

## Cerebral Mycotic Aneurysm in the Setting of Infective Endocarditis

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**Section:** Neuroradiology

**Area of Interest:** Vascular Neuroradiology brain

**Imaging Technique:** CT

**Imaging Technique:** CT-Angiography

**Imaging Technique:** Catheter arteriography

**Special Focus:** Acute Case Type: Clinical Cases

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**Patient:** 34 years, male

### Clinical History:

A 34-year-old male with a history of intravenous drug abuse presented to hospital with a four-day history of headache, nausea and shortness of breath. He was admitted to the hospital for suspected meningitis, and was subsequently found to have gram-positive bacteremia resulting in infective endocarditis.

### Imaging Findings:

Magnetic resonance imaging of the brain revealed several embolic ischemic strokes and right parietal subarachnoid haemorrhage [Figure 1], which was later confirmed by repeat computed tomography imaging of the head. These findings prompted computed tomography angiography, which revealed a cerebral mycotic aneurysm [Figure 2]. Conventional angiography revealed a small mycotic aneurysm in the distal M4 branch of the right middle cerebral artery that was not amenable to endovascular repair [Figure 3]. The patient was taken to the operating room for urgent craniotomy for open clipping of the aneurysm [Figure 4]. The patient's decompensated heart failure necessitating surgical repair with the need for perioperative anticoagulation made surgical optimization difficult. An open surgical approach was a contraindication for anticoagulation and ultimately delayed the valve replacement in this patient.

### Discussion:

The prevalence of infected cerebral aneurysms is 0.7% - 4% among all patients with cerebral aneurysms [1]. Cerebral mycotic aneurysms (CMAs) are often due to bacterial endocarditis and commonly seen in intravenous drug users or immunocompromised individuals, a combination that was seen in our patient. Prompt diagnosis with imaging is paramount, considering mortality approaches 60-90% with aneurysm rupture [1]. Computed tomography angiography (CTA) is currently the imaging modality of choice for diagnosing CMAs with the overall sensitivity and specificity approaching 92.5%–96.2% and 93.3%–100%, respectively [1]. CTA allows for quick analysis of a large cerebral volume with the added benefit of three-dimensional reconstructed images for vascular mapping. Conventional cerebral angiography, though invasive, can be both diagnostic and therapeutic via an endovascular repair and is still the gold standard for diagnosing infected mycotic aneurysms. Magnetic resonance imaging (MRI) has been a less popular imaging modality used for detecting CMAs. Several reasons account for this including; lengthier examination times with less cerebral volume coverage, increased motion artifact and less spatial resolution [1,2]. Advancements such as three-dimensional contrast-enhanced MR angiography has shown promise of being more useful for detecting CMAs with a sensitivity and specificity of 95%-100% and 82%-96%, respectively

[1].

The preferred treatment regimen for cerebral mycotic aneurysms ranges from medical to endovascular to open surgical management. The best option remains controversial and must be addressed on a case-by-case basis [3]. CTA is the imaging modality of choice for the diagnosis of cerebral mycotic aneurysms. Prompt diagnosis and management is necessary to prevent high mortality associated with aneurysm rupture.

**Differential Diagnosis List:** Cerebral Mycotic Aneurysm, Fusiform Aneurysm, Infundibulum, Dissecting Aneurysm

**Final Diagnosis:** Cerebral Mycotic Aneurysm

#### **References:**

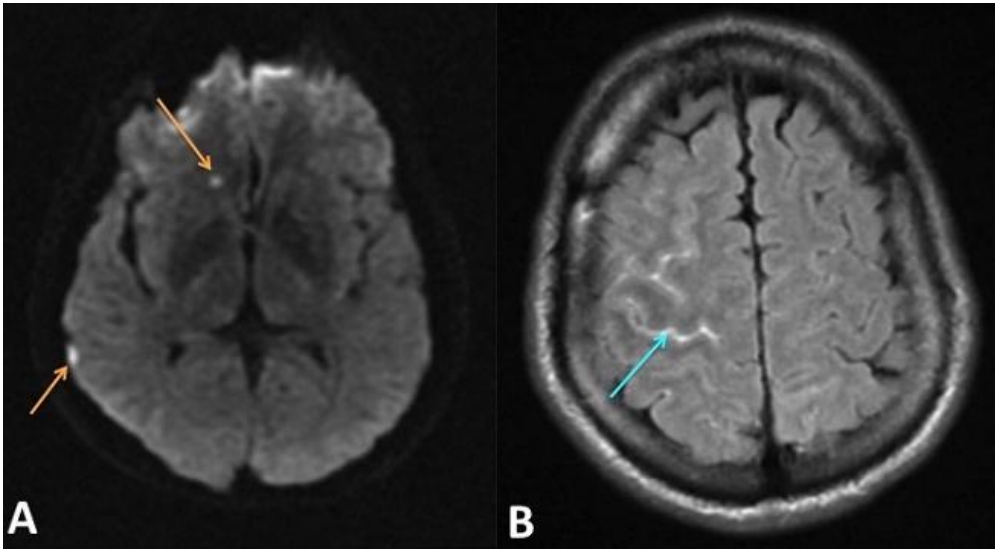
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**Figure 1**

