International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Ruptured Azygous Anterior Cerebral Artery (ACA) Aneurysm: A Report of Two Rare Cases

Dr. Arundhati Shingare[1], Dr. Taral Patil[2], Dr. Sarfaraz Shaikh[3]

[1]Junior Resident, M.D. Radio-Diagnosis, Department of Radiodiagnosis, Dr. DY Patil Medical College and Hospital, Navi Mumbai, Maharashtra, India

[2]Junior Resident, M.D. Radio-Diagnosis, Department of Radiodiagnosis, Dr. DY Patil Medical College and Hospital, Navi Mumbai, Maharashtra, India

[3]M.D.- Radio-Diagnosis, FRCR(UK), Department of Radiodiagnosis, Dr. DY Patil Medical College and Hospital, Navi Mumbai, Maharashtra, India

Abstract: ***Aneurysms of the azygous anterior cerebral artery (ACA) are rare vascular anomalies, and their rupture is associated with significant morbidity due to bilateral frontal lobe involvement. Hereby, we present two cases of ruptured azygous ACA aneurysms with distinct clinical presentations and management approaches. In both cases, non-contrast CT revealed subarachnoid hemorrhage predominantly in the interhemispheric fissure. CT angiography and digital subtraction angiography (DSA) confirmed saccular aneurysms arising from an azygous ACA variant. One patient underwent successful endovascular coiling, while the other was managed via surgical clipping. Both patients demonstrated favorable outcomes with mild residual deficits. Early identification and appropriate management of this rare entity are essential for optimal neurological recovery.***

Keywords: Azygous anterior cerebral artery, cerebral aneurysm, subarachnoid hemorrhage, endovascular coiling, surgical clipping, digital subtraction angiography

1. Introduction

Aneurysms arising from the anterior cerebral artery (ACA) account for a minority of intracranial aneurysms, and those associated with an azygous ACA variant are exceedingly rare. The azygous ACA is an uncommon anatomical variant where a single midline A2 segment of ACA supplies both hemispheres, typically the result of embryologic fusion failure. Rupture of aneurysms in this location can cause bilateral frontal lobe damage, with clinical outcomes dependent on early diagnosis and effective intervention. We report two such rare cases with differing clinical severity and management approaches.

2. Case Presentation

Case 1: A 39-year-old male presented with a sudden severe headache, vomiting, and seizures. On examination, his Glasgow Coma Scale (GCS) score was 15. MRI-Angiography was done initially which showed an outpouching from Azygous variant of ACA, further advised CT-Angiography/DSA for further evaluation. Non-contrast CT revealed subarachnoid hemorrhage (SAH) in the interhemispheric fissure. CT angiography demonstrated a focal saccular outpouching of an azygous ACA variant suggestive of a ruptured aneurysm. This was confirmed with digital subtraction angiography (DSA).

The patient underwent successful endovascular coiling. Post-procedure, the patient showed good neurological recovery with mild residual cognitive deficits.

