Case Lessons 42-2025

Ruptured Left Temporal Lobe Arteriovenous Malformation Treated With Endovascular Approach: A Case Report

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Introduction

Intracranial arteriovenous malformations (AVMs) are a significant cause of spontaneous intracranial hemorrhage in young adults. Temporal lobe AVMs are particularly prone to hemorrhagic presentation due to angioarchitectural features such as deep venous drainage and associated aneurysms. Recent advances in endovascular techniques and embolic agents have expanded the role of embolization as a primary or curative treatment option in selected cases. We report a case of a ruptured left temporal lobe AVM successfully treated with arterial endovascular approach.

Case Report

A 33-year-old man presented with an abrupt onset of severe thunderclap headache followed by vomiting, blurred vision, and transient loss of consciousness. On admission, his Glasgow Coma Scale score was 13. Noncontrast CT demonstrated an acute left temporal hemorrhage with associated intracerebral, subarachnoid, and intraventricular hemorrhage. CT angiography and subsequent digital subtraction angiography revealed a ruptured left temporal lobe AVM. The nidus measured approximately 3 cm and was classified as Spetzler–Martin grade II. Arterial supply arose from branches of the left middle cerebral artery and left posterior cerebral artery. An associated aneurysm was identified. Venous drainage occurred exclusively through a straight vein of Labbé draining toward the torcular, without deep venous drainage Fig.1.

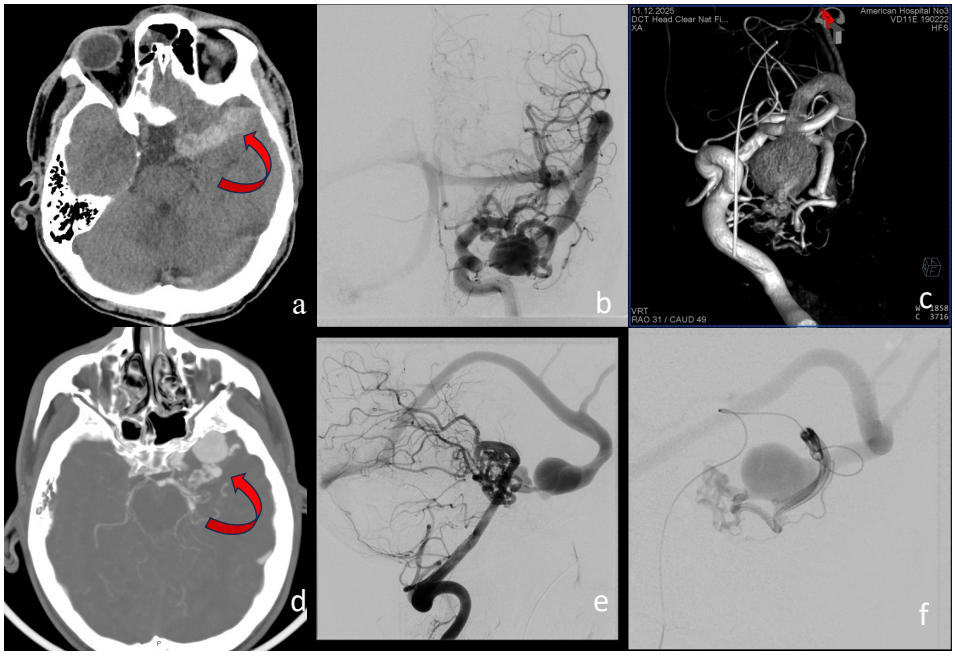

Fig. 1. Ct, Ct-angiography and DSA. ***a:*** Native Ct showing the hemorrhage in the temporal lobe of the left hemisphere (arrow). ***b:*** AP view and ***c:*** 3D DSA showing the cAVM as a tangled mass with associated aneurysm. Transfemoral catheterization of arteria cerebri interna (ICA) sinister. The cAVM is supplied by arterial feeders from temporal branches of arteria cerebri media (MCA) and arteria cerebri posterior (PCA) sinister and is drained via cortical vein of Labe. ***d:*** Ct-angiography showing the cAVM (Spetzler-Martin Grade II) located in the temporal lobe of the left hemisphere (arrow). ***e:*** DSA showing the cAVM as a tangled mass with associated aneurysm. Transfemoral catheterization of arteria vertebralis (VA) sinister. The cAVM is supplied by high flow dilated branches of arteria cerebri superior (SCA) sinister and drained via dilated cortical running veins. ***f:*** super-selective catheterization of arteria cerebri interna (ICA) sinister. The cAVM is supplied by arterial feeders from distal temporal branches of arteria cerebri media (MCA) and is drained via cortical veins.

