International Journal of Medical Science and Pharmaceutical Research

ISSN(e): 3050-5720
ISSN(p): 3050-5712

Vol. 3 (1): 19-23, January 2026

Home Page: https://ijmspr.org/

CT Angiographic Evaluation of Anterior Cerebral Artery Aneurysms: A Case Series

Dr. Anand Gajakos[1], Dr. Prathamesh Shinde[2], Dr. Netaji Patil[3], Dr. Sheetal Patil[4]

[1]Professor, BKL Walawalkar rural medical college, Chiplun, Ratnagiri, Maharashtra, India.
[2]Junior Resident, BKLWRMC, Chiplun, Ratnagiri, Maharashtra, India.
[3]Assistant Professor, BKLWRMC, Chiplun, Ratnagiri, Maharashtra, India.
[4]Assistant Professor, BKLWRMC, Chiplun, Ratnagiri, Maharashtra, India.

KEYWORDS:
Anterior cerebral artery(ACA), Anterior communicating artery (ACoM), Intracranial aneurysm, CT angiography(CTA), Digital subtraction Angiography(DSA).

Corresponding Author:
Dr. Anand Shrikant Gajakos

DOI: 10.55677/IJMSPR/2026-3050-I104

Published: January 29, 2026

ABSTRACT

Background: Anterior cerebral artery (ACA) aneurysms are among the rare intracranial aneurysms and accounts for small fraction of all the intra cranial aneurysms. These carry a high risk of rupture. Their deep intra hemispheric location and close relationship with the pericallosal–callosomarginal bifurcation often make their identification and characterization challenging on routine imaging. While DSA (digital subtraction Angiography) remains the gold standard for diagnosis the intra cranial aneurysms, CT angiography (CTA) is a non-invasive and rapid modality for their detection and characterization.

Objective: Here we report five cases of ACA aneurysms to describe the CT angiography findings in five cases of ACA aneurysms.

Materials and Methods: This observational prospective study includes five patients diagnosed with ACA aneurysms on CT angiography within a span of 3 months. These patient presented with acute severe headache and underwent CT Angiography at
Department of Radio diagnosis, BKL Walawalkar Rural Medical College, hospital, Chiplun, Ratnagiri, Maharashtra, India. Three patients presented with incidentally detected unruptured aneurysms, while two presented with subarachnoid hemorrhage secondary to aneurysmal rupture. All patients underwent CT angiography on a 32-slice scanner, with multiplanar and three-dimensional volume-rendered reconstructions for detailed morphologic assessment.

Results: Three unruptured aneurysms were indentified, saccular in configuration, arising from the ACA and the ACoM, while the other two cases demonstrated a ruptured aneurysm with subarachnoid hemorrhage along the interhemispheric fissure.

Conclusion: ACA aneurysms, although rare, can be confidently diagnosed on CT angiography. Recognizing their characteristic imaging features and anatomical relationships is essential for early detection, differentiation of ruptured from incidental lesions, and guiding therapeutic planning.

INTRODUCTION

Aneurysms of the anterior cerebral artery (ACA) are relatively uncommon, accounting for about 5–8% of all intracranial aneurysms, with most arising from the anterior communicating artery complex. In contrast, distal ACA aneurysms (A2–A5 segments) are rare, comprising only 1–9% of cases. These aneurysms lie deep within the interhemispheric fissure, where their small size and midline

location often make detection difficult on routine imaging. The A3 (precallosal) and A4 (supracallosal) segments are particularly prone to aneurysm formation at branching points, especially when associated with anatomical variants such as A1 hypoplasia or fetal-type posterior cerebral artery. With the advent of Multidetector CT angiography (CTA), evaluation of distal ACA aneurysms has become faster and more precise, allowing accurate assessment of aneurysm morphology, neck, and relation to adjacent vessels. We report five cases of ACA aneurysms—three unruptured (A1–A2, A2 and A4 segments) and two ruptured (A3 segment and ACoM)—to illustrate their CT angiographic features and emphasize the role of CTA in diagnosis and management of this uncommon vascular entity.