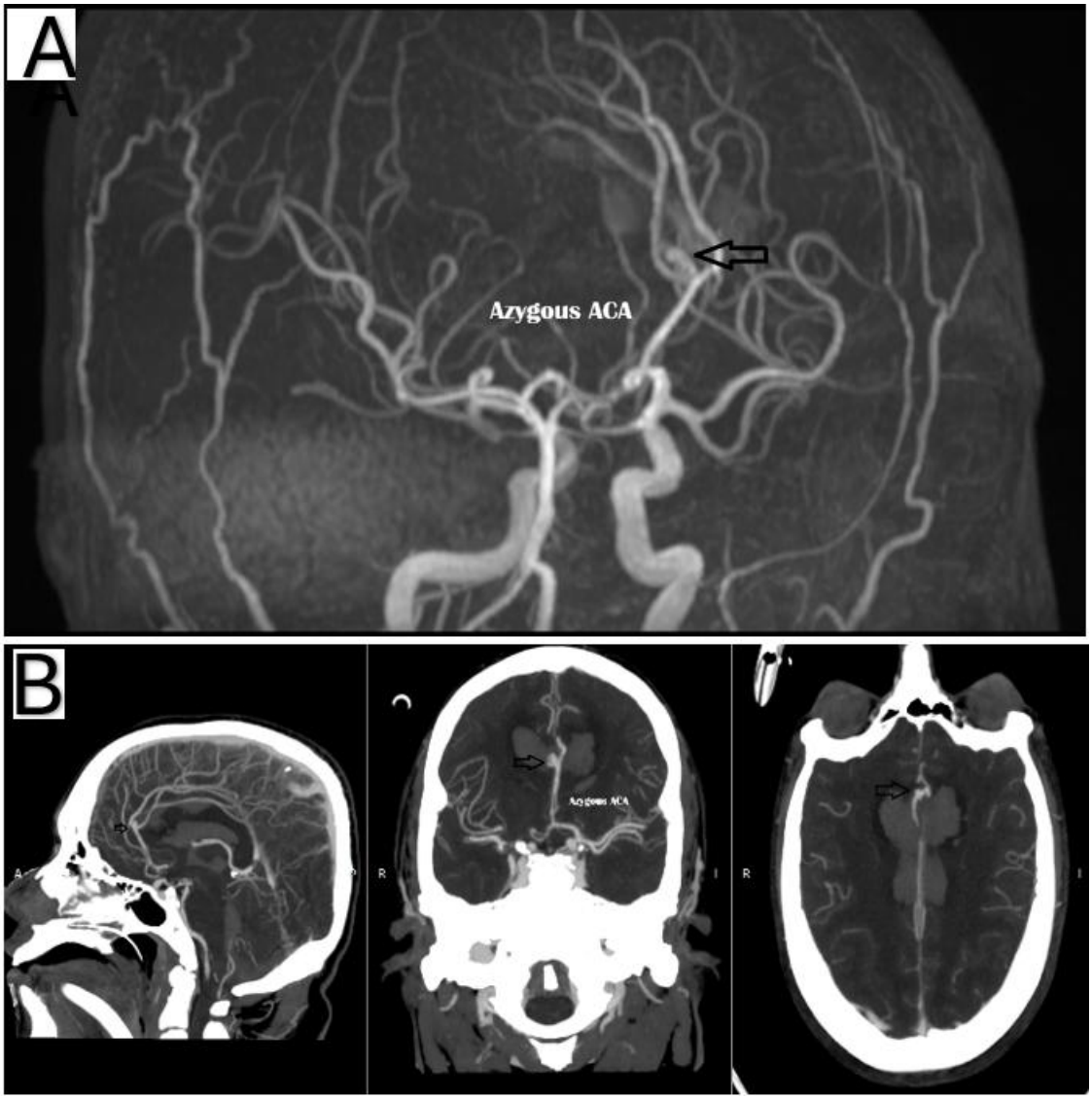


Figure (A): Shows 3D-TOF images of MR Angiography study showing a saccular outpouching (black arrow) with an Azygous variant of ACA.

Figure (B): Shows MIP images of CT Angiography showing an aneurysmal outpouching (black arrow) of Azygous ACA with subarachnoid hemorrhage in the interhemispheric fissure.

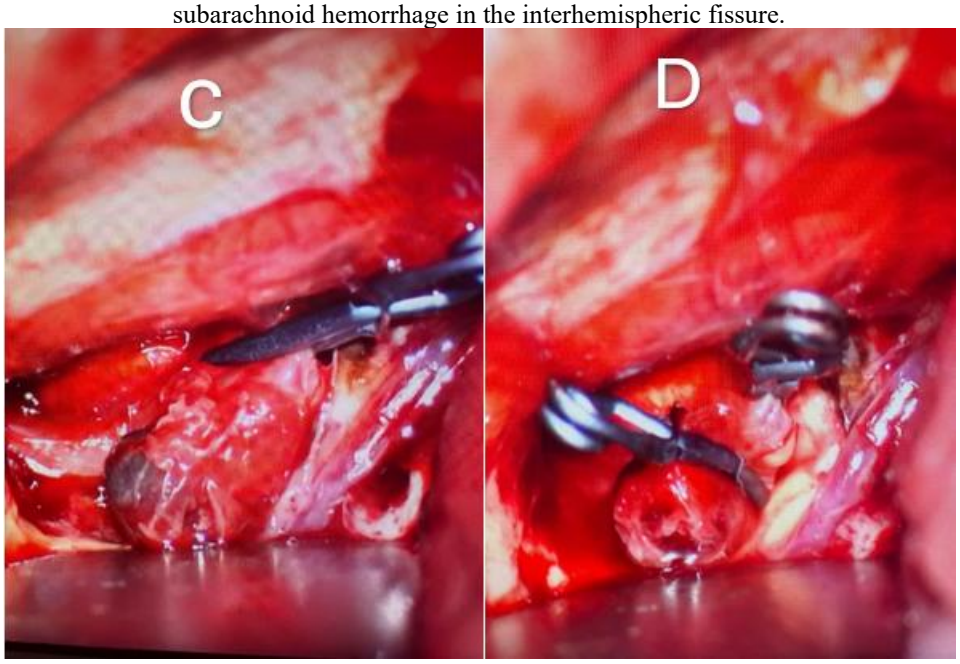


Figure C: Shows intraoperative images of the aneurysm.

