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Authors

Wang, Jennifer
Loui, Hollyann
Zara, Janette

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CLINICAL VIGNETTE

Infective Endocarditis Associated Mycotic Aneurysm of the Superior Mesenteric Artery

Jennifer Wang, BS, Hollyann Loui, MD and Janette Zara, MD

Abstract

Infective endocarditis is a severe condition associated with a spectrum of infectious and rheumatologic symptoms and complications. Peripheral mycotic aneurysms are a rare complication of infective endocarditis with vague presenting symptoms, making early clinical suspicion critical for timely diagnosis and management to prevent severe complications. We report a case of infective endocarditis complicated by mycotic aneurysm of the superior mesenteric artery to highlight the elusive presentation, diagnostic evaluation, and subsequent multidisciplinary treatment.

Background

A mycotic aneurysm**,** also known as infectious aneurysm or pseudoaneurysm, is a dilation of an artery due to damage of the vessel wall by an infection, classically from hematogenous spread from the heart.[1] The term "mycotic," referring to fungal origin, is a misnomer as various microorganisms, especially bacteria, can cause mycotic aneurysms. Microorganisms rapidly degrade the vessel intima into the deeper layers, and subsequent inflammatory processes lead to further local breakdown of the vessel wall.[1] Nontreatment or delayed treatment of mycotic aneurysms often leads to fulminant sepsis, spontaneous arterial rupture, and death.[2]

Infectious endocarditis (IE) is associated with a 30-60% incidence of embolic events to major organs, and 2.5-10% mycotic aneurysms formation.[3] Arterial branch points are the most common sites of mycotic aneurysm development since they favor the impaction of emboli.[4,5] Although peripheral mycotic aneurysms associated with infective endocarditis are rare, they have a high risk of complications for rupture with associated morbidity and mortality.[6] Keen clinical suspicion for peripheral mycotic aneurysms is essential for timely management to prevent these serious complications.

Case Presentation

Initial Presentation

A 47-year-old female presented for two weeks of intermittent migratory pains and fevers. Her past medical history is notable for patent ductus arteriosus (PDA) status post closure with a 6mm Amplatzer Ventricular Septal Defect device two months prior and history of mitral regurgitation and prolapse. Her PDA closure two months ago had no acute complications, and post-operative echocardiography was negative for valvular vegetations. However, six weeks after the procedure she developed progressive fevers, chills, and diffuse, intermittent migratory pain involving the right palm and fingers, bilateral forearms, left ankle, and the right foot with associated swelling. She was initially evaluated in the emergency department and thought to have right lower extremity cellulitis, started on cefalexin, and discharged. However, blood cultures drawn at that time grew gram positive cocci, so she was asked to return to the hospital for admission. Review of systems was notable for fever, chills, myalgias, and mild, diffuse abdominal pain in the setting of acute on chronic constipation and menstrual cramping. She denied hematochezia, melena, diarrhea, or bowel or bladder incontinence. Her exam was notable for a holosystolic murmur at the apex, and a benign abdominal exam without distension, masses, tenderness or peritoneal signs. She was admitted for infective endocarditis complicated by bacteremia.

Hospital Course

Vancomycin and Gentamicin were started for *Staph capitis* bacteremia, and Cefazolin was added after transesophageal echocardiography revealed mitral valve endocarditis. Two days later she developed a truncal and bilateral forearm rash, and dermatology suspected symmetrical drug-related intertriginous and flexural exanthem (SDRIFE) from antibiotics and a morbilliform eruption from iodinated contrast allergy from prior imaging. Cefazolin and gentamicin were stopped due to concern for allergy. Her fever resolved and leukocytosis improved to normal limits over the following week. Adult congenital cardiology and cardiac surgery were consulted to evaluate for intervention following antibiotic therapy.

However, during the second week of hospitalization, she developed a new fever, leukopenia, and migratory back pain without localizing infectious symptoms. She underwent extensive imaging given her high risk for septic emboli.

CT imaging revealed a superior mesenteric artery (SMA) lesion suspicious for SMA vasculitis with small mycotic pseudoaneurysm versus intraluminal branching thrombus (Figure A). Subsequent PET CT had FDG uptake in the SMA area but not around the PDA closure device, suggesting arterial infection of the SMA (Figure B). Vascular surgery recommended no surgi-

cal intervention at this time given the extensive nature of any possible procedure and modest improvement on interval imaging. Due to worsening leukopenia in conjunction with fevers she was switched from Vancomycin to Daptomycin with resolution of fevers and leukopenia. She was discharged on IV Daptomycin with close follow-up and plans to return for vascular re-evaluation of SMA mycotic aneurysm with repeat surveillance imaging in several weeks.

Repeat imaging three weeks later showed growth of the aneurysm from 6 mm to 15 mm concerning for ongoing mycotic process despite antibiotics. The patient underwent successful resection of the mycotic SMA aneurysm and placement of a SMA interposition graft using the greater saphenous vein. Months later, the mitral valve was replaced, and PDA closure device removed due to concern for seeding infection.