CASE REPORTS

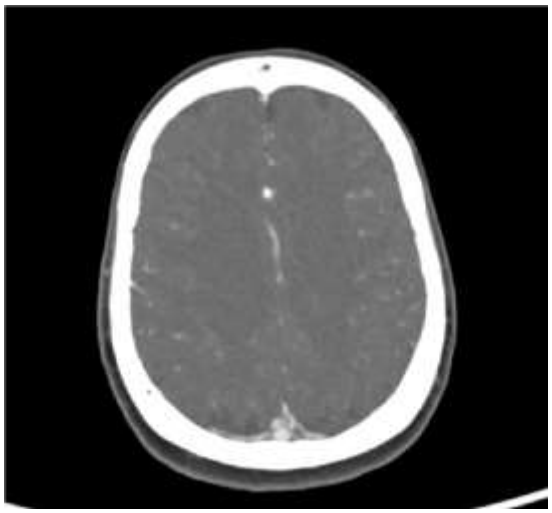
Case 1 — Unruptured Saccular Aneurysm of the Right ACA-A4 Segment.

A 65-year-old female, was referred for CT angiography following evaluation for chronic headache and dizziness.

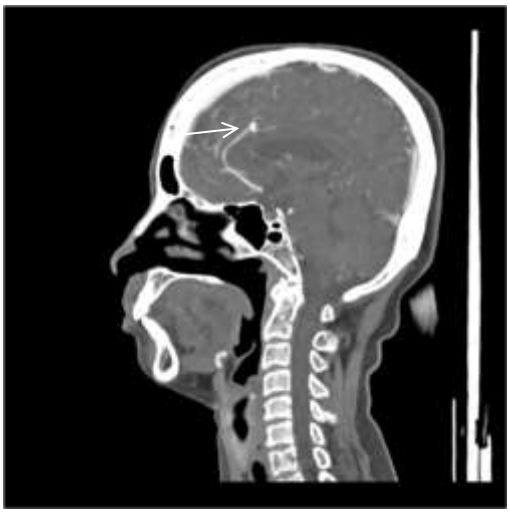
Non-contrast CT brain revealed a small ill-defined hypodensity in the periventricular white matter of the left frontal lobe, suggestive of a chronic infarct. No acute haemorrhage or mass effect was noted.

CT angiography of the carotid and circle of Willis arteries demonstrated a well-defined saccular aneurysm measuring 4.8 × 4.7 × 5.5 mm, with a neck of approximately 2.8 mm, was identified arising from the right anterior cerebral artery (A4 segment) in the right parafalcine, supracallosal region. The aneurysm wall was smooth, without contrast extravasation, adjacent haemorrhage, or calcification, consistent with an unruptured saccular aneurysm of the distal ACA. (Figure 1.A and 1.B)

The patient subsequently underwent microsurgical aneurysm clipping via a right frontal craniotomy under the neurosurgery unit. The postoperative course was uneventful, and follow-up imaging confirmed satisfactory clip placement with no residual aneurysmal sac.



(Figure 1.A)



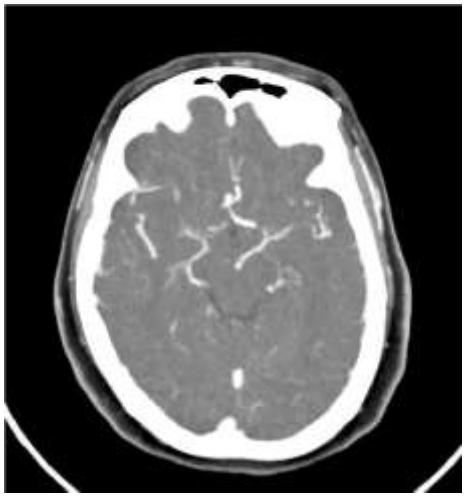
(Figure 1.B)

