

A Fatal Case of Multiple Mycotic Aortic Aneurysms Following Septic Arthritis and Complicated by Aneurysm Rupture and Aortoenteric Fistula

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Abstract Mycotic aneurysms are rare infectious vascular disorders, which predominantly occur in aorta and peripheral vessels. Clinically apparent mycotic aneurysms are usually well advanced at the time of presentation as early clinical diagnosis of infected aneurysms is challenging owing to vague and non-specific symptoms. Delayed treatment of mycotic aneurysms often lead to life threatening complications including rupture, hemorrhage and aortoenteric fistula resulting in poor outcome and high mortality and morbidity. High degree of suspicion is required to accurately diagnose mycotic aneurysms and prevent complications. Despite surgery and aggressive medical management, mortality rate is high. Septic arthritis is one of the rare causes of mycotic aneurysm, which usually occur if there is delayed, or no treatment. We report a case of complicated mycotic aortic aneurysms in a patient with septic arthritis resulting in a fatal outcome. This case report not only highlights the importance of early recognition and management of Mycotic aneurysms, but also stresses accurate diagnosis and treatment of predisposing conditions like septic arthritis, as aggressive management of predisposing conditions can safely prevent life threatening mycotic aortic aneurysms.

Keywords: *Mycotic aortic aneurysms, Septic Arthritis, Aneurysm rupture, Aortoenteric fistula*

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1. Introduction

Mycotic aortic aneurysm is a rare but life threatening infectious vascular disease, which has a very high mortality and morbidity without adequate treatment [1]. The majority of cases are caused by bacteria with *staphylococcus aureus* and *salmonella species* implicated as the most common organisms causing mycotic aneurysms [2]. *Streptococcus pneumoniae*, once used to be a frequent cause of mycotic aneurysms in pre-antibiotic era, is reemerging again as a cause of infected aneurysms [3]. Antecedent infection including pneumonia, endocarditis, urinary tract infection, cholecystitis, diverticulitis and osteomyelitis is an important risk factor for mycotic aneurysm. Septic arthritis has rarely been associated with mycotic aneurysms, but can certainly cause infectious aneurysms if left untreated. We report a case of multiple aortic mycotic aneurysms in a patient with septic arthritis that was complicated by aneurysm rupture and aortoenteric fistula resulting in death of the patient.

2. Case Presentation

A 70 year old man presented to emergency department with an aching pain in the left wrist. Pain was 7/10 in

intensity, throbbing in quality, radiated to left hand and worse with flexion and extension of wrist. On examination, there was slight swelling and tenderness on the dorsal aspect of left wrist, more on ulnar side, but no local redness or warmth was appreciated. He denied any hand trauma but he did sweep recently with a lot of back-and-forth motion with his wrist while using cleaning tools. X-ray of wrist was normal with no erosions or fractures. A diagnosis of tendonitis of left wrist was made, wrist splint was applied and patient was discharged on NSAIDs. Patient past medical history included gouty arthritis, TIA, diabetes, hypertension, neurogenic bladder with self catheterization, compression fracture with kyphoplasty and chronic kidney disease. Patient was an active smoker and social drinker but denied use of illicit drugs. Patient had a history of two episodes of acute gouty arthritis in left wrist and knee with most recent attack 1 year ago that was treated with painkillers only.

After 3 days, patient presented to emergency again with left wrist pain but this time it was much worse and intolerable. Patient denied fever, chills, nausea and vomiting. Significant amount of swelling, erythema and warmth was noted on left wrist. Repeat X ray wrist once again revealed normal bony alignment without any evidence of abnormality. Joint aspiration was attempted twice but each time it resulted in dry tap as there was not

enough fluid in joint for synovial fluid analysis. Given the nature of his symptoms and previous history of gout, it was believed that this is another episode of acute gouty arthritis. He was treated with hydromorphone and colchicine in emergency with marked improvement in his pain. Patient was discharged on colchicines and NSAIDs.

After a couple of days, patient started to have severe lower abdominal and back pain that was associated with nausea and vomiting. He denied having any fever or chills but he did have constipation for last couple of days. Non-contrast CT scan of abdomen/pelvis showed bladder wall thickening with possibility of chronic cystitis (Figure 1). Urine analysis showed 4+ bacteria and 10-12 WBCs. WBC count was 18000 and lactic acid was high. As patient did not have urinary symptoms, it was considered

asymptomatic bacteriuria. In the mean time, patient wrist pain and swelling started worsening for which repeat joint aspiration was done which drained pus. Vancomycin and ceftriaxone was started for possible septic arthritis. Synovial fluid analysis showed numerous WBCs and culture grew *Streptococcus pneumoniae*. No crystals were seen on synovial fluid analysis. Similarly, two blood cultures from different sites were also positive for *Streptococcus pneumoniae* susceptible to ceftriaxone. Vancomycin was discontinued and patient was continued on ceftriaxone. Arthrotomy with debridement and drainage of left wrist was done because of failure of wrist pain and swelling to improve after medical treatment. After a couple of days of antibiotics, repeat synovial and blood cultures were negative for any bacteria.



