



# Surgical Clipping of a Petrosal Tentorial Dural Arteriovenous Fistula (Lawton's Type 5)

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## Abstract

**Objectives** To demonstrate the surgical clipping of a lateral petrosal tentorial dural arteriovenous fistula (DAVF), located in the cerebellopontine angle (CPA), through a retrosigmoid approach.

**Method** A previously healthy 49-year-old man presented a sudden episode of headache, photophobia, and dizziness. Due to the persistence of his symptoms despite proper analgesic treatment, he sought medical attention. The initial computed tomography (CT) scan showed a hyperdense lesion in the left CPA. Magnetic resonance imaging (MRI) demonstrated the vascular nature of the lesion, corresponding to an engorged superior petrosal vein (SPV) and Rosenthal's vein. The preoperative angiography showed a lateral tentorial DAVF (Lawton's type 5), fed by multiple transpetrosal branches coming off the external carotid artery, and draining into the SPV. A standard retrosigmoid approach was planned for clipping and exclusion of the DAVF.

**Results** Through a left retrosigmoid craniotomy the DAVF was approached, along with the different neurovascular structures of the CPA. The DAVF originated at the tentorial petrosal junction. The fistulous vein was closely attached to the trigeminal nerve and the anterior inferior cerebellar artery (AICA). The fistulous vein was dissected and clipped close to its base at the lateral tentorium, achieving complete occlusion of the DAVF. The patient fully recovered after surgery with neither relapse of his symptoms nor postoperative complications.

**Conclusion** The retrosigmoid craniotomy is the best surgical approach for lateral tentorial DAVFs, as it provides a direct way to the fistula origin and permits a successful clipping of the draining vein.

The link to the video can be found at: <https://youtu.be/Fj3uqrTPX5c>.

## Keywords

- ▶ cerebellopontine angle
- ▶ dural arteriovenous fistula
- ▶ superior petrosal vein
- ▶ Lawton's type 5 tentorial fistula
- ▶ retrosigmoid craniotomy
- ▶ superior petrosal sinus

## Conflict of Interest

None.