CASE 2 — Unruptured Saccular Aneurysm at the Right A1–A2 Junction

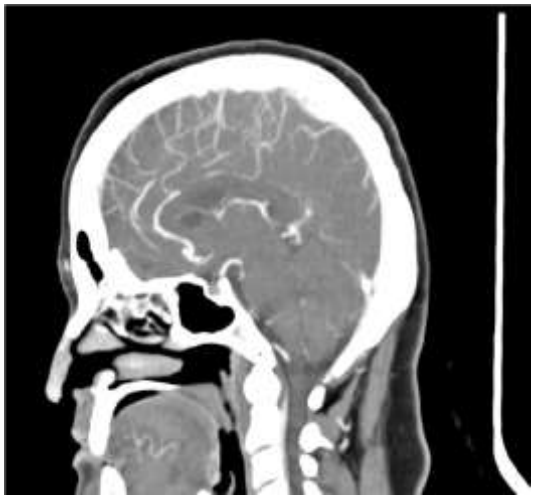
A 56-year-old female, presented with complaints of intermittent giddiness and generalized weakness. Non-contrast CT brain revealed a small ill-defined hypodensity in the right insular cortex was suggestive of an acute–subacute infarct. No evidence of intracranial haemorrhage was noted.

CT angiography demonstrated a well-defined saccular outpouching measuring 3.1 × 3.7 × 4.0 mm, with a neck of approximately 2.1 mm, arising at the junction of the right A1–A2 segment of the ACA, projecting anteriorly towards the anterior communicating artery (ACom) complex. The aneurysm wall appeared smooth and intact, with no evidence of contrast leak or calcification, consistent with an unruptured saccular aneurysm. (Figure 2.A and 2.B)

The patient underwent microsurgical aneurysm clipping of the A1–A2 junction aneurysm via a right pterional craniotomy under neurosurgical guidance. The postoperative CT scan confirmed clip placement with no residual aneurysm sac or hemorrhage, and the patient made an uneventful recovery.



(Figure 2.A)



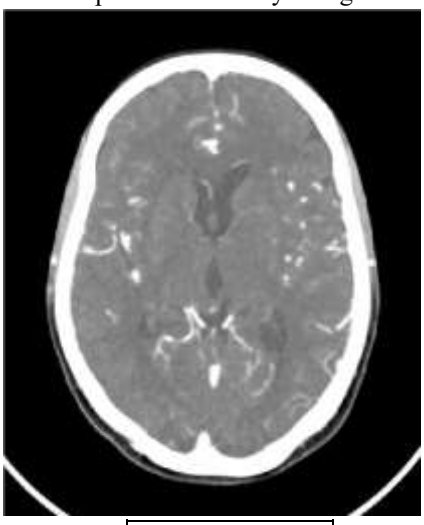
(Figure 2.B)

CASE 3— Ruptured Saccular Aneurysm of the Right A3 (Precallosal) Segment with Subarachnoid Haemorrhage

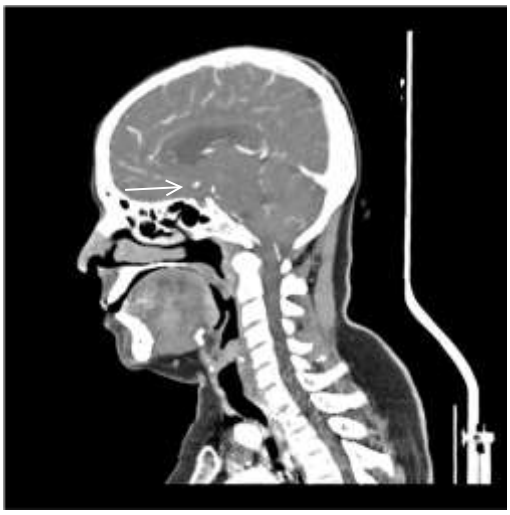
A 67-year-old female, presented to the emergency department with sudden-onset severe headache and vomiting. Non-contrast CT brain revealed acute subarachnoid haemorrhage along the superior and anterior interhemispheric fissure, bilateral Sylvian fissures, and temporal lobe sulci, with a focal hyperdense lesion in the right frontal parafalcine region.