Given the favorable angioarchitectural configuration, an endovascular strategy was selected. A approach using two arterial accesses via the left middle cerebral artery and left posterior cerebral artery was planed . The straight course of the vein of Labbé allowed safe navigation across the torcular allowing the venous access through the contralateral internal jugular vein in case of nidal residual in the end of arterial approach.

The therapeutic strategy consisted of initiating embolization via the arterial route to reduce nidus flow and secure hemorrhage-prone components, followed by completion via the venous route if needed, to optimize embolic penetration. Embolization was performed using Squid 18 using a detachable microcatheter. Final angiography demonstrated complete exclusion of the AVM with no early venous drainage, consistent with angiographic cure Fig. 2.

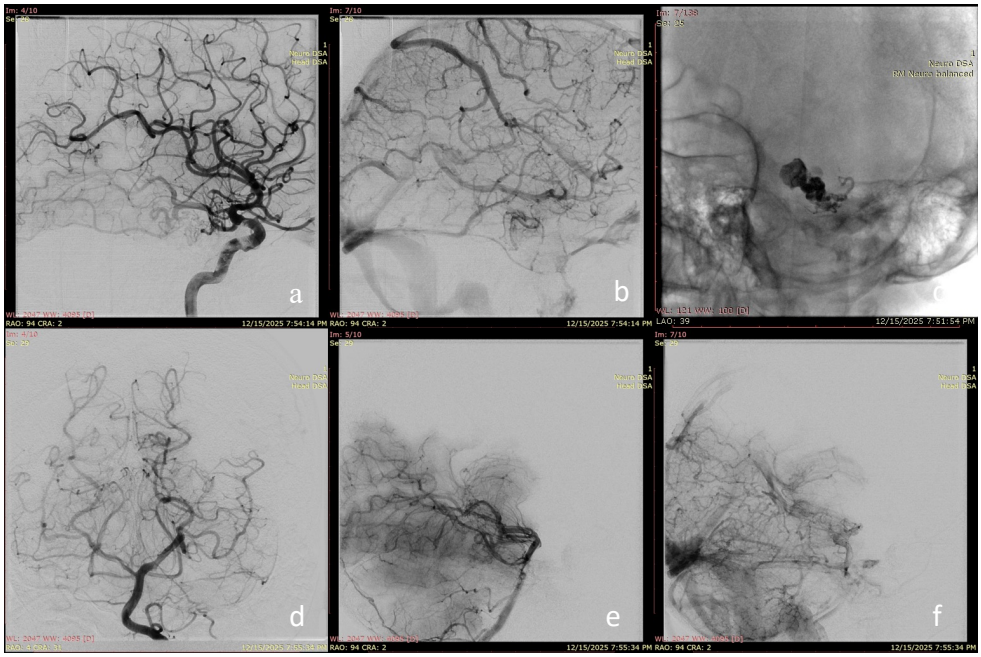

Fig. 2. DSA. ***a*** *and* ***b:*** DSA showing lateral view of arterial and venous normal faze of transfemoral catheterization of arteria cerebri interna (ICA) sinister.
c: native view of the embolic agent. ***d, e and f:*** AP and lateral view of arterial and venous normal faze of transfemoral catheterization of arteria vertebralis (VA) sinister.

The postprocedural course was uneventful. The patient showed progressive neurologic improvement and was discharged with a modified Rankin Scale score of 2. No further treatment was planned Fig. 3.

