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CAROTID-CAVERNOUS FISTULA: NATURE OF THE PROBLEM

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Carotid-Cavernous fistula (CCF) is an abnormal connection between the internal carotid artery (ICA) and the cavernous sinus (CS). The relevancy of studying CCF is dictated by its high frequency which is reported in from 3% to 24% of patients with vascular cerebral aneurysms.

Anatomically, CCFs could be classified as direct and indirect fistulas. The direct ones are characterized by the high flow of blood and they are formed between ICA and CS. The indirect fistulas are created between meningeal arteries and the CS, and the blood flow is low in them. The direct CCFs are mainly associated with trauma or iatrogenic complications caused by neuro-endovascular therapy. Indirect fistulas could be resolved spontaneously or with conservative management, where direct fistulas require more aggressive treatment with transarterial or transvenous embolization or radiosurgery.

One of the reasons of CCF are congenital abnormal communications between the CS and dural branches from ICA or external carotid artery. They often present with ocular symptoms that can mimic a thyroid-associated ophthalmopathy: proptosis, strabismus and diplopia. These CCFs can be treated with an endovascular embolization. One more cause of CCFs is the aneurysm of ICA which can be ruptured and should be also treated endovascularly. The cases of posttraumatic, direct, low-flow CCF associated with cerebral hemorrhage due to arterial pressure in fistula transmitted into cerebral venous system are noticed in the references. The patients with indirect CCF do not demonstrate the classic triad of symptoms, however, they usually have chronically red eyes as a result of tortuous arterialization of the conjunctiva. It should be taken into account that the cases of low-flow CCFs, prompted by subconjunctival hemorrhage, can be created a week after treatment for intraocular hypertension. One of the rare complications of iatrogenic CCF is formed after mechanical endovascular thrombectomy in acute ischemic stroke patients with middle cerebral artery occlusion.

In conclusion, the knowledge on the anatomical background for CCFs is relevant for the clinical application and prognostic analysis of these severe disorders as well as for the elaboration of new approaches for their treatment.