

Intracranial Dural Arteriovenous Fistula: 2-Dimensional Operative Video

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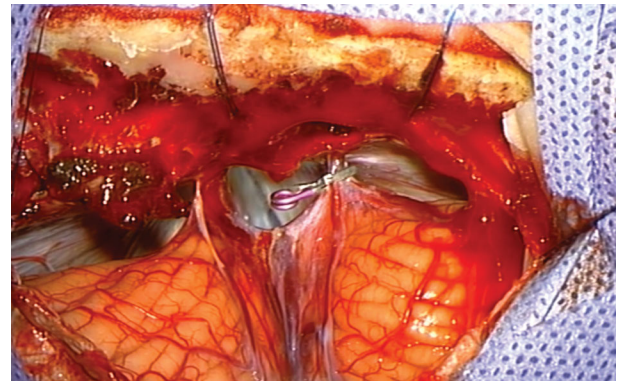
A dural arteriovenous fistula (DAVF) is an uncommon vascular malformation that has a direct dural arterial supply to a venous sinus.^{1,2} A DAVF is acquired after trauma and thrombosis,² and is most common in elderly women.³ The principal location of a DAVF is the cavernous sinus, followed by the transverse sinus, and presents with pulsatile tinnitus.^{3,4}

Endovascular embolization has become first-line treatment, although microsurgery is most likely to result in successful obliteration.² However, in selected cases in which embolization is difficult because of proximity to neural structures, such as the cranial nerves, and because of the risk of compromising the pial supply, open surgery may be necessary.

A 70-yr-old woman presented with headache and pulsatile tinnitus without neurological deficits. The patient signed the Institutional Consent Form, which allows the use of his/her images and videos for any type of medical publications in conferences and/or scientific articles. Magnetic resonance imaging demonstrated anomalous contrast uptake between the transverse sinus and right cerebellar hemisphere suggesting a DAVF. The DAVF is better identified on arteriography.

The angiogram identified a direct arteriovenous shunt between a meningeal branch of the left vertebral artery, with retrograde drainage through the right inferior vermian vein to the straight sinus in the torcular area, ie, a Borden/Cognard type 3 fistula.⁵ Onyx[®], a liquid embolic agent (Micro Therapeutics Inc, Irvine, California), was injected into the meningeal artery but not across the fistula into the draining vein, resulting in a residual fistula. Therefore, surgical treatment was indicated after unsuccessful embolization.

Suboccipital craniotomy was performed, and the fistula site was identified with indocyanine. After clipping the fistula near the transverse sinus, we observed a decrease in flow. Accordingly, we performed the coagulation and incised the fistula near the dural sinus. The patient was discharged with remission of symptoms.



Watch now at <https://academic.oup.com/ons/article-lookup/doi/10.1093/ons/oxz273>

Disclosure

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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COMMENTS

The authors describe the surgical disconnection of a high grade peritorcular DAVF draining via an inferior cerebellar vein after a failed attempt at transarterial embolization. Detailed analysis of the preoperative angiogram in conjunction with direct visualization of the draining vein and intraoperative indocyanine green angiogram helps avoid the pitfalls of nonfistulous venous occlusion and incomplete disconnection. A delayed follow-up angiogram after at least 6 months is useful to confirm a robust occlusion of the fistula.

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Dural arteriovenous fistulas are most often able to be treated by endovascular therapy, avoiding the need for surgery. The development of transvenous routes to these lesions has further expanded the role of endovascular therapy. As this video demonstrates, there remain

some dural fistulas that require surgical treatment either after failed endovascular therapy or due to lack of transarterial or transvenous access to the fistula. The video also demonstrates the relative simplicity of surgical management of these lesions, requiring only occlusion of the draining vein at the site of the fistula. Our preference is to use intraoperative rather than postoperative angiography to document obliteration of

the fistula at the time of surgery. Thus, if there is some residual arterial supply to the fistula, it can be dealt with at the time of the initial operation and possibly avoid reoperation.

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