CT angiography demonstrated a saccular aneurysm measuring 7 × 5.8 × 8 mm, arising from the right anterior cerebral artery (A3 / precallosal segment). The aneurysm was seen communicating with the parent artery through a hyperdense stalk measuring 3.4 × 3.3 × 3.1 mm, with adjacent perilesional edema and localized haematoma, confirming a ruptured distal ACA aneurysm.A hypoplastic A1 segment of the left ACA was also noted. (Figure 3.A and 3.B)

The patient underwent emergency microsurgical clipping of the aneurysm via a right frontal craniotomy under neurosurgical guidance. Post-operative CT demonstrated aneurysm clip in situ with resolving subarachnoid haemorrhage and no residual aneurysmal sac. The patient's recovery was gradual but uneventful.



(Figure 3.A)



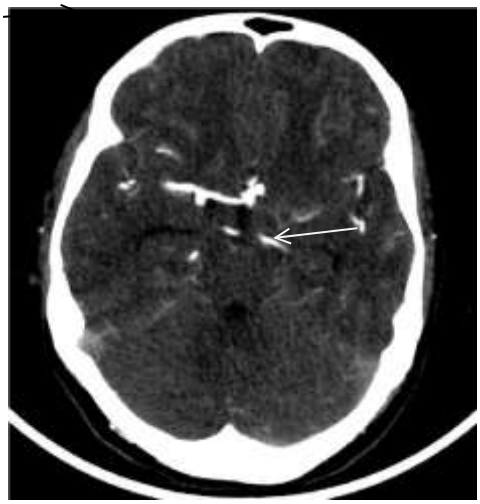
(Figure 3.B)

CASE 4 — Unruptured Multiple Saccular Aneurysms at the Anterior Communicating Artery–A2 Junction and the Anterior Communicating Artery. A 75-year-old female, was evaluated with CT angiography for assessment of cerebrovascular pathology. Non-contrast CT brain demonstrated generalized mild cerebral atrophy with chronic small-vessel ischemic changes. No evidence of intracranial haemorrhage was noted.

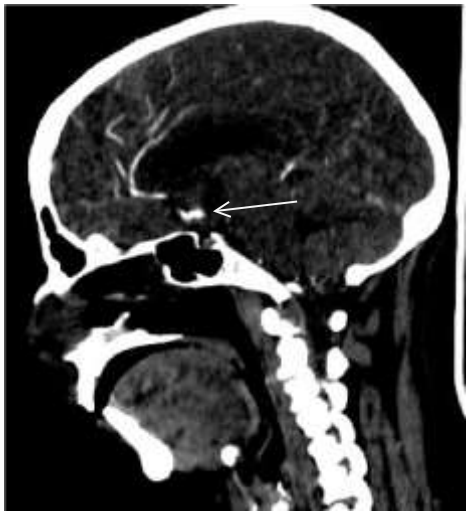
CT angiography revealed a saccular outpouching measuring approximately 4.5 × 4.6 mm, with a neck of about 2.8 mm, arising from the left anterior cerebral artery at the origin of the A2 segment, just beyond the anterior communicating artery. In addition, a second saccular aneurysm measuring approximately 4.5 × 4.4 mm, with a similar neck width, was identified along the dorsal aspect of the anterior communicating artery. Both aneurysms showed smooth margins, with no evidence of contrast extravasation, wall calcification, or adjacent subarachnoid haemorrhage, consistent with unruptured saccular aneurysms.

The left posterior communicating artery demonstrated fetal origin, while the remaining intracranial arteries were normal in course and calibre.