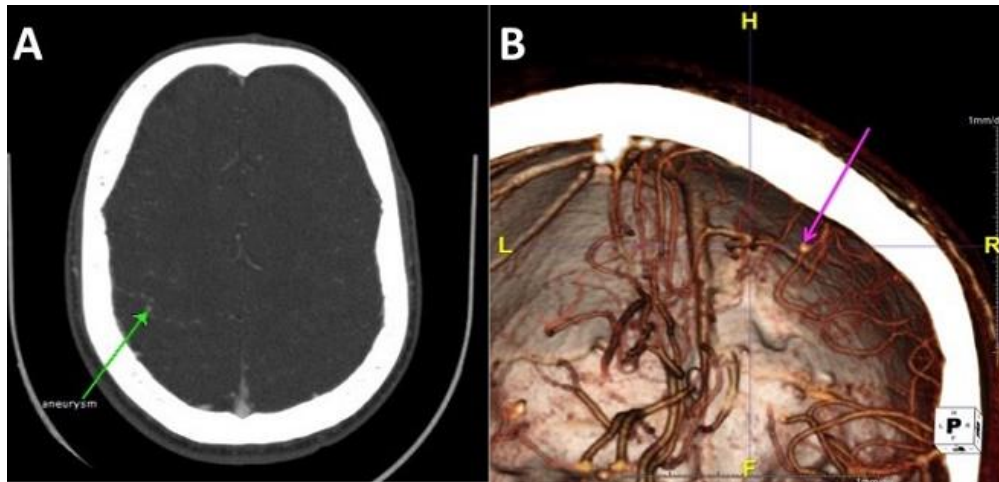
a



**Description:** Axial DWI image demonstrates foci of restricted diffusion in the right caudate head and right temporal lobe (orange arrows)(A). Axial T2 flair image demonstrates subarachnoid haemorrhage in right frontoparietal lobe (blue arrow) (B) **Origin:** Radiology Department of Upstate Medical Center

**Figure 2**

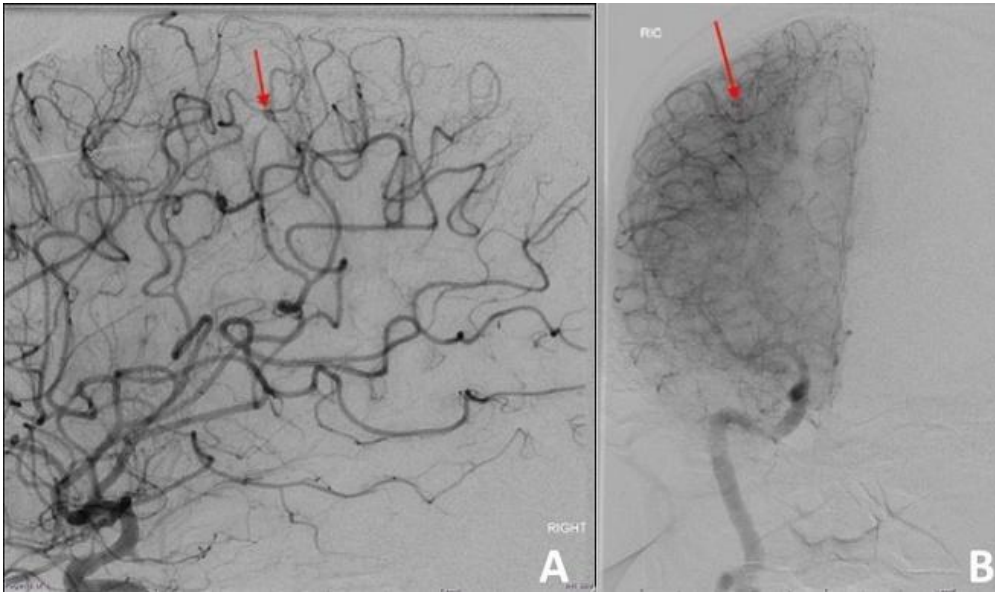
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**Description:** Pre-procedure axial CTA demonstrates aneurysm (green arrow) of the distal MCA branch (A). Additionally, 3D volume rendered reconstruction image demonstrates the aneurysm (purple arrow) of the distal M4 branch within the right parietal lobe (B) **Origin:** Radiology Department of Upstate Medical Center