Figure 1. CT scan of abdomen (with out contrast) done on the day of admission shows normal distal aorta. Severe vascular calcification is seen

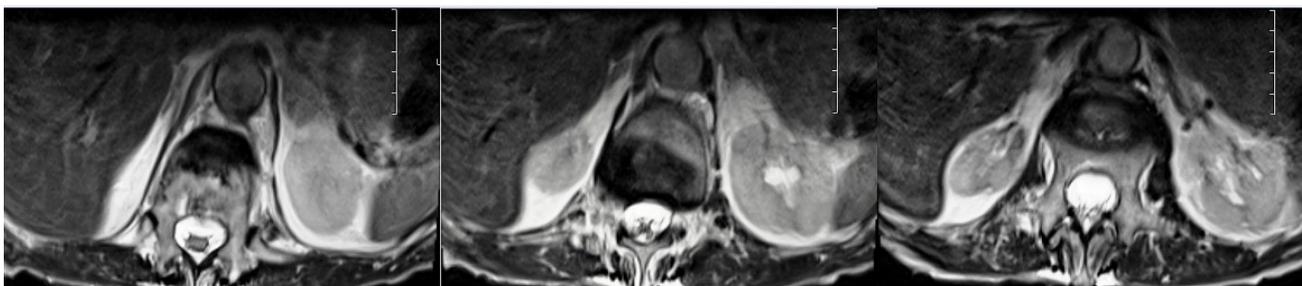


Figure 2. MRI of lumbar spine done for evaluation of severe back pain showing T2 signal surrounding the distal aorta. The aortal appears to be enlarged with suspicion of mycotic aneurysm

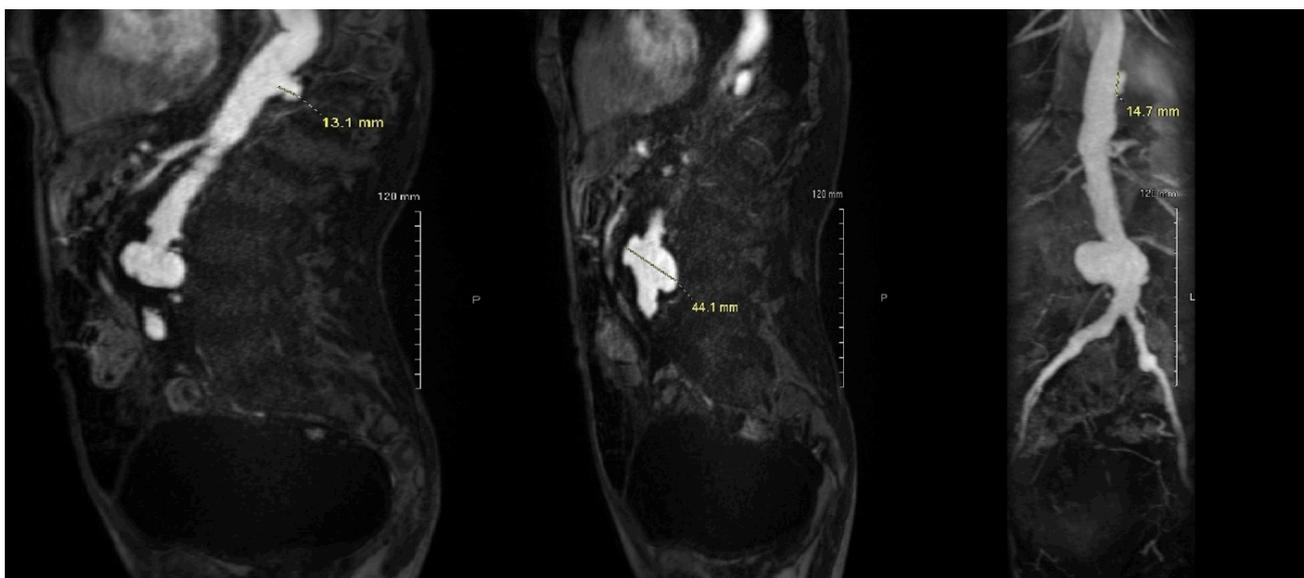


Figure 3. MR Angiography of abdomen showing aneurysms in descending thoracic aorta, distal abdominal aorta, mid right common iliac artery and distal left common iliac artery



Figure 4. 3D reconstruction images from MR angiography demonstrating multiple aneurysms in thoracoabdominal aorta and common iliac arteries

