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ANATOMIC VARIATIONS

Persistence of the otic artery with neurological sequelae: case report

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Abstract Persistence of intracranial fetal vasculature may be encountered by the neurosurgeon. Of these, the otic artery is extremely rare and to some, a true case has to date, not been authenticated. We report an adult patient found to harbor an otic artery. Moreover, neurological sequelae of this fetal vascular connection are believed to have occurred. This case and a review of germane literature are presented.

Keywords Fetal circulation · Intracranial · Neurology · Stroke · Persistence · Embryology · Otic artery

Introduction

Persistance of intracranial fetal arteries that may be seen in the adult include the otic, hypoglossal, proatlantal, and trigeminal arteries. When the human embryo is less than 5 mm long, these arteries serve as transient anastomoses between the developing internal carotid arteries and longitudinal neural arterial plexus with the latter going on to form the basilar artery. At 1 month and when the posterior communicating artery has linked the anterior and posterior circulations, these fetal vessels begin to regress in the following order: otic, hypoglossal, trigeminal, and proatlantal [11]. A persistent otic (acoustic) artery (Fig. 1) has been unequivocally documented at autopsy only once [7] and radiologic observations are extremely rare with many of these reports being questioned by some authorities [2]. In one review of 7,382 carotid angiograms, the otic artery was observed only once [14].

Vasovic et al. [13] reported that such cases may be slightly more common in females. Lasjaunias et al. [8] have stated that the otic artery cannot continue to exist without the persistence of the trigeminal artery. Croft [2] has recently suggested that a true otic artery has yet to be reported. The otic artery may join the basilar artery near the origin of the superior cerebellar or anterior inferior cerebellar arteries [4] or at the mid portion of this vessel [6, 11, 13]. We now present a case of authenticated persistence of the otic artery in an adult that lead to neurologic compromise.

Case report

We report a 35-year-old female patient who was involved in a motorcycle accident and suffered bilateral humeral fractures, right 12th rib fracture with hemothorax, lacerations to the forehead and transverse process fractures of T12–L5. Neurologically, the patient was intact but had pain and mild weakness in her right upper limb. Arteriogram noted a 4-cm segment occlusion of the proximal right brachial artery. CT observed left posterior circulation distribution infarctions. Angiography revealed left internal carotid dissection that was treated with anticoagulation via a heparin drip. This examination also observed a left-sided otic artery joining the midsection of the basilar artery (Figs. 1, 2). No other intracranial anomalies were noted. The patient underwent axillary to brachial artery bypass using the right great

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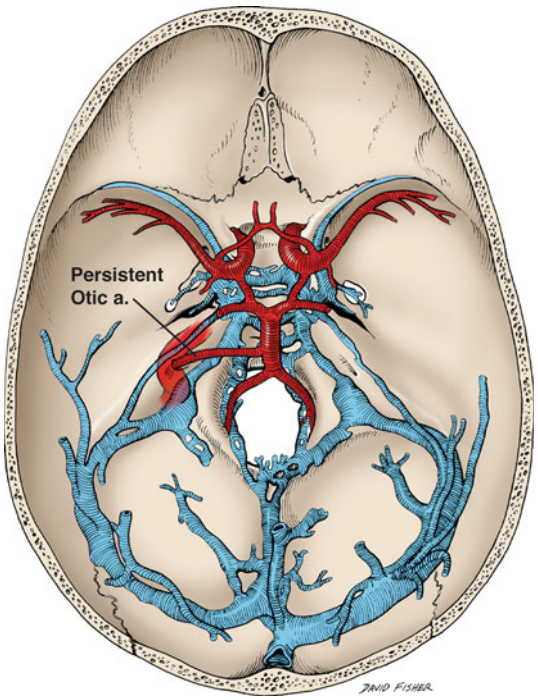

Fig. 1 Schematic drawing of persistence of the left otic artery

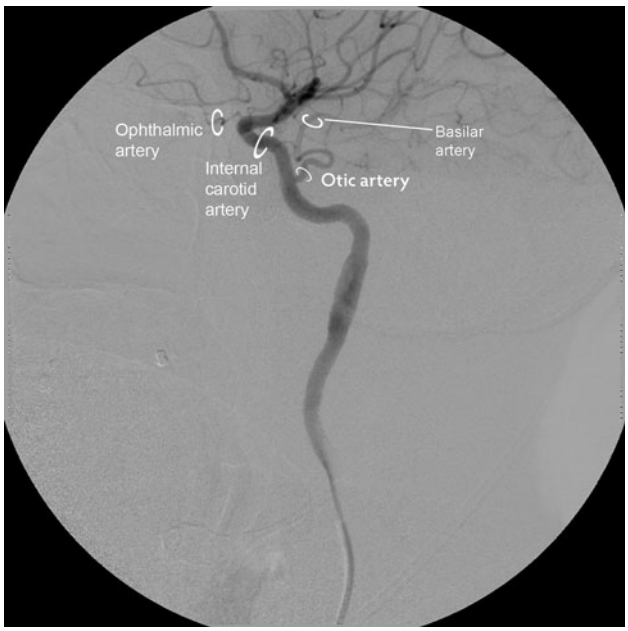

Fig. 2 Angiogram depiction of the left otic artery

saphenous vein, right-sided chest tube placement, and at 5-year follow-up is well and neurologically intact.

Discussion

Pasco et al. [10] has stressed that the best identifying angiographic criterion for diagnosing an otic artery is to observe it coursing through the internal acoustic meatus and this was seen in our case. Although not observed in our case, hypoplasia or aplasia of the vertebral and posterior communicating arteries may be seen in patients with an otic artery [1, 7]. Kaido et al. [5] described fenestration of the internal carotid artery in the presence of an otic artery. Both a trigeminal [6] and hypoglossal artery [1] have been identified in patients with an otic artery [13].

Symptomatically, a persistent otic artery has been reported as resulting in hemifacial spasm [7] and paraparesis [12]. Whether or not persistence of intracranial fetal vessels predisposes one to aneurysm formation is debatable as the prevalence of such aneurysms is similar to the prevalence of aneurysms in the general population [2]. Regarding the otic artery, Franz et al. [3] described aneurysms of the left internal carotid and basilar arteries and an arteriovenous fistula in the presence of an otic artery. Reports also exist of the simultaneous occurrence of an otic artery and aneurysms of the anterior and posterior communicating arteries [11] or cavernous segment of the internal carotid artery [9, 15]. Hypoplasia or aplasia of the vertebral or posterior communicating arteries may also be present in patients with an otic artery [13].

In the case of Zhang et al. [15], the otic artery arose from the cavernous internal carotid artery aneurysm and complicated endovascular therapy management. In our case, the internal carotid dissection coupled with the presence of an otic artery, explains the posterior circulation territory infarcts, likely secondary to artery emboli arising from the left internal carotid artery dissection.

Conclusions

Although exceedingly rare, persistence of the otic artery should be considered by the neurosurgeon during operative procedures and by radiologists during interpretation of cranial imaging.

Conflict of interest The authors confirm that there are no conflicts of interest.

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