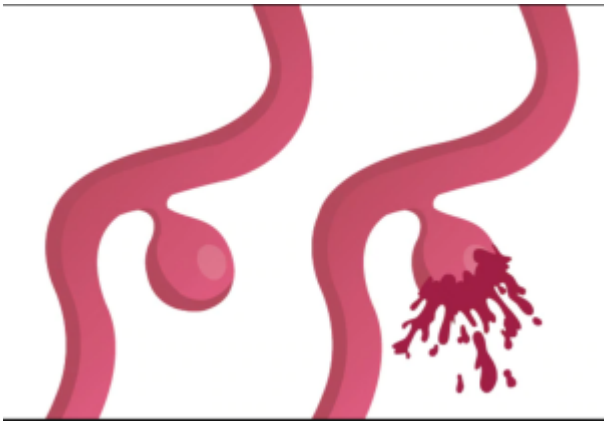
Infectious aneurysm



Infectious aneurysm (also known as mycotic aneurysm or microbial arteritis) is an aneurysm arising from bacterial infection of the arterial wall. It can be a common complication of the hematogenous spread of bacterial infection.

William Osler first used the term "mycotic aneurysm" in 1885 to describe a mushroom-shaped aneurysm in a patient with subacute bacterial endocarditis [1]. rather than the current usage which infers a fungal etiology. Currently accepted terminology favors infectious aneurysm (or bacterial aneurysm). Infectious aneurysms can, however, also occur with fungal infections [2].

However, mycotic aneurysm is still used for all extracardiac or intracardiac aneurysms caused by infections, except for syphilitic aortitis.

The term "infected aneurysm," proposed by Jarrett and associates is more appropriate, since few infections involve fungi.

According to some authors, a more accurate term might have been endovascular infection or infective vasculitis, because mycotic aneurysms are not due to a fungal organism.

Epidemiology

1. comprise ≈ 4% of intracranial aneurysms.

2. Intracranial mycotic aneurysms (ICMAs) complicate about 2% to 3% of infective endocarditis (IE) cases, although as many as 15% to 29% of patients with IE have neurologic symptoms.

3. most common location: distal middle cerebral artery branches (75–80%)

4. at least 20% have or develop multiple intracranial aneurysms

5. increased frequency in immunocompromised patients (e.g. AIDS) and drug users

6. most probably start in the adventitia (outer layer) and spread inward

Left ventricular assist device-associated subarachnoid hemorrhage may be caused by infectious intracranial aneurysms when acute bloodstream infections are present [3].

Pathogens

streptococcus- 44% - S. viridans (classic cause of SBE)

staphylococcus- 18% S. aureus (cause of acute bacterial endocarditis)

miscellaneous - 6% (pseudomonas, enterococcus, corynebacteria…)

multiple 5%

no growth 12%

no info 14%

total 99% [4].

Diagnosis

Blood cultures and LP may identify the infectious organism. Patients with suspected infectious aneurysm(s) should undergo echocardiography to look for signs of endocarditis.

Treatment

For the clinician, early diagnosis is the cornerstone of effective treatment. Without medical or surgical management, catastrophic hemorrhage or uncontrolled sepsis may occur. However, symptomatology is frequently nonspecific during the early stages, so a high index of suspicion is required to make the diagnosis.

These aneurysms usually have fusiform morphology and are usually very friable, therefore surgical treatment is difficult and/or risky. Most cases are treated acutely with antibiotics which are continued 4–6 weeks. Serial angiography (at 7–10 days and 1.5, 3, 6 and 12 months, even if aneurysms seem to be getting smaller, they may subsequently increase [5] and new ones may form) helps document the effectiveness of medical therapy (serial MRA may be a viable alternative in some cases). Aneurysms may continue to shrink following completion of antibiotic therapy [6]. Delayed clipping may be more feasible; indications include:

1. patients with SAH.

2. increasing size of an aneurysm while on antibiotics (controversial, some say not mandatory) [7].

3. failure of the aneurysm to reduce in size after 4–6 weeks of antibiotics [8].

Patients with subacute bacterial endocarditis requiring valve replacement should have bioprosthetic (i.e. tissue) valves instead of mechanical valves to eliminate the need for risky anticoagulation.

Case reports

Lee et al. reported three left ventricular assist device recipients who presented with septicemia and developed subarachnoid hemorrhage. Case 1, a 37-year-old male with non-ischemic cardiomyopathy with HeartMate II, presented with confusion and found to have Serratia bloodstream infection and left frontal lobe subarachnoid hemorrhage. A cerebral angiography showed a right M3/M4 branch infectious intracranial aneurysm. He was treated with coil embolization and underwent device exchange. Case 2, a 41-year-old male with non-ischemic cardiomyopathy with HeartMate II presented with confusion and found to have methicillin-resistant staphylococcus aureus bloodstream infection and bilateral frontal convexity subarachnoid hemorrhage. Cerebral angiogram showed left M3 and left A3 infectious intracranial aneurysms, which were treated with antibiotics alone. Case 3, a 58-year-old female with ischemic cardiomyopathy with HeartMate II presented with fever, found to have candida albicans bloodstream infection and a parieto-occipital enhancing lesion concerning for cerebral abscess. Repeat computed tomography brain a week later showed a new right frontal subarachnoid hemorrhage. Cerebral angiogram showed a M4/M5 junction infectious intracranial aneurysm; patient was not a surgical candidate and was transitioned to hospice. This case series emphasizes that left ventricular assist device-associated subarachnoid hemorrhage may be caused by infectious intracranial aneurysms when acute bloodstream infections are present [9].

Khan et al.reported two cases of a ruptured mycotic aneurysm with intracerebral hematoma and impending brain herniation. Both patients had signs of high intracranial pressure and required urgent surgical evacuation of a clot. One patient survived while the other patient expired soon after surgery.

Mycotic aneurysm of middle cerebral artery (MCA) in IE with intracranial hemorrhage is rare and urgent surgical decompression, and aneurysmal clipping can be lifesaving [10].

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