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Case Report

Persistent Trigeminal Artery Anomaly with Concomitant Basilar Artery Hypoplasia

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Abstract

The persistent Primitive Trigeminal Artery (PTA) is the largest of the fetal carotid-basilar anastomosis arteries. PTA is generally determined incidentally during investigations for unrelated reasons. Persistent trigeminal artery is a rarely seen anomaly with reported incidence of 0.1% - 0.5%.It may be seen together with one or several vascular variations of the head and neck region. In cases where surgery or a neuroradiological intervention is planned, it may be important to know about both PTA and other concomitant vascular variations. The radiological findings are here presented of persistent trigeminal artery anomaly accompanied by basilar artery hypoplasia.

Introduction

The persistent Primitive Trigeminal Artery (PTA) is the largest of the fetal carotid-basilar anastomosis arteries. It may remain open until the late embryonic period [1,2]. Persistent trigeminal artery is a rarely seen anomaly with reported incidencce of 0.1%- 0.5% [3-6]. Due to the localisation, it is important to know of this anomaly during management of lesions in the surrounding area.

PTA is generally determined incidentally during investigations for unrelated reasons. There are studies which have related it to clinical events such as cerebrovascular anomalies, aneurisms, vertebrobasilar failure, and carotico-cavernous fistula [4,7-9].

The radiological findings are here presented of persistent trigeminal artery anomaly accompanied by basilar artery hypoplasia.

Case Report

A 35-year old male patient was referred to our clinic with a request for cranial MR and MR angiography for the evaluation of possible posterior extension of mucosa of right side recurrent maxillary sinus. The patient had no complaints of headache, dizziness or syncope. In the physical examination, there was right side exophthalmus. No motor or sensory deficit was determined in the extremities.

Axial 3D multislab TOF MRA (time-of-flight magnetic resonance angiography,1.5 Tesla scanner Siemens Essanza, Tim-Dot, Germany) was applied to the cranium of the patient and reformatting was made with the post-processing MIP (maximum intensity projection) algorithm. On MRA, the vertebral artery was not observed on the left. The basilar artery was significantly hypoplastic (Figure 1). There was a thick PTA anomaly at the ICA (internal carotid artery) cavernous segment level on the left extending to the basilar artery in the posterior (Figure 2). The trigeminal artery in the distal of the superior cerebellar artery origin, was opened to the basilar artery. The Willis polygon was of normal configuration, including both posterior cerebral arteries. On both sides, the posterior communicating arteries were normal. There was no aneurism or arteriovenous malformation.

Discussion

Saltzman [10] recommended angiographic classification separating PTA into two main types. In Type 1, PTA are open to the proximal superior cerebellar artery and the distal anterior inferior cerebellar artery with the basilar artery. In this type of PTA with proximal insertion, the basilar artery may be hypoplastic. In distal anastomosis, the whole basilar system, both posterior cerebral arteries and the superior cerebral arteries are fed by the PTA. In Type 2, PTA shows insertion to the basilar artery, but basically it supplies the bilateral superior cerebellar arteries. In the distal, the basilar artery shows weak circulation and both posterior cerebellar arteries are predominantly supplied from the posterior communicating arteries. The current case was classified as Saltzman Type 1 as the proximal basilar artery was hypoplastic and the insertion point and the posterior cerebellar arteries in the distal were predominantly fed from the basilar artery.

Another striking finding of the current case was the agenetic appearance of the left vertebral artery accompanying the basilar artery hypoplasia. In the normal population, vertebral artery hypoplasia can be seen on MRA at rates of approximately 10%-40% [11]. However, agenetic vertebral artery is rare. This combination is not surprising due to increased rates of observation of anomalies in head and neck vessels in PTA cases.

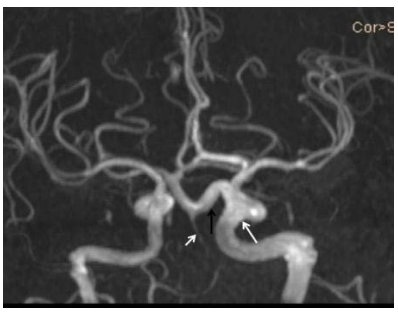

Figure 1: The hypoplasia of the basilar artery (short white arrow), Internal Carotid Artery (ICA) (long white arrow) and PTA (black arrow) was showed in MRA.

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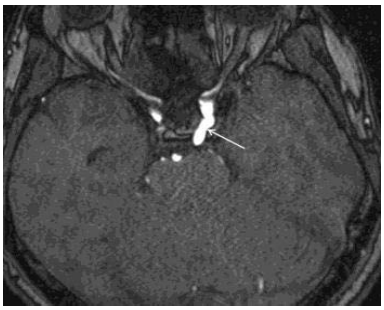

Figure 2: A wide PTA in axial MR images (white arrow).

PTA is a rare vascular anomaly. It may be seen together with one or several vascular variations of the head and neck region. In cases where surgery or a neuroradiological intervention is planned, it may be important to know about both PTA and other concomitant vascular variations.

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