

Case Series

Mycotic Aortoiliac Aneurysm: A case series

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Abstract

Mycotic aneurysms are rare and usually occur secondary to embolization of septic foci. Early diagnosis is crucial. They have high risk of rupture/complications and can pose a difficult management challenge especially in an acute setting. We describe the management of three patients with mycotic aneurysms in our case series.

Key Words: Infected aneurysm; mycotic aneurysm; surgical treatment.

Background

Infected aneurysms are classified into four categories based on their etiology. They include mycotic aneurysm, microbial arteritis, infected preexisting aneurysms and posttraumatic infected false aneurysms.

Case Series

Case 1: DTA -Mycotic Saccular Aneurysm

A 48-year-old female, presented with fever and pain in her back for the past 15 days. The pain was severe, present in the middle of her spine and was affecting her activities of daily life. The fever was high and recurrent. She did not suffer from loss of weight, loss of appetite, cold, cough or any nocturnal symptoms. There were no other localizing signs in her history. She was evaluated outside for the same and was diagnosed to suffer from paravertebral lesion/collection from the level of 7th to 9th thoracic vertebrae and she was referred our hospital for further management.

On examination, she was thin and moderately built. Her general examination was unremarkable. No notable signs in her abdominal examination. Her vitals were stable. All her peripheral pulses were palpable. There was no weakness in her lower limbs.

She was admitted and her imaging films were reviewed extensively. There was a

Mycotic Aortoiliac Aneurysm: A case series

small outpouching from the DTA (saccular aneurysm – 7mm) [Figure - 1], which was present amidst the paravertebral collection (5cm in transverse axis and 4.4 cm in maximal AP diameter) [Figure - 2]. The lesion was unlikely to be tuberculosis as the vertebrae and intervertebral disc space were uninvolved. Fever workup was performed (blood and urine), which turned out to be sterile. Her CRP was elevated (201 mg%) and her TLC was 18000 cells/cu mm at admission. She was started on empirical antibiotics (Inj. Cefotaxime and Inj. Amikacin). Her Mantoux was negative at the end of 48 hr. Aspiration from the paravertebral collection was contemplated either under CT guidance or thoracoscopy or mini thoracotomy with the concerned consultants.

An extensive evaluation for vegetations turned out to be negative. The antibiotic was changed to Inj. Meropenem 2 gm IV Q8H along with Bactrim DS (Trimethoprim-Sulfamethoxazole) due to the clinical picture and the clinical findings were in favor of melioidosis.

The patient gradually improved following the measures taken during the admission

and her symptoms were reduced by more than 50%. She was afebrile and she was able to ambulate with minimal support. At the time of discharge, her CRP was 48 mg% from 201 mg% and her TLC was 11700 cells/cu mm from 18500 cells/cu mm.

A central venous line was placed in her right subclavian vein to facilitate administration of antibiotics for a month. She was discharged with stable vitals and she was advised to undergo repeat imaging of her DTA after 4 weeks.



Fig (1): CTA- small contrast filled diverticulum in DTA

Mycotic Aortoiliac Aneurysm: A case series



Fig (2): CTA- Paravertebral abscess in D8-D9 level (5cm in transverse axis and 4.4 cm in maximal AP diameter)

After 1 month of antibiotics, patient was reviewed and admitted for definitive surgery. Repeat CT angiogram of aorta showed decrease in paravertebral collection (5cm in transverse axis and 4.2 cm in maximal AP diameter) and increase in the size of aneurysm [Figure-3].



Fig (3): CTA- paravertebral collection (5cm in transverse axis & 4.2 cm in maximal AP diameter) and increase in the size of DTA Aneurysm.

She underwent successful aneurysm repair (22mm polyester graft) + omentoplasty + debridement [Figure-4 and 5].