Discussion

Early Diagnosis

Early suspicion and timely imaging were critical in diagnosing this complication of infective endocarditis. Our patient presented with new mild abdominal pain with an unremarkable abdominal exam other than dermatologic lesions. The clinical picture was confounded by concurrent ongoing endocarditis treated with antibiotics, pain from SDRIFE and/or iodinated drug allergy, acute on chronic constipation, and menstrual cramps which all could have contributed to her dull pain. The differential included these known conditions in addition to endocarditis-associated complications such as septic emboli, glomerulonephritis, vasculitis. Given the host of systems potentially involved, our consultants' expertise was paramount in delineating what symptoms could be attributed to allergy and drug reaction versus sequelae of infection, and how to approach treatment in the setting of her complex clinical picture.

Pan-CT scanning was essential in identifying the SMA lesion, as she was largely asymptomatic besides recurrent intermittent fevers. Without this, she may have been discharged with six weeks of IV antibiotics alone without surveillance imaging. Multidetector CT angiography remains the current imaging modality of choice for the evaluation of suspected infected aneurysms based on clinical suspicion.[2] It is essential to keep mycotic aneurysm on the differential for any patient diagnosed with infective endocarditis, given symptoms can be vague and variable.

Treatment

Coordination and timing of treatment is essential in infective endocarditis complicated by peripheral mycotic aneurysm. The principles of infectious endocarditis treatment include early empiric antibiotic therapy and consideration of cardiac surgery for cases that progress to heart failure, uncontrolled infection, and to prevent embolic events[7]. In general, treatment of cardiac complications of infective endocarditis requiring surgical management take precedence over peripheral mycotic aneurysms.[3] Most mycotic aneurysms are treated with antibiotic therapy combined with surgical debridement with or without revascularization.[8] However, treatment is largely reliant on clinical experience guided by case series, since there are no randomized trials guiding management.[8,9]

For this patient, we initiated antibiotic therapy for infective endocarditis and closely monitored for cardiac decompensation that would indicate emergent cardiac surgical intervention. Since she was largely stable, focus was shifted to management of her mycotic aneurysm of the SMA. Serial imaging identified growth of the aneurysm despite antibiotics, warranting vascular intervention. This was essential in preventing further complications from the mycotic aneurysm. There is ongoing discussion as to whether this patient will need cardiac intervention depending on the state of her mitral valve after antibiotic therapy. Her most recent postoperative echocardiogram was promising, with no evidence of mitral vegetation seen on admission.

Although peripheral mycotic aneurysms associated with infective endocarditis are uncommon, delayed treatment or nontreatment can lead to serious complications such as sepsis, spontaneous aneurysm rupture, and death.[2] Maintaining clinical suspicion for peripheral mycotic aneurysms is essential for early diagnosis, and coordination of timely medical and surgical management is critical to prevent these severe complications.

Learning Points

- Early suspicion and diagnosis of mycotic aneurysm is critical for appropriate treatment as symptomatology may be vague
- Evaluation with CT angiogram is gold standard
- Multidisciplinary team of consultants is essential to facilitate appropriate diagnosis and management in the setting of concomitant conditions
- Coordination of combined medical and surgical treatment optimizes outcomes

Figures

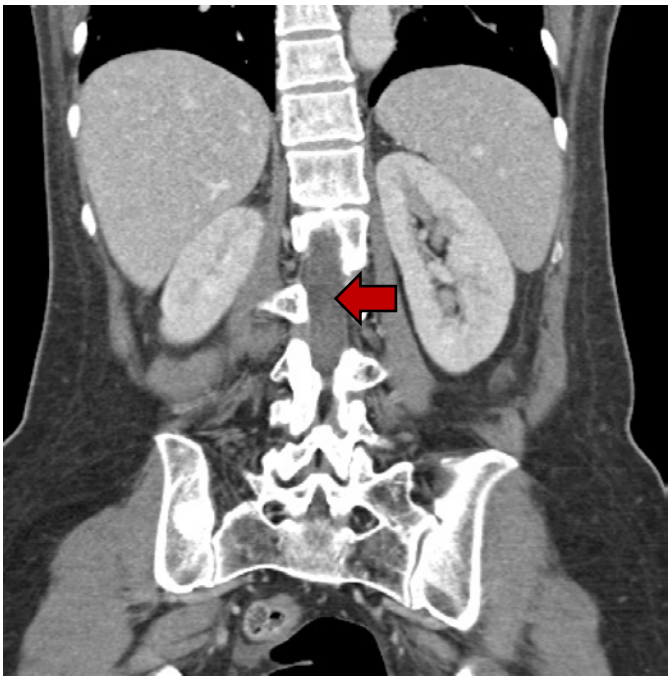

Figure A: CT Abdomen/Pelvis with contrast. Soft tissue thickening surrounding the SMA suspicious for SMA vasculitis with possible small mycotic pseudoaneurysm component versus intraluminal branching thrombus.