**Figure 3**

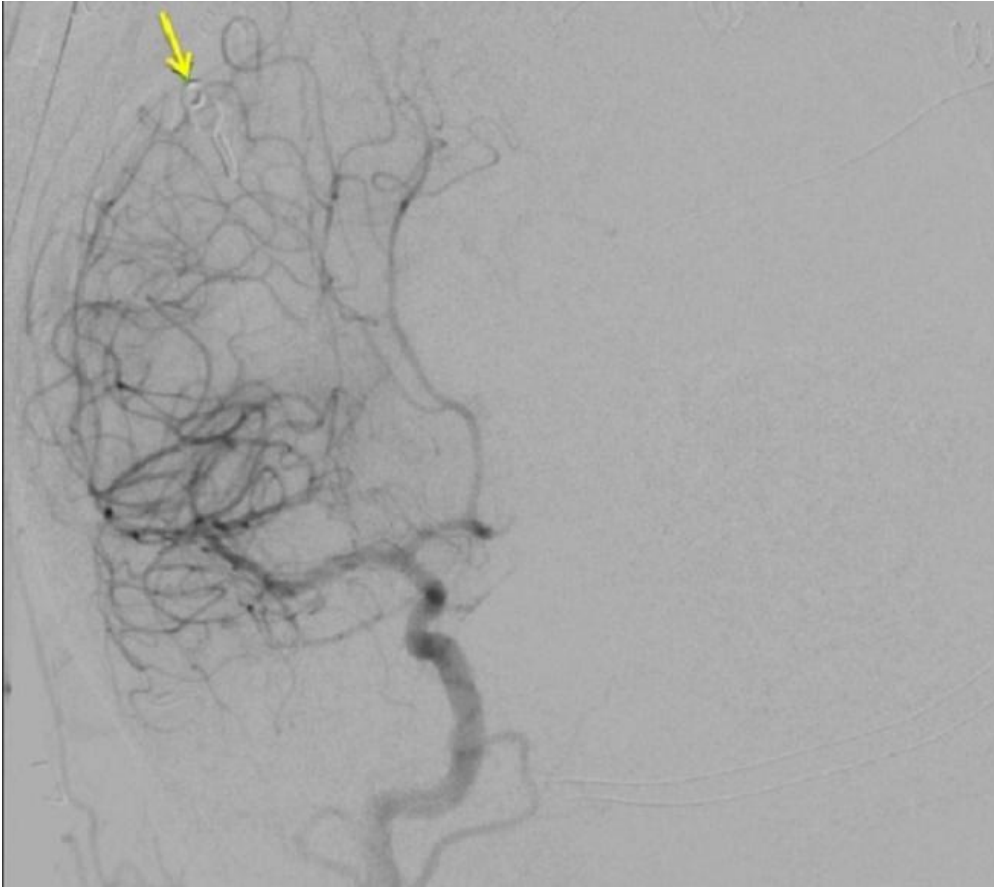
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**Description:** Pre-procedural conventional angiogram shows a 3mm x 2mm mycotic aneurysm of the distal M4 MCA (red arrows) inaccessible to endovascular route, with the aneurysm demonstrated on sagittal view (A) and on coronal view (B) **Origin:** Radiology Department Upstate Medical Center

**Figure 4**

**a**



**Description:** Intraoperative transfemoral diagnostic cerebral angiogram demonstrates complete occlusion of aneurysm with persistent filling of involved rolandic branch of the right middle cerebral artery with a microsurgical clip (yellow arrow) in the region of the aneurysm **Origin:** Radiology Department of Upstate Medical Center