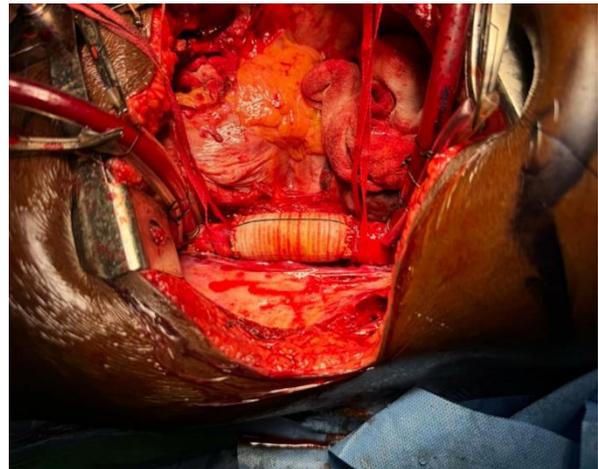


Fig (4): Procedure- DTA segmental replacement with (22mm Tube Graft)

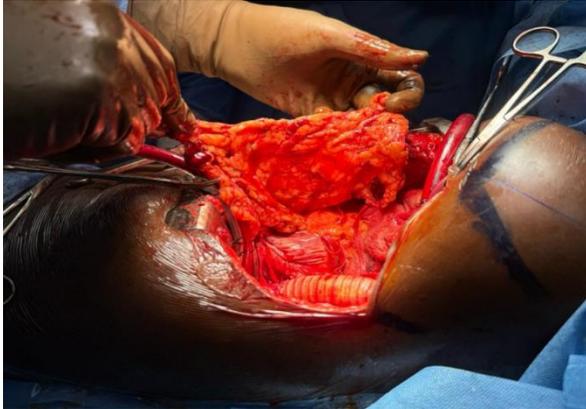


Fig (5): Omentoplasty

Results

Specimen	
AFB Smear	Negative
Tissue C/S	Sterile
Gram Stain	No Bacteria isolated
Fungal C/S	No growth
Real time PCR	Not detected
Genotype MDR + MTP complex	Negative

Postoperative course

- Recovered well.
- Received Meropenem for 4 weeks post-operative period
- 2 month follow up- patient well. Ambulant.
- On Bactrim DS BD and Folvite.
- CRP - Normal.

Case 2: Infected Aortoiliac Aneurysm

A 64 year old male presented with a chief complaints of left loin pain for 1 week which was insidious in onset, progressive with history of fever present. No comorbidities were present. On examination, he was febrile, tachycardic and his BP and SpO2 were normal. The left loin was tender and all lower limb pulses were felt. ECHO revealed no vegetations. His HbA1c was 12.5% and diagnosed with newly detected DM. His blood culture turned out to be sterile. CT angiogram of aorta and bilateral lower limb arteries showed saccular aortic aneurysm with collection [Figure -6].

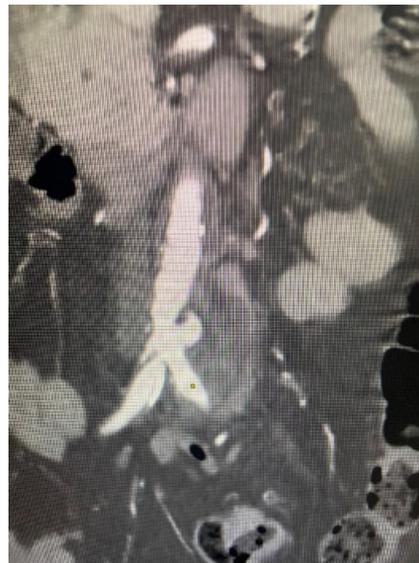


Fig (6): CTA- Saccular Aortic Aneurysm with collection

Mycotic Aortoiliac Aneurysm: A case series

He underwent laparotomy and found to be have pus around the saccular aneurysm. The procedure performed was drainage of abscess + debridement of aorta with reconstruction using neo-aorto iliac system [femoral vein harvest - figure -7 and 8]. Debrided tissues were sent for culture & sensitivity.



Fig (7): Femoral Vein Harvest



Fig (8): NAIS

Tissue culture and sensitivity report showed ***Burkholderia Pseudomallei*** which was sensitive to Meropenem and Ceftazidime. Good glycemic control was achieved. He recovered well and discharged with Meropenem for 4 weeks and 3 months of Bactrim DS. On 5 months of follow up, he was found to be doing well.