Figure D: Shows intraoperative images of successful endovascular coiling done for surgical repair.

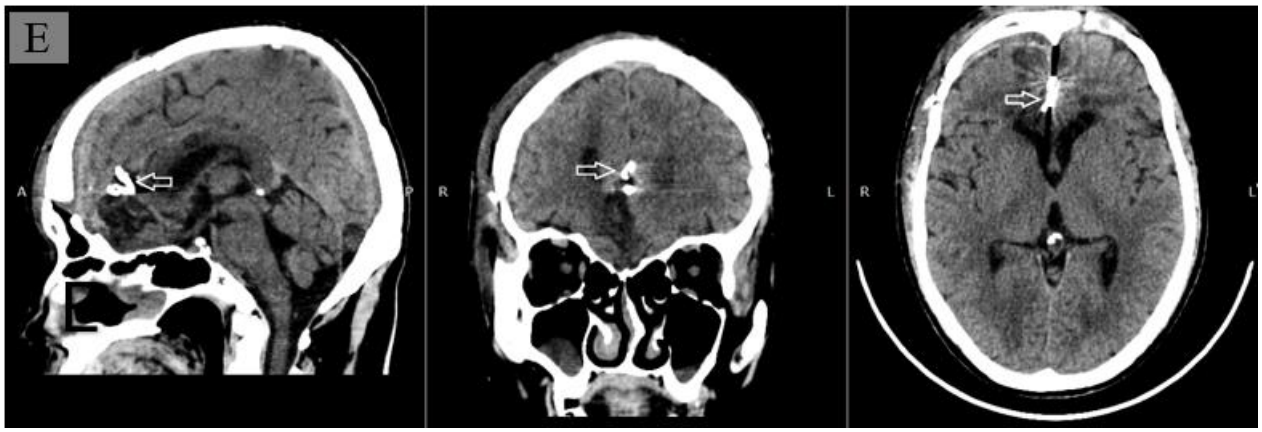


Figure E: Shows a follow up Non Contrast CT done post successful surgical endovascular coiling (white arrow) of the aneurysm with resolved Subarachnoid hemorrhage.

Case 2: A 43-year-old male presented with sudden onset giddiness, altered sensorium, and unconsciousness. His initial GCS score was 9. Axial non-contrast CT revealed SAH involving all basal cisterns and the interhemispheric fissure. CT angiography and subsequent DSA confirmed a saccular aneurysm of an azygous ACA. The patient underwent surgical clipping. Follow-up CT showed resolution of SAH with favorable clinical recovery.

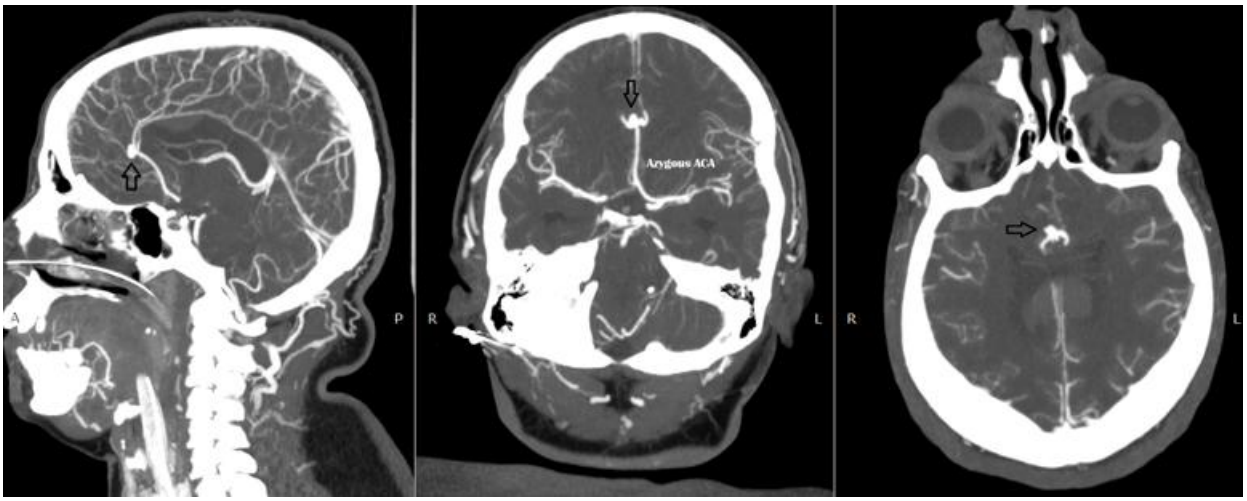


Figure F: Shows MIP images of CT Angiography showing an aneurysmal outpouching (black arrow) of Azygous ACA

Figure G: Shows Non contrast images of CT Brain showing subarachnoid hemorrhage in the interhemispheric fissure.

