



Post-traumatic carotid-cavernous fistula

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Abstract

A 28-year-old woman who suffered a head injury 2 months before presented with a history of progressive right eye proptosis, ophthalmoplegia, and conjunctival injection. The radiological workup with a magnetic resonance imaging of the brain and cerebral angiography revealed a direct, high-flow, right post-traumatic carotid-cavernous fistula. An endovascular procedure was performed, and the carotid-cavernous fistula was successfully occluded with a progressive resolution of the complained symptoms.

Keywords Traumatic brain injury · Carotid-cavernous fistula · Endovascular

A 28-year-old woman presented to our department with a 1-month history of progressive right eye proptosis, ophthalmoplegia, and conjunctival injection. The medical history was unremarkable. The patient experienced a head injury 2 months before from a motorbike fall. The brain MRI showed enlarged vessels within the right intraconal space. The subsequent cerebral angiography revealed a direct, high-flow, right post-traumatic carotid-cavernous fistula (CCF) associated with a retrograde, cortical, and pial posterior fossa venous drainage (Fig. 1). No orbital bruits were appreciable. To rule out evidence of ocular hypertension related to the abnormal pressure gradient that hinders the retrograde venous outflow an ophthalmoscopic evaluation was performed not revealing signs of papilledema. In light of the carotid-cavernous syndrome and the bleeding risk related to the abnormal

posterior fossa drainage, an endovascular procedure was scheduled. The fistula was occluded with an endovascular balloon-assisted coiling procedure, re-establishing the normal intracranial circulation. All the symptoms were resolved at the 1-month follow-up visit. Remarkably, this case presents an extremely rare combination of CCF and retrograde posterior fossa venous drainage consequent to a head injury. Our findings aim to raise the awareness regarding this possible combined presentation after a traumatic brain injury for an appropriate follow-up imaging and patient counselling in case of the presentation of suggestive symptoms. The prompt recognition of the signs and the consequent treatment is paramount to prevent serious vision-threatening complications in case of CCF [1] and bleeding risks in case of retrograde posterior fossa venous drainage and venous hypertension [2].

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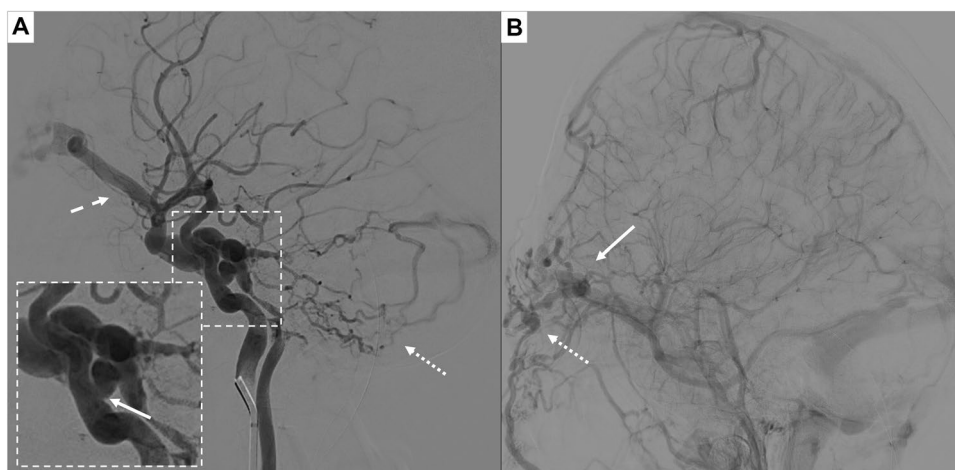


Fig. 1 Angiographical manifestation of a post-traumatic carotid-cavernous fistula. **A** Cerebral angiogram showing the carotid-cavernous fistula with a pathologic communication between the intrapetrous portion of the right internal carotid artery and the cavernous sinus via the foramen lacerum (arrow) along with the congestion and dilatation of the superior ophthalmic vein (dashed arrow). The retrograde venous outflow is appreciable in the posterior fossa, characterized

by a retrograde flow throughout the inferior petrosal sinus within the dilated and tortuous cerebellar veins (dotted arrow) and draining in the torcular Herophili. **B** Venous phase of the cerebral angiogram showing contrast stagnation in the orbital space (arrow) with venous outflow in the angular and facial vein (dotted arrow) instead of the superior and inferior orbital vein due to the abnormal gradient pressure inside the cavernous sinus

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Data availability The authors confirm that the data supporting the findings of this study are available within the article.

Declarations

Informed consent statement An informed consent for publication of anonymized data was obtained from the patient. Given the nature of the study and the use of anonymized data, local Institutional Review Board approval was waived.

Ethical approval Given the nature of the study and the use of anonymized data, local Institutional Review Board approval was waived.

Conflict of interest None.

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