The patient subsequently underwent microsurgical clipping of both aneurysms via craniotomy under neurosurgical care. Post-operative imaging confirmed satisfactory clip placement with no residual aneurysmal sac or haemorrhage, and the patient had an uneventful postoperative recovery.



(Figure 4.A)



(Figure 4.B)

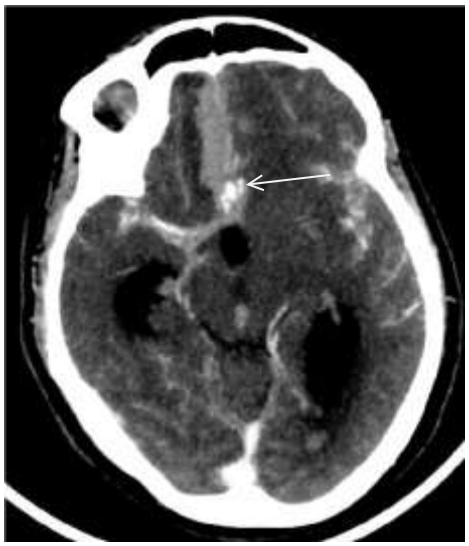
CASE 5 — Ruptured Saccular Aneurysm of the Anterior Communicating Artery with Subarachnoid Haemorrhage.

A 54-year-old female , presented with acute onset severe headache and altered sensorium. Non-contrast CT brain revealed mild to moderate acute subarachnoid haemorrhage, predominantly involving the anterior interhemispheric fissure, bilateral Sylvian fissures, and basal cisterns, with extension into the bilateral lateral ventricles and third ventricle. Mild obstructive hydrocephalus at the level of the cerebral aqueduct . An acute intra-axial haematoma measuring approximately 28 × 13 × 20 mm was seen in the right basifrontal lobe.

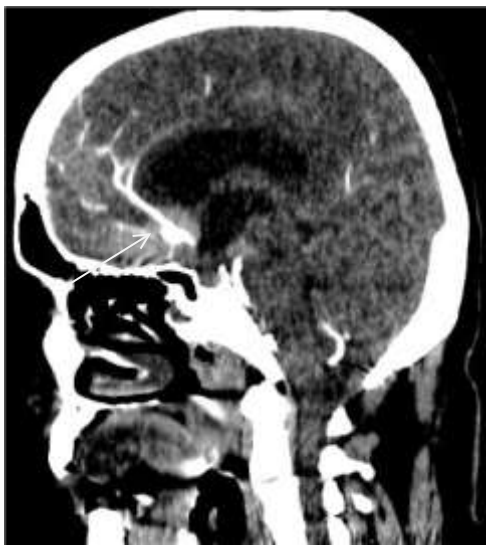
CT angiography demonstrated a well-defined ovoid saccular aneurysm measuring 6.3 × 4.2 × 7.1 mm, arising from the anterior communicating artery (ACoM) along its anterosuperior border. The aneurysm neck measured approximately 1.8 mm, with no evidence of intraluminal thrombosis. These findings were consistent with a ruptured ACoM aneurysm.

Associated vascular variations included a fetal origin of the right posterior cerebral artery, a hypoplastic left posterior communicating artery, and a dominant left vertebral artery. The remaining intracranial arteries were normal in course and calibre, with no additional aneurysms or vascular malformations identified.

The patient underwent emergency microsurgical clipping of the anterior communicating artery aneurysm via craniotomy under neurosurgical care. Post-operative imaging demonstrated aneurysm clip in situ with resolving subarachnoid haemorrhage and no evidence of residual aneurysmal sac. The patient was managed in the intensive care unit and showed gradual clinical improvement.



