Occult Ruptured Intracranial Aneurysm: The Importance of Repeat Imaging

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Introduction

Rupture of an intracranial aneurysm is the most common cause of non-perimesencephalic subarachnoid hemorrhage (SAH). Despite the high diagnostic accuracy of computed tomography angiography (CTA) and digital subtraction angiography (DSA), initial imaging may occasionally be negative.

Case summary

We present a case of a 39-year-old male admitted with sudden severe headache and transient loss of consciousness. Non-contrast CT demonstrated extensive SAH with an aneurysmal pattern and early hydrocephalus. Initial CTA and DSA showed no vascular abnormalities. Due to high clinical suspicion, repeat CTA was performed four days later, revealing a 5 mm saccular aneurysm of the anterior communicating artery (AComA). The aneurysm was successfully treated with endovascular coiling.

Discussion

This case highlights the limitations of early imaging, where thrombosis, vasospasm, or hematoma compression may obscure the aneurysm. Repeat vascular imaging is essential in patients with non-perimesencephalic SAH and negative initial studies, as it enables timely diagnosis and treatment and reduces the risk of rebleeding.

Teaching points

- DSA combined with 3DRA can be initially negative — thrombus, hematoma compression, or vasospasm may obscure a ruptured aneurysm.
- In non-perimesencephalic SAH with negative CTA/DSA/3DRA, repeat vascular imaging is mandatory.
- 3DRA significantly increases sensitivity for small anterior-circulation aneurysms, particularly AComA.

Initial imaging findings

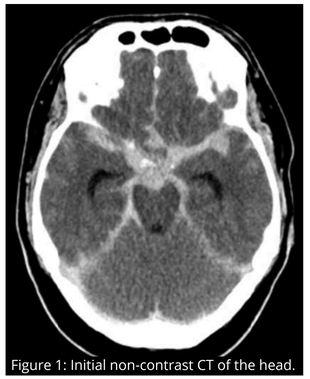

Figure 1: Initial non-contrast CT of the head.

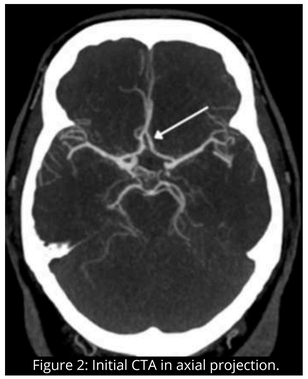

Figure 2: Initial CTA in axial projection.

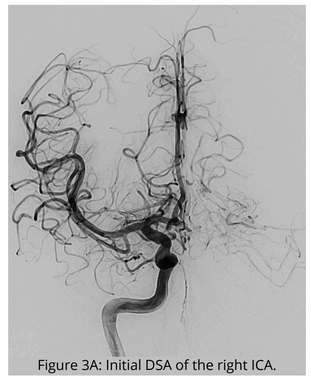

Figure 3A: Initial DSA of the right ICA.

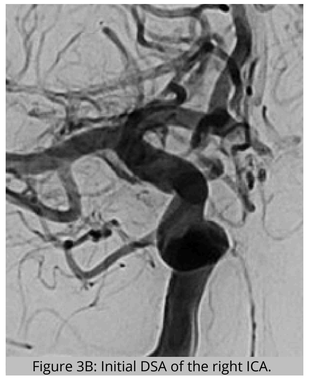

Figure 3B: Initial DSA of the right ICA.

Initial CT (Day 0): Massive SAH with aneurysmal pattern, early hydrocephalus, mild diffuse cerebral edema. No midline shift or acute ischemia. (Fig. 1)

Initial CTA + DSA (Day 0): Both negative for aneurysms. Anterior vasculature spasm noted, no definitive vascular pathology identified. (Fig. 2, 3A & 3B)

Repeated imaging findings and endovascular treatment

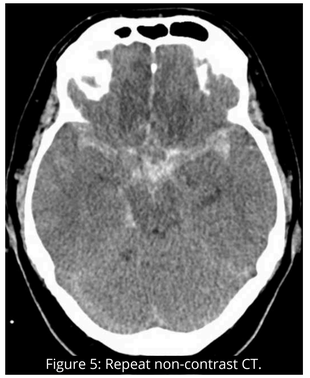

Figure 5: Repeat non-contrast CT.

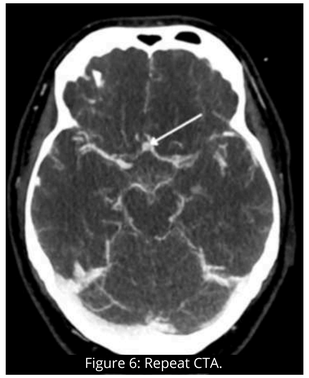

Figure 6: Repeat CTA.

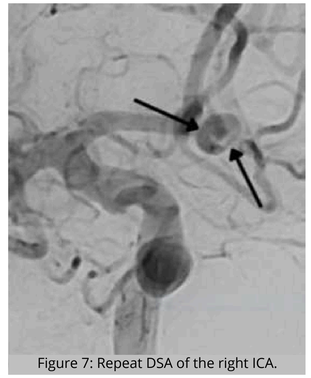

Figure 7: Repeat DSA of the right ICA.

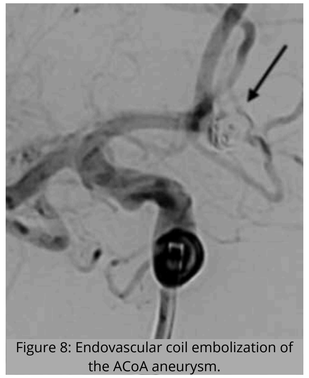

Figure 8: Endovascular coil embolization of the ACoA aneurysm.

Repeat CT/CTA (Day 4): Non-contrast CT revealed bilateral ischemic lesions in ACA territory. CTA demonstrated a newly visible 5 mm saccular AComA aneurysm. (Fig. 5&6)

Endovascular treatment: Ruptured AComA aneurysm confirmed and excluded from circulation with detachable coils; distal branch flow preserved. (Fig. 7&8)