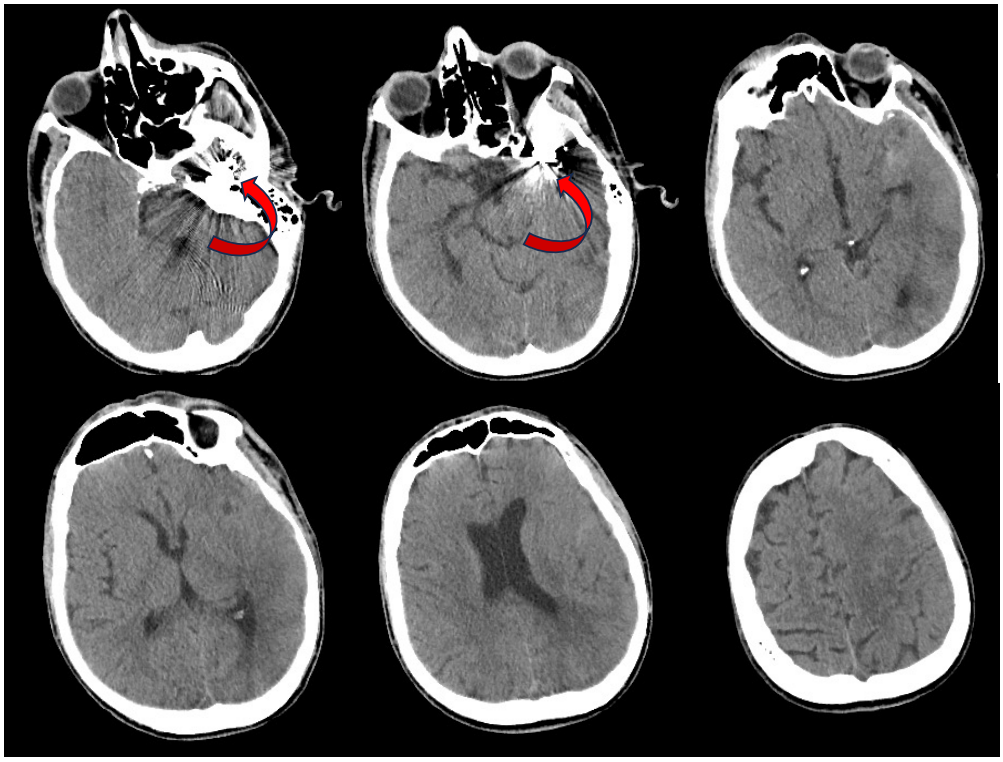

Fig. 3. Head Ct control after the treatment showing no complication and the embolic agent (arrow)

Discussion

Ruptured temporal lobe AVMs represent a challenging clinical entity due to their hemorrhagic presentation and the eloquence of surrounding cortex. Recent literature supports an expanding role for endovascular embolization as a first-line or curative treatment in selected ruptured AVMs, either as a standalone therapy or as part of a multimodal strategy[1,2].

Liquid embolic agents such as Onyx, n-BCA, Phil and Squid allow controlled nidus penetration and targeted occlusion of high-risk angioarchitectural features, including associated aneurysms,deep venous drainage and high-flow shunts[1,6]. These features are well-recognized predictors of hemorrhage and early rebleeding, particularly in temporal AVMs[6].

Multimodal management remains common, with embolization often serving as an initial step to reduce nidus flow and facilitate subsequent microsurgical resection or radiosurgery[2,4,7]. However, recent series have demonstrated that complete angiographic cure can be achieved with embolization alone in carefully selected low-grade AVMs, particularly those with compact nidus morphology and favorable venous anatomy[1,5].

In the present case, an arterial approach was chosen based on the presence of a low-grade AVM, and the absence of deep venous drainage. A venous approach through the left vein of Labbé, was planned in the end of arterial approach if some nidal residual is seen. Initiating embolization through arterial feeders allowed flow reduction and stabilization, while venous completion enabled optimal embolic penetration and complete nidus exclusion. This anatomy-driven strategy is consistent with contemporary reports advocating tailored endovascular approaches for ruptured AVMs[1,2,7].

Despite these advances, long-term angiographic and clinical follow-up remains essential to detect potential recanalization or delayed hemorrhage[8]. Multidisciplinary decision-making remains critical to optimizing outcomes.

Conclusion

This case demonstrates that an arterial endovascular approach using Squid 18 can achieve complete angiographic cure and favorable clinical outcome in a selected ruptured low-grade temporal lobe AVM. Careful angioarchitectural analysis is essential in identifying patients who may benefit from embolization as a definitive treatment.

References

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