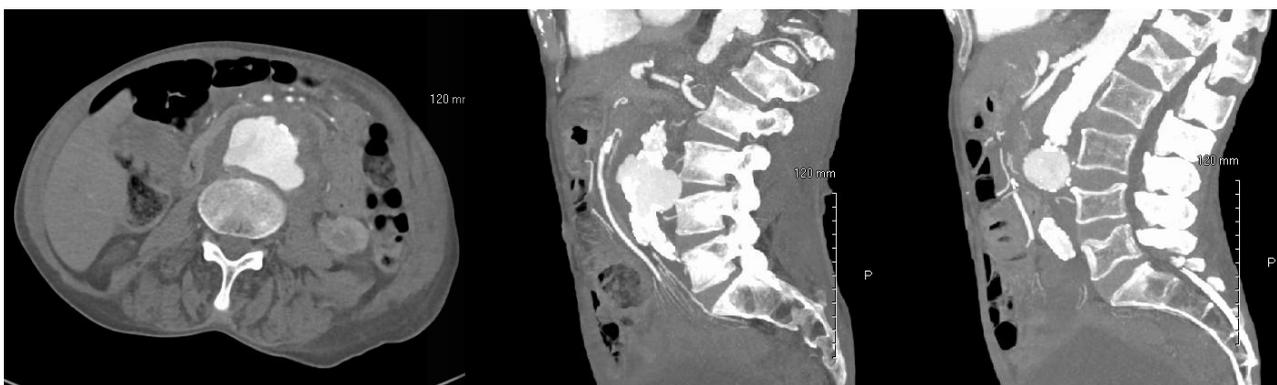


Figure 5. Follow up CT angiography done next day showed leaking mycotic aneurysm of distal abdominal aorta

Patient left wrist pain improved significantly, but his lower belly and back pain continued to get worse and became intolerable despite opioid medications. MRI Lumbar spine was ordered to rule out compression fracture of spine which revealed some abnormal T2 signal surrounding the distal aorta with enlarged aorta compared to previous MRIs suggestive of possible mycotic aneurysm (Figure 2). MRA Abdomen done on the same day showed multiple mycotic aneurysms of thoracoabdominal aorta and common iliac arteries with the largest aneurysm located in distal abdominal aorta (Figure 3, Figure 4). Patient was continued on antibiotics and repeat blood cultures were ordered. Follow up CT angiography of abdomen on next day showed leaking mycotic aneurysm of distal abdominal aorta (Figure 5). Vascular surgery performed emergent open repair of ruptured mycotic abdominal aneurysm with aortoiliac cadaveric implant. During the procedure, aortoenteric fistula between aorta and jejunum was identified which was successfully repaired. Patient was subsequently transferred to ICU where his condition deteriorated and he developed anuric acute kidney injury. A discussion was made to family regarding the poor prognosis of his condition who requested to withdraw intensive care and continue palliative and end of life care only.

3. Discussion

Mycotic aneurysm is characterized by destruction of vessel wall by infection leading to blind saccular dilation [4]. Mycotic aneurysm is a rare but serious disease that can be fatal if left untreated. Aneurysm may either develop in a previous normal artery secondary to infection

of vessel wall or previously existing aneurysm may become secondarily infected. Mycotic aneurysms can affect any artery but aorta, peripheral arteries, cerebral arteries and visceral arteries are more frequently involved in descending order of frequency [4,5]. Staphylococcal and salmonella species are the most common organisms causing infected aneurysm because of their strong affinity for the wall of arteries. Gram negative bacteria, fungi and mycobacterium have also been reported to cause mycotic aneurysms [6]. A variety of mechanisms have been described for causing infected aneurysm. These include direct bacterial inoculation, bacteremic seeding from remote focus, contiguous infection and septic micro emboli to vasa vasorum [7]. Mycotic aneurysm usually occurs in patients with prior atherosclerosis disease thus making it the most significant risk factor. A number of other predisposing factors have been described such as impaired immunity, old age, diabetes, alcoholism, cancer, arterial trauma and local infection.

The clinical presentation depends on site, size and cause of mycotic aneurysm. The clinical manifestations are diverse and more often non specific thus making the diagnosis of mycotic aneurysm difficult. The classical presentation is a painful pulsatile mass together with systemic features of infection. Mycotic thoracic aortic aneurysm presents with chest or inter scapular pain, whereas mycotic abdominal aortic aneurysm usually manifest as abdominal or back pain with or without palpable mass. Signs and symptoms of systemic infection such as fever, chills and generalized weakness along with leucocytosis, elevated ESR and CRP are common. Blood cultures are positive in 50-85% patients. In majority of cases, symptoms are usually vague and by the time

mycotic aneurysms are diagnosed, they are usually well advanced or are associated with life threatening complications. Infected aortic aneurysms, if not diagnosed and treated in timely manner, can lead to fatal complications which include aneurysm rupture, fulminant sepsis, hemorrhage septic emboli and aortoenteric fistula.

