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Ascending pharyngeal artery-internal jugular vein fistula complicating radical neck dissection

Case report

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Summary. Arteriovenous fistulae of the ascending pharyngeal artery (AP) and internal jugular vein (IJ) are rare. Only two spontaneous AP-IJ fistulae have been described previously, both of which presented with pulsatile tinnitus. A unique case of an AP-IJ fistula developing after radical neck dissection is described in which the clinical presentation was identical to that of a carotid-cavernous fistula.

Key words: Arteriovenous fistula-Ascending pharyngeal artery-Radical neck dissection-Iatrogenic

Case report

A 64-year-old man developed progressive pain and proptosis of the left eye over a 6-week period. He also complained of persistent left retro-orbital headache and mildly blurry vision. Examination of the left eye revealed mild proptosis, chemosis, elevated intraocular pressure and tortuous retinal veins. No orbital bruit was noted. A diagnosis of carotid-cavernous fistula was suggested.

The patient's past medical history was notable for local resection of a squamous cell carcinoma of the basal tongue and subsequent left radical neck dissection for malignant cervical adenopathy 2 years previously.

Carotid and vertebral angiography was performed. A left common carotid artery injection showed a poorly defined arteriovenous shunt below the jugular bulb, which resulted in abnormal retrograde filling of the left interior petrosal and cavernous sinuses. Selective external carotid arteriography was not attempted due to significant atherosclerotic disease at the carotid bifurcation. The fistula was best demonstrated on left vertebral artery injection, when anastomotic muscular branches resulted in retrograde filling of the ipsilateral occipital artery and antegrade filling of the ascending pharyngeal artery (AP) (Fig. 1 a). The neuromeningeal branch of AP supplied the fistula approximately 2 cm below the jugular fossa and this resulted in retrograde filling of the most rostral portion of the internal jugular vein (IJ). Flow was subsequently directed from the jugular bulb into the left inferior petrosal sinus and cavernous sinus, ultimately resulting in retrograde filling of the sphenoparietal (Fig. 1 b) and superior ophthalmic veins.

Endovascular embolization and direct surgical attack were both considered, but the patient declined both options. He was treated conservatively with acetazolamide and on short-term follow-up was found to have diminished intraocular pressure and chemosis. His visual acuity remained unchanged.

Discussion

This case is very unusual in two regards. First, it is our belief that this is the first reported case of an AP-IJ fistula complicating radical neck dissection. Both the temporal pattern and the unusual extracranial location of the fistula (which corresponds to the rostral margin of the operative field) point strongly to a causal relationship. An extensive review of the literature shows no previous report of this complication, although other types of arteriovenous fistulae complicating head and neck surgery have rarely been reported [1–4]. Only one previous case of an "arteriovenous malformation" complicating radical neck dissection has been reported, in which careful review of the angiogram suggests that the lesion is an arteriovenous fistula involving the ascending palatine artery [1].

Two previous reports have described AP-IJ fistulae [5, 6]. Both were spontaneous fistulae that presented with pulsatile tinnitus, prompting diagnostic angiography for a possible glomus tumor of the temporal bone or jugular foramen. Successful treatment was achieved in each case by endovascular particulate embolization.

Our case is also unique in its means of presentation. Unlike the previous two reports of AP-IJ fistula, the constellation of signs and symptoms suggested a dural type carotid-cavernous fistula. This was probably a direct result

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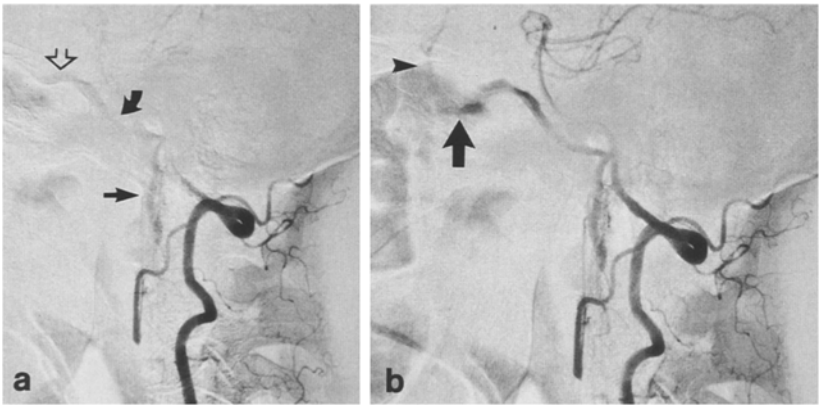

Fig. 1. **a** Left vertebral arteriogram, early arterial phase. An ascending pharyngeal artery – internal jugular vein fistula is demonstrated *(arrow)* via vertebral-occipital muscular anastomoses that fill the AP. There is faint filling of the inferior petrosal sinus *(curved arrow)* and posterior cavernous sinus *(open arrow)*
b Slightly later phase. There is now more prominent retrograde filling of the inferior petrosal sinus and posterior cavernous sinus as well as the anterior cavernous sinus *(large arrow)* and sphenoparietal vein *(arrowhead)*

of resection of the IJ vein, which produced chronic redistribution of dural venous outflow from the left transverse-sigmoid sinus complex. Although the fistula was extracranial, shunt flow had to be redirected cephalad into the jugular bulb, superior petrosal sinus, cavernous sinus and sphenoparietal vein. Thus, the hemodynamic consequences of this particular fistula were identical to those of a carotid-cavernous fistula.

An AP-IJ fistula needs to be added to the list of potential complications of radical neck dissection. Due to the altered dural venous outflow produced by this surgery, such a fistula can cause symptoms related to redirected intracranial shunt flow, resulting in dural sinus and possibly pial congestive venopathy.

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