁸ Coil embolization has been previously described as a treatment option for non-infected CAA⁹; however, there have been no published reports of its use for MCA, with this being the first published report.

This case illustrates a rare and challenging case of a large MCA that was not amenable to surgery and was successfully treated with percutaneous coil embolization.

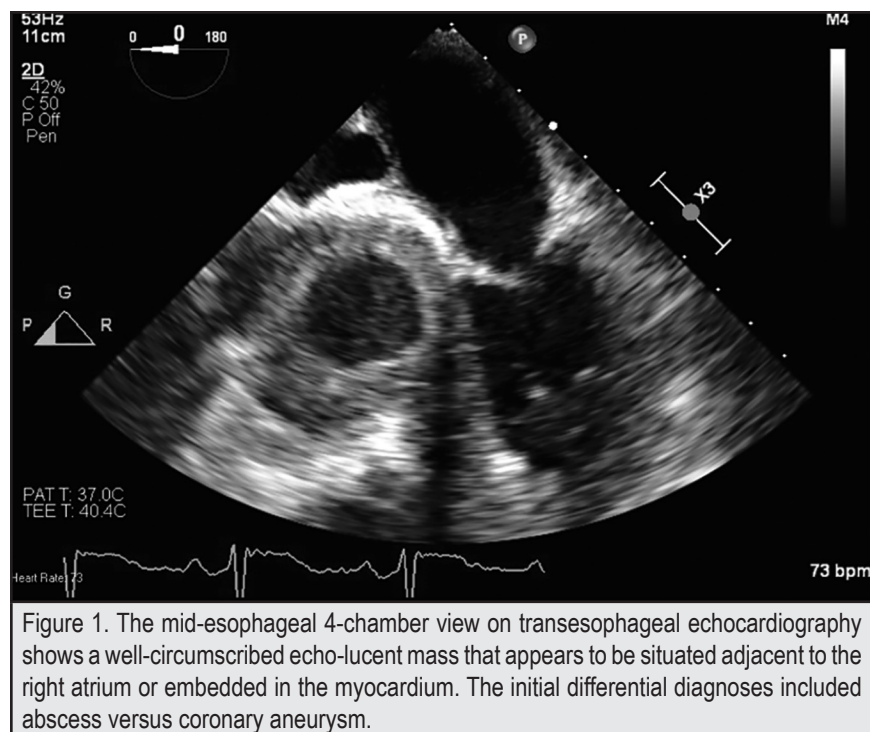


Figure 1. The mid-esophageal 4-chamber view on transesophageal echocardiography shows a well-circumscribed echo-lucent mass that appears to be situated adjacent to the right atrium or embedded in the myocardium. The initial differential diagnoses included abscess versus coronary aneurysm.

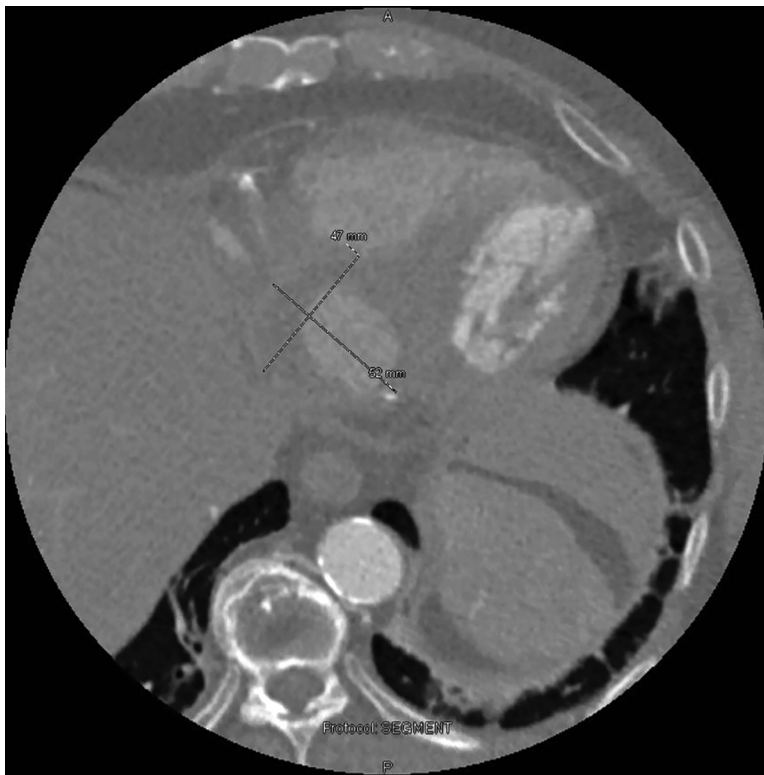


Figure 2. Cross-sectional view of the chest on computed tomography demonstrates a large distal right coronary artery aneurysm measuring 47 mm x 52 mm.

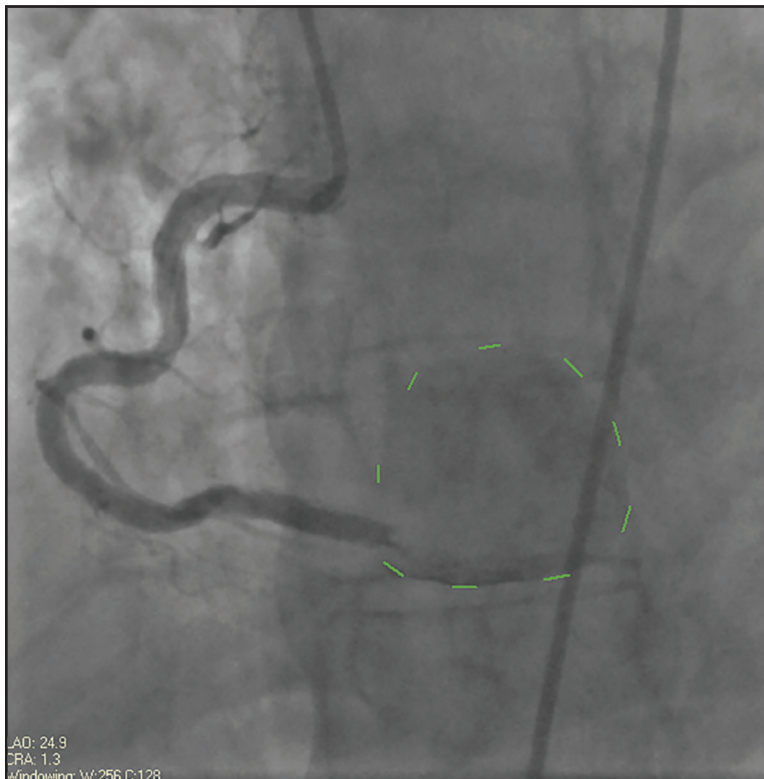


Figure 3. Right coronary angiography reveals a large aneurysm arising from the distal right coronary artery (traced in the green dotted line). There is no coronary flow beyond the aneurysm.



Figure 4. Right coronary angiography at the completion of percutaneous coil embolization shows the absence of flow into either the neck of the aneurysm or the aneurysm itself.

Conclusion

Mycotic coronary aneurysms represent a rare condition with potentially fatal complications. Due to the risk for rupture, early surgical intervention is the preferred management strategy. For cases in which the large aneurysm is not amenable to surgical intervention, percutaneous coil embolization may be considered an alternative treatment method with concomitant long-term antibiotic therapy.

Conflict of Interest

None of the authors identify any conflict of interest.

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