(Figure 5.A)



(Figure 5.A)

DISCUSSION

Distal anterior cerebral artery (distal ACA) aneurysms, arising from the A2-A5 segments, are rare, comprising only 1–9% of all intracranial aneurysms. Their deep midline location presents distinct diagnostic and surgical challenges compared to the more common ACoM lesions. Our series highlights the morphological heterogeneity of these aneurysms, encompassing ruptured A3, unruptured A4, and A1–A2 junction lesions. The ruptured A3 aneurysm (Case 3) presented with subarachnoid hemorrhage and localized hematoma, reinforcing the aggressive nature of these distally located ruptures, even when small. A notable finding was the co-existence of vascular anomalies—specifically hypoplastic A1 segments and fetal PCA origin—which may contribute to altered hemodynamics and aneurysm formation across all three patients. Multidetector CT Angiography (CTA) proved essential, providing high-resolution imaging necessary to accurately define the aneurysm's morphology, neck, and segmental origin for precise planning. Given the small size, complex location, and need to preserve vital perforators, all three patients underwent successful microsurgical clipping. Our outcomes confirm that timely and definitive surgical management is highly effective for both ruptured and unruptured distal ACA aneurysms. Recognizing the characteristic imaging features and anatomical associations is key to the early diagnosis and successful treatment of this uncommon pathology.

CONCLUSION

Distal anterior cerebral artery (distal ACA) aneurysms are a rare but clinically significant subtype of intracranial aneurysm, demonstrating diverse morphology across the A1–A2, A3, A4 and AcoM segments. Multidetector CT Angiography (CTA) is crucial for their precise non-invasive characterization, especially in identifying associated anatomical variants (e.g., A1 hypoplasia) that contribute to their formation. Given the risk of rupture—even for small lesions—and the complex surgical anatomy, definitive microsurgical clipping provides a highly effective and safe management strategy, yielding excellent outcomes for patients with both incidental and ruptured distal ACA aneurysms.

Author Contributions, Conflict of Interest, and Funding

Author Contributions: All authors contributed to data collection, image review, manuscript drafting, and approval of the final version.

Conflict of Interest: None declared. Funding: Nil.

REFERENCES

1. Brinjikji W, et al. CT Angiography of Intracranial Aneurysms: A Systematic Review andMeta-Analysis. AJNR Am J Neuroradiol. 2011;32(1):170–175.
2. Lin N, et al. Clinical and radiological characteristics of distal ACA aneurysms. J Neurosurg.2013;118(4):634–641.
3. Abdihalim M, Watanabe M, Chaudhry SA, Jagadeesan B, Suri MFK, Qureshi AI. Are coilcompaction and aneurysmal growth two distinct etiologies leading to recurrence following endovascular treatment of intracranial aneurysm? J Neuroimag. (2014) 24:171–5. 10.1111/j.1552-6569.2012.00786.x
4. Bohnstedt BN, Conger AR, Edwards J, Ziemba-Davis M, Edwards G, Brom J, et al. Anterior communicating artery complex aneurysms: anatomic characteristics as predictors of surgical outcome in 300 cases. World Neurosurg. (2019) 122:E896–906. 10.1016/j.wneu.2018.10.172
5. Ronald O. Crandall, Sudha Challa , Osman Tahir, et al. Four simultaneous anterior cerebral artery aneurysms (three initially unsuspected) with surgical treatment. Radiology Case Reports Volume 14, Issue 12, December 2019.
6. Chung CY, Peterson RB, Howard BM, Zygmont ME. Imaging intracranial aneurysms in the endovascular era: Surveillance and posttreatment follow-up. Radiographics. 2022;42(3):789-805
7. Chung CY, Peterson RB, Howard BM, Zygmont ME. Imaging intracranial aneurysms in theendovascular era: Surveillance and posttreatment follow-up. Radiographics. 2022;42(3):789-805
8. Kim JW, Lee JS, Kim BM, et al. Imaging follow-up strategy after endovascular treatment of Intracranial aneurysms: A literature review and guideline recommendations. J Korean Neurosurg Soc. 2024 Mar 26;67(2):230-244