

## CTA-guided outflow-targeted embolization of direct carotid-cavernous fistula

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This video presents a case of new-onset visual blurring, diplopia, and conjunctival injection after head injury. CTA of the brain revealed a direct carotid-cavernous fistula (dCCF) of the right side. Careful evaluation of CTA source images revealed that the fistula point was at the ventromedial aspect of the right cavernous internal carotid artery (ICA), about  $3.6 \times 3.6 \text{ mm}^2$  in size, with 3 main outflow channels (2 intracranial and 1 extracranial) (CTA-guided concept). DSA of the brain also confirmed the diagnosis but was unable to locate the fistula point in a large-sized dCCF. Through a transfemoral artery approach, 3 microcatheters were navigated to each peripheral channel to initiate outflow-targeted embolization. Intracranial refluxes were blocked first to avoid cerebral hemorrhages, followed by the extracranial outflow. During embolization, accidental dislodge of one coil into the sphenoparietal vein occurred, but no attempt of coil retrieval was made. Complete obliteration of the dCCF was achieved, and the patient recovered well without new neurological deficits. 4D MRA at the 3-month follow-up showed no residual dCCF.

The video can be found here: <https://youtu.be/LH2INVRZSPk>.

**KEYWORDS** direct carotid-cavernous fistula; outflow-targeted embolization; video

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