Case 3: Mycotic Iliac Aneurysm with rupture

A 59 year old female presented with a chief complaints of pain in the right iliac fossa followed by vomiting for 2 days and loss of appetite for 2 days. She was a K/C/O DM, HTN, and old CVA on

Mycotic Aortoiliac Aneurysm: A case series

treatment. On examination, she was dehydrated, pallor, tachycardic and tachypneic. P/A was tender at umbilical region, rebound tenderness in RIF and guarding was present. All lower limb pulses were felt. Her GRBS was 561 and ABG showed metabolic acidosis with respiratory alkalosis. All corrective measures were instituted and started with antibiotics. Imaging showed aneurysm of the proximal right IIA [Figure-9] with peri aneurysmal hematoma extending into retroperitoneum causing right HUN. [Figure: 10 and 11]

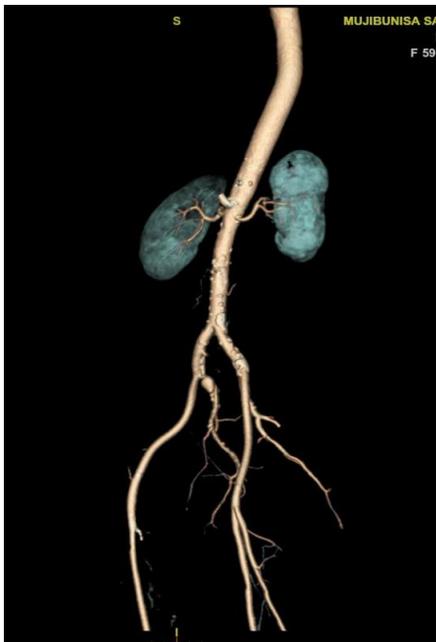


Fig (9): CTA-Right IIA Aneurysm



Fig (10): CECT- Collection around CIA and hematoma in Retroperitoneum



Fig (11): Large Collection with IIA aneurysm and Right HUN

She underwent DJ Stenting on right side ureter followed by laparotomy and found to have aneurysm of infective origin with pus around the right CIA [Figure - 12] and retroperitoneal hematoma [Figure - 13]. Pus drained & sent for culture and sensitivity. The procedure performed was ligation of Right iliac arteries (CIA, IIA, and EIA) + Left CFA to Right cross

over bypass using graft (7mm) [Figure - 14].

Intraop findings

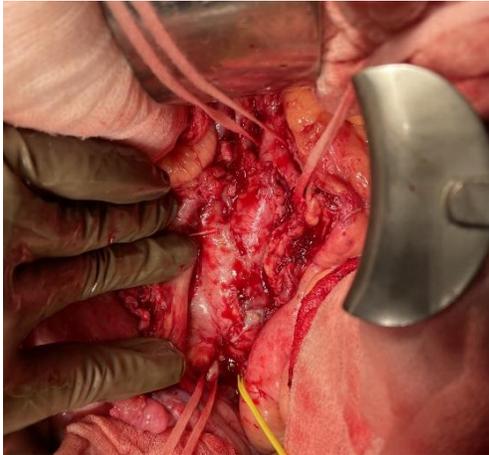


Fig (12): Pus around Right CIA



Fig (13): Retroperitoneal hematoma

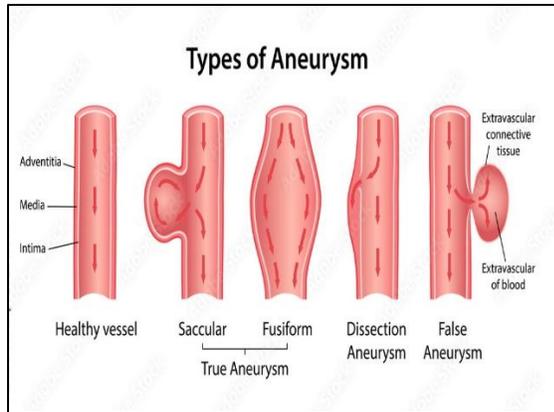


Fig (14): Right CIA/IIA ligation with Femoro Femoral cross over bypass

Culture and sensitivity report showed isolated Group B Streptococcus (*S. agalactiae*) and treated with Teicoplanin. She was discharged with IV Ceftriaxone for 4 weeks and Oral Augmentin/Azithromycin for 3 months. On 6 months of follow up she was doing well and the Graft was patent.

Discussion

Mycotic Aortoiliac Aneurysms



True Vs False Aneurysm

Parameter	True	False
Layers of artery	All three layers involved	Not involved
Size	Is a factor on deciding rupture risk	Doesn't matter
Rupture risk	Low comparatively	High

Definition

William Osler coined the term “mycotic” in his Gusionian lectures, where he described a man with multiple aortic mycotic aneurysms in a patient with valve

vegetations, which resembled the appearance of a fleshy fungus.