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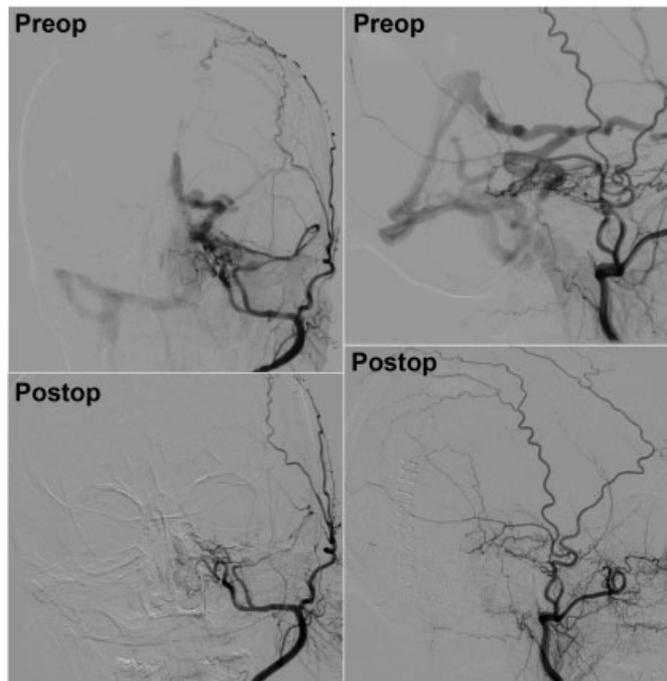
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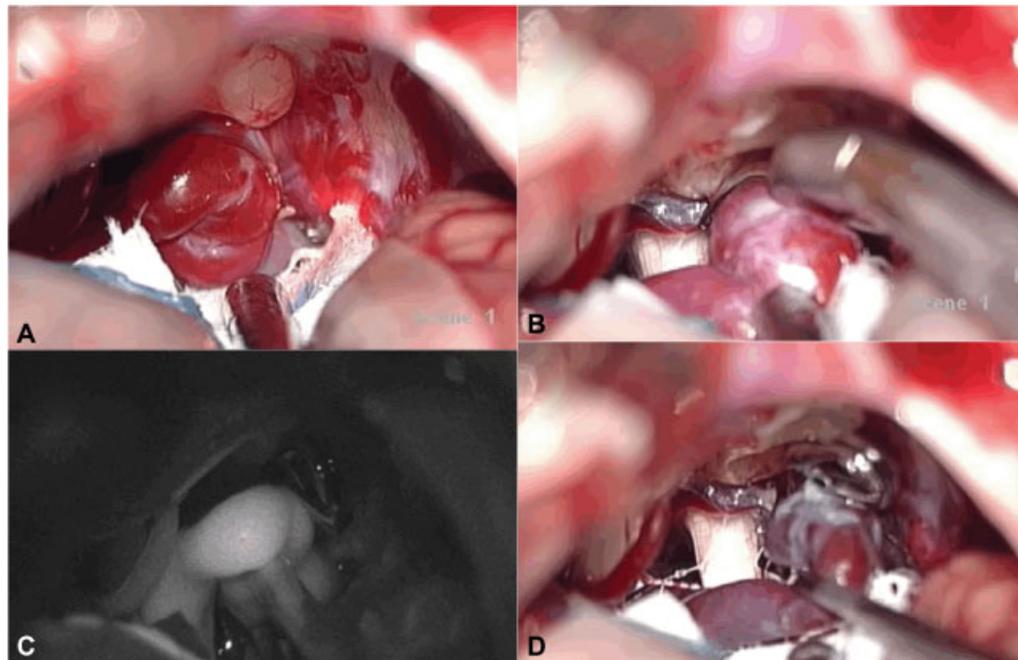
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**Fig. 1** Comparison between pre- and postoperative cerebral angiogram. The *upper left image* corresponds to a preop anterior–posterior view after left ECA injection. The two main final branches of the ECA, namely, the STA and the IMA are depicted. Multiple transpetrosal branches coming off the latter feed the lateral tentorial DAVF, which drains directly into the SPV and secondarily into the left RBV. The *upper right image* corresponds to a lateral view of the same left ECA injection. Notice the clear depiction of the different DAVF components: the multiple tentorial and transpetrosal feeders, the single fistulous vein, namely the SPV, and how this vein subsequently drains into the RBV, which drains both anterograde and retrograde. The *lower left image* is the postop equivalent to the upper left image, demonstrating the final exclusion of the DAVF, with no longer early filling of the SPV and RBV. The *lower right image* is the postop equivalent of the upper right image, which again shows a normal extracranial vasculature after DAVF exclusion. DAVF, dural arteriovenous fistula; ECA, external carotid artery; IMA, internal maxillary artery; STA, superficial temporal artery; preop, preoperative; postop, postoperative; RBV, Rosenthal's basal vein; SPV, superior petrosal vein.



**Fig. 2** Intraoperative images through a left retrosigmoid craniotomy. (A) Complete exposure of the fistulous DAVF vein at the CPA. The root of the fistulous vein is located just between the petrous bone and the tentorium. (B) Clip application close to the base of the fistulous vein. Notice the left trigeminal nerve right behind the DAVF origin. (C) Intraoperative image after indocyanine green injection, which clearly shows the sparkling enhancement of the SPV after clip opening for DAVF occlusion checking. (D) Postclipping checking of the tentorial DAVF and CPA structures. Notice the bluish and slack aspect of the DAVF vein with the clip at its base. The vein is moved cranially with a dissector to expose both the trigeminal nerve and the VII, VIII complex. CPA, cerebellopontine angle; DAVF, dural arteriovenous fistula; SPV, superior petrosal vein.