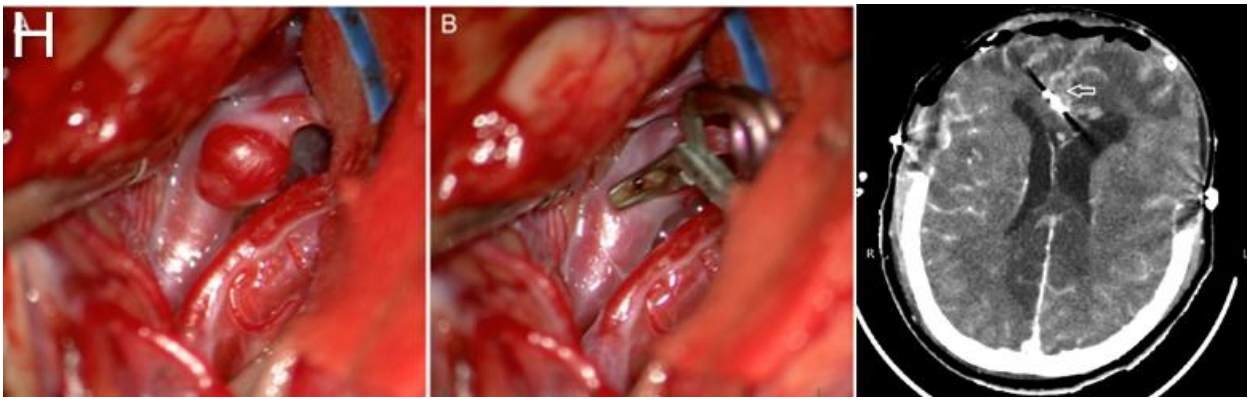
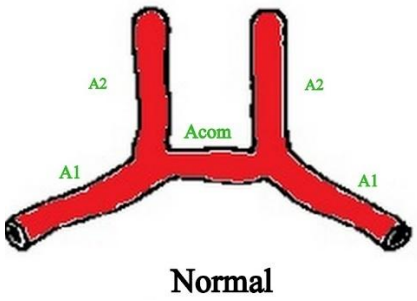
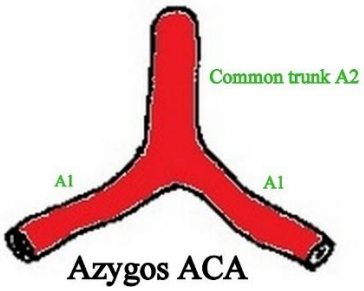


Figure H: Shows intraoperative and follow up CT Angiography images done post successful surgical clipping (white arrow) of the aneurysm with resolved Subarachnoid hemorrhage.

3. Discussion

Embryological basis: The embryologic basis of an azygous anterior cerebral artery (ACA) lies in the persistence of the median artery of the corpus callosum during fetal development. Normally, the A1 segments of both ACAs fuse to form a single A2 segment, and the anterior communicating artery (ACom) connects them. In an azygous ACA, these A1 segments fuse into a single midline artery, bypassing the formation of the A-COM.





Pathophysiology: The azygous ACA variant occurs in approximately 0.3–2% of the population and predisposes to aneurysm formation due to hemodynamic stress at vessel bifurcation points. Rupture may result in diffuse SAH and bilateral frontal lobe involvement, often leading to cognitive and behavioral changes.

Imaging with CTA and DSA is crucial for diagnosis and preoperative planning.

Surgical options: Endovascular coiling is preferred in selected cases due to its minimally invasive nature, while surgical clipping remains a mainstay in complex or broad-neck aneurysms.

In our series, both patients presented with classic SAH findings, but with varying clinical severity. The choice of treatment was tailored to the anatomical and clinical considerations, with both approaches yielding satisfactory outcomes.

4. Conclusion

Ruptured aneurysms of the azygous ACA are rare but carry significant clinical implications due to their unique vascular territory. High clinical suspicion, prompt neuroimaging, and individualized management strategies are essential for favorable outcomes.

References

[1] Kriss TC, Kriss VM. Aneurysm of the azygos anterior cerebral artery: diagnosis and surgical treatment. J Neurosurg. 1988;69(4):616-619.
[2] Perlmutter D, Rhoton AL Jr. Microsurgical anatomy of the anterior cerebral-anterior communicating-recurrent artery complex. J Neurosurg. 1976;45(3):259-272.
[3] Chow MM, et al. Azygous anterior cerebral artery aneurysms: surgical management and literature review. Acta Neurochir (Wien). 2005;147(6):625-632.