- Bacteria is most common.
- Fungal- Rare.
- Viral- Not reported.

Etiopathogenesis

Bacteremia: Pre-existing vessel injury predisposes to infection of intima due to bacterial seeding. Aorta is the most common location due to the high prevalence of atherosclerosis and aneurysm.

Local Injury and Bacterial Inoculation: Vascular injury resulting from IV drug abuse, trauma, or iatrogenic causes like percutaneous intervention, can inoculate bacteria into the vascular wall. This is commonly seen in arteries of extremities like femoral, common iliac, or subclavian and carotid arteries.

Local Spread: Extension of infection to local arteries can result in subsequent arterial inflammation, seen in vertebral osteomyelitis and intra-abdominal pathologies like appendicitis, pyelonephritis, and cholecystitis.

Septic Emboli: Infective endocarditis is associated with emboli in vasa vasorum resulting in inflammation of vascular wall and subsequent mycotic aneurysm. These emboli tend to be multifocal and involve the intracranial arteries at branch points.

Common Risk factors

- Infective endocarditis - 2 decades back.
- Currently-DM, Immunosuppression, IV drugs.

Microbiology profile

- Cultures are positive in 50–85% of the cases.
- Most common - *Streptococcus*, *Staphylococcus* and *Salmonella*.
- Others - *Burkholderia Pseudomallei*, *Clostridium Septicum*,
- *E Coli*, *Pseudomonas aeruginosa*, *Yersinia*.

Clinical Presentation

- Common- fever, pulsatile mass, local pain, and inflammation in the arterial site.

- Many patients are evaluated as fever of unknown origin and remain undiagnosed until there are severe symptoms of sepsis, thrombosis, hemorrhage, or rupture.
- Local expansion of the infection may result in psoas abscess formation (flank pain, limping and fever), vertebral osteomyelitis, dysphagia, and hoarseness due to the impingement of laryngeal nerve, and hemoptysis.
- Present with rupture into IVC with high output heart failure.

Investigations and Imaging

1. Elevated inflammatory parameters CRP, ESR, leucocytosis, positive blood culture.
2. Contrast enhanced CT scan is the investigation of choice.
3. Findings,
 - Saccular with lobulated contours
 - Soft tissue inflammation surrounding the vessel wall (seen as perivascular contrast enhancement)

- Intramural air or air collection around the blood vessel
- Perianeurysmal fluid collection

Treatment

- All patients require prolonged antibiotic therapy tailored to the culture and sensitivity results. A course of 6-8 weeks of medical therapy is recommended, but the duration is prolonged if there is evidence of persistent infection.
- Response to therapy is monitored via serial white counts, inflammatory markers, and resolution of fever and hemodynamic stability. Empiric antibiotics are a combination of vancomycin with an agent with activity against gram-negative organisms, to cover for salmonellae, such as ceftriaxone, a fluoroquinolone, or piperacillin-tazobactam.
- Definitive management requires the removal of all infected tissue by surgical interventions. This includes debridement with or without revascularization via endovascular or open procedure.

Surgical Principles

1. The procedure is chosen based on aneurysm location, the extent of the infection, the fitness of the patient, and the surgeon's preference.
2. In general, proximal ligation and resection of the aneurysm is a suitable approach for peripheral arteries and splanchnic vessels. Homografts involving segments of medium size vessels like an iliac artery or saphenous vein are suitable for renal, visceral, carotid or femoral arteries.
3. Larger vessels like aorta with minimal purulence are managed with reconstruction with an in situ graft, and the conduit is covered with an omental pedicle to reduce the risk of persistent infection.
4. There is no consensus on the ideal graft; options include rifampin soaked dacron graft, cryopreserved aortic graft, or femoral vein graft. Persistent purulence and systemic signs of inflammation or extensive aortic or paraaortic purulence suggest the

Mycotic Aortoiliac Aneurysm: A case series

need for an extra-anatomic bypass.

5. Long-term antimicrobial suppression therapy is considered if the emergency surgical procedure is performed for graft placement in the infected surgical site.

Conclusion

- High index of suspicion with imaging is key in diagnosis.
- DM and TB seem to be causative factors in our population.
- Identifying the microorganism is vital to provide appropriate antibiotic therapy.
- Planning surgical strategy is important. (Insitu vs Extra anatomic bypass)
- Constantly involving Physician during acute phase and follow up is of paramount importance.