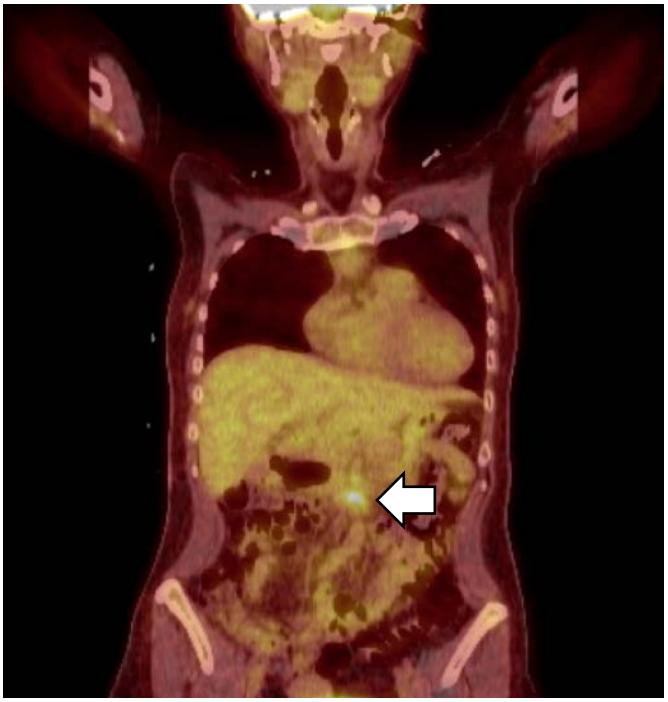

Figure B: PET-FDG. Focal intense FDG uptake in the SMA region surrounded by soft tissue thickening consistent with focal inflammation or infection involving the SMA. No focal FDG uptake around the PDA closure device.

REFERENCES

1. **Majeed H, Ahmad F**. Mycotic Aneurysm. 2021 Oct 11. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 32809571.
2. **Lee WK, Mossop PJ, Little AF, Fitt GJ, Vrazas JI, Hoang JK, Hennessy OF**. Infected (mycotic) aneurysms: spectrum of imaging appearances and management. *Radiographics*. 2008 Nov-Dec;28(7):1853-68. doi: 10.1148/rg.287085054. PMID: 19001644.
3. **Teixeira PG, Thompson E, Wartman S, Woo K**. Infective endocarditis associated superior mesenteric artery pseudoaneurysm. *Ann Vasc Surg*. 2014 Aug;28(6):1563.e1-5. doi: 10.1016/j.avsg.2014.03.032. Epub 2014 Apr 3. PMID: 24704049.
4. **Mylonakis E, Calderwood SB**. Infective endocarditis in adults. *N Engl J Med*. 2001 Nov 1;345(18):1318-30. doi: 10.1056/NEJMra010082. PMID: 11794152.
5. **Allen B, Desai B, Falgiani M**. Endocarditis-Induced Mycotic Brain Aneurysm following Right MCA Stroke. *Case Rep Emerg Med*. 2012;2012:606921. doi: 10.1155/2012/606921. Epub 2012 May 30. PMID: 23326719; PMCID: PMC3542890.
6. **Enç Y, Cinar B, Konuralp C, Yavuz SS, Sanïoglu S, Bilgen F**. Peripheral mycotic aneurysms in infective endocarditis. *J Heart Valve Dis*. 2005 May;14(3):310-6. PMID: 15974523.
7. **Habib G, Hoen B, Tornos P, Thuny F, Prendergast B, Vilacosta I, Moreillon P, de Jesus Antunes M, Thilen U, Lekakis J, Lengyel M, Müller L, Naber CK, Nihoyannopoulos P, Moritz A, Zamorano JL; ESC Committee for Practice Guidelines**. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): the Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the International Society of Chemotherapy (ISC) for Infection and Cancer. *Eur Heart J*. 2009 Oct;30(19):2369-413. doi:10.1093/eurheartj/ehp285. Epub 2009 Aug 27. PMID: 19713420.
8. **Greillier L, Barlesi F, Fraticelli A, Gimenez C, Chetaille B, Gaubert JY, Astoul P**. Fatal pulmonary haemorrhage from a mycotic pulmonary artery aneurysm. *Int J Tuberc Lung Dis*. 2005 Jun;9(6):702-3. PMID: 15971404.
9. **Sörelius K, Budtz-Lilly J, Mani K, Wanhainen A**. Systematic Review of the Management of Mycotic Aortic Aneurysms. *Eur J Vasc Endovasc Surg*. 2019 Sep;58(3):426-435. doi: 10.1016/j.ejvs.2019.05.004. Epub 2019 Jul 16. PMID: 31320247.