Carotid cavernous fistula treatment

General information

20–50% of low flow carotid-cavernous fistula (CCF) spontaneously thrombose, therefore one may observe these as long as visual acuity is stable and intraocular pressure is < ≈ 25. Symptomatic (e.g. progressive visual deterioration) high-flow CCFs rarely resolve spontaneously, and urgent treatment is usually indicated. Treatment is usually in the form of embolization by an interventional neuroradiologist or trapping between surgically placed clips.

Even if normal ocular motility cannot be achieved in affected eye, preservation of vision is desir- able because:

1. for some ocular motility abnormalities, surgical treatment may reduce diplopia.

2. patient may be provided with frosted eyeglass lens which will eliminate diplopia but will main- tain peripheral vision

3. in the rare event of injury to contralateral eye (trauma, central retinal artery occlusion…) there would be “reserve” vision in the eye with reduced motility (with loss of the other eye, there would not be diplopia)

Indications for endovascular intervention

Direct fistulae usually require treatment as they frequently do not resolve spontaneously. Other indi- cations: corneal exposure, diplopia, proptosis, intolerable bruits or headaches.

Timing of treatment

If the patient is stable, treatment may usually be performed within a couple of days of the diagnosis (i.e., treatment does not have to be emergent).

Indications for urgent treatment: ICH, epistaxis, increased IOP, decreased visual acuity, rapidly progressive proptosis, cerebral ischemia and enlargement of traumatic aneurysm beyond the cavernous sinus.

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Embolization

see Carotid cavernous fistula embolization.

Trapping between surgically placed clips.

The treatment of a carotid cavernous fistula (CCF) depends on the severity of the clinical symptoms, its angiographic characteristics, and the risk it presents for intracranial hemorrhage. In most instances, endovascular treatment is preferred.High-flow direct CCFs usually are traumatic or are caused by rupture of a cavernous aneurysm into the sinus, but a small percentage can be spontaneous. They usually present with sudden development of a clinical triad: exophthalmos, bruit, and conjunctival chemosis. All direct CCFs should receive treatment, because they carry a high probability of intracranial hemorrhage or neurologic deterioration.Low-flow indirect or dural CCFs, either incidental or with minimal symptoms, are not associated with significant risk of intracranial hemorrhage. The accepted practice is to treat ocular symptoms conservatively with medical management or manual carotid compression. If the patient cannot tolerate the symptoms, or if signs of ocular morbidity occur, endovascular treatment is offered.The first treatment option should be endovascular embolization with a combination of detachable balloons, coils, stents, or liquid embolic agents. The procedure can be performed from either an arterial or venous approach. Use of these materials and techniques can yield a high cure rate with minimal complications.If the patient is not amenable to embolization or if the embolization fails, then surgery (surgical ligation of the internal carotid artery or packing of the cavernous sinus) should be offered.Stereotactic radiosurgery may be an elective treatment for low-flow CCFs, but it has no role in the treatment of high-flow CCFs [1].

The current therapies for traumatic carotid-cavernous sinus fistula (tCCF) yield a variable rate of recurrence and produce different results.

A detachable coil is a favorable approach in the management of tCCFs when considering the rate of recurrence. In addition, the involvement of C2 or C4 segments (Debrun classification) served as an independent risk factor of the recurrence of tCCFs [2].

In the 1980s, an era when treatment with transarterial embolization was the preferred endovascular approach, it differentiated technical difficulties encountered with the ICA vs the external carotid artery catheterization [3]

1)
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2)
Lin TC, Mao SH, Chen CH, Chen YL, Wong HF, Chang CJ, Huang YC. Systematic Analysis of the Risk Factors Affecting the Recurrence of Traumatic Carotid-Cavernous Sinus Fistula. World Neurosurg. 2016 Jan 4. pii: S1878-8750(15)01795-7. doi: 10.1016/j.wneu.2015.12.088. [Epub ahead of print] PubMed PMID: 26763351.
3)

Barrow DL, Spector RH, Braun IF, Landman JA, Tindall SC, Tindall GT. Classification and treatment of spontaneous carotid-cavernous sinus fistulas. J Neurosurg. 1985;62(2):248–256.