CT angiography is currently the diagnostic modality of choice for evaluation of suspected aneurysm [8]. MR angiography is emerging as an alternative imaging modality for mycotic aortic aneurysms as it provides an entire aortic image with high resolution. Imaging is necessary to establish diagnosis, identify any complications, map vascular anatomy and define disease extension, which can help plan surgical intervention. In general, antibiotic therapy with surgical debridement with or with our revascularization is the standard treatment for unruptured mycotic aneurysms [9,10]. The aim of surgery is to remove all necrotic and infected tissue and restore blood flow to ischemic area. On the other hand, small asymptomatic aneurysms can be managed with IV antibiotics alone for 4-6 weeks and follow up imaging [9]. Mycotic aneurysms should be treated empirically initially with Rocephin and Vancomycin prior to the availability of culture reports. Antibiotic should be tailored according to culture and sensitivity. Infected aneurysms, if ruptured, prompt urgent surgical intervention followed by long term antibiotic therapy [10]. Adequate debridement and surgical excision of infected aorta with in situ graft is the most commonly used surgical procedure, however, mortality rates are high (14-36%) with surgical procedures. More recently, minimally invasive procedure in the form of endovascular stent repair has been developed especially for mycotic thoracic aneurysms however further studies are needed to evaluate its efficacy and complications. Endovascular stenting does not remove the focus of infection and may be associated with increased morbidity and mortality, however its use is increasing in patients with high risk for surgery.

Antecedent infections like infected endocarditis, pneumonia, UTI, cholecystitis and diverticulitis can all cause mycotic aneurysm. Septic arthritis has rarely been recognized to cause infected aneurysm because of rarity of disease and early use of antibiotics. *Staphylococcus aureus* and *streptococcus pneumonia* are the most common causes of non gonococcal arthritis. Septic arthritis presents with acute onset of joint pain, swelling, redness and warmth along with fever. This is a medical emergency, if untreated septic arthritis can rapidly damage the joint resulting in permanent disability. Possible complications include osteomyelitis, bone erosions, sepsis and even death. Joint aspiration should be done if there is suspicion of septic arthritis. It is treated with both antibiotics and surgical approach. If condition does not improve with antibiotics and joint aspiration, open drainage and lavage using arthroscopy or via arthrotomy should be strongly considered.

Our patient presented with left wrist swelling which was initially diagnosed as acute gouty arthritis and treated with NSAIDs. Patient wrist pain and swelling got worse for which joint aspiration was done which showed septic arthritis. Patient was started on IV antibiotics, which relieved the wrist pain. Synovial fluid and blood culture were initially positive for streptococcus pneumonia but subsequent cultures were all negative after treatment with

antibiotics. In the mean time, patient developed severe lower abdomen and back pain. CT of abdomen and pelvis on admission was unremarkable other than chronic cystitis changes. Considering the fact that patient had compression fracture of lumbar spine in past, MRI of back was done for evaluation of severe back pain which incidentally showed aortic mycotic aneurysm. MRA of abdomen was done for further evaluation, which revealed multiple mycotic aortic aneurysms with the largest aneurysm in distal abdominal aorta. The fact that mycotic aneurysm developed after septic arthritis indicated that infectious joint was the possible underlying etiology of mycotic aneurysms. Mycotic aneurysms were not initially seen on admission CT scan but were seen on subsequent CTA and MRA. Patient's severe lower abdominal pain was most likely secondary to complete occlusion of inferior mesenteric artery due to occlusion by saccular aneurysm. During the course of hospital stay, distal abdominal aortic aneurysm got ruptured which was surgically repaired using graft. During the procedure, it was found that patient also has aortoenteric fistula, which was also repaired. Patient condition deteriorated and he died after family decided to withdraw life support due to poor prognosis.

4. Conclusion

Mycotic aortic aneurysm is a rare but potentially life threatening vascular disorder with high mortality and morbidity. Early detection of mycotic aneurysm is imperative because of high risk of rupture and complication thus making early diagnosis and aggressive management key to a successful outcome. Antecedent infection like septic arthritis if left untreated can rarely lead to mycotic aneurysm. Our case not only demonstrates the rarity of septic arthritis as the predisposing cause of mycotic aortic aneurysms, but also stresses the significance of its accurate diagnosis and management at early stages as untreated septic arthritis can be life threatening. Joint aspiration is a crucial investigation and should be done in all patients with acutely swollen, warm and tender joints to rule out septic arthritis despite the history of previous gouty attacks in the same joint.

Conflict of Interests

None.

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