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Case Report

Persistence of a hypoglossal artery: Case report [☆]Abdullah Ali AlQarni^{a,*}, Talal AlOtibi^b, Yahya Mahnashi^c, Abdullah Alawad^d,
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ABSTRACT

Persistent primitive hypoglossal artery (PPHA) is a rare embryological carotid–basilar anastomosis. Diagnosis is by imaging and computed tomography angiography is the most common methods employed. Herein we present a case of a 51 years-old Indian male, who admitted with midnight nonwitnessed syncope. CT angiogram of the brain revealed a very rare caroto-basilar anastomoses anomaly with PPHA.

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Introduction

Multiple anastomoses develop between the carotid and basilar artery systems early in embryogenesis. These anastomoses normally vanish during embryonic development. As the posterior connecting arteries mature, these connections normally disappear by the fourth week of foetal development. Patients with a prolonged carotid-basilar anastomosis exhibit a failure of involution [1–3].

The second most common persistent embryonic carotid-basilar anastomosis is persistent primitive hypoglossal artery (PPHA), with a prevalence of 0.1%–0.25% [4]. It usually starts in

the internal carotid artery (ICA) between C1 and C3, however it can also start in the external carotid artery. It is connected to the vertebrobasilar system via the hypoglossal canal [5].

Imaging exams are used to make a definitive diagnosis of this anatomic variation, with computed angiotomography being the most often used modality [6]. We present a case of PPHA, which we detected by angiographic evaluation.

Case presentation

We are reporting case of a 51 years-old Indian male, medically free working as plumber for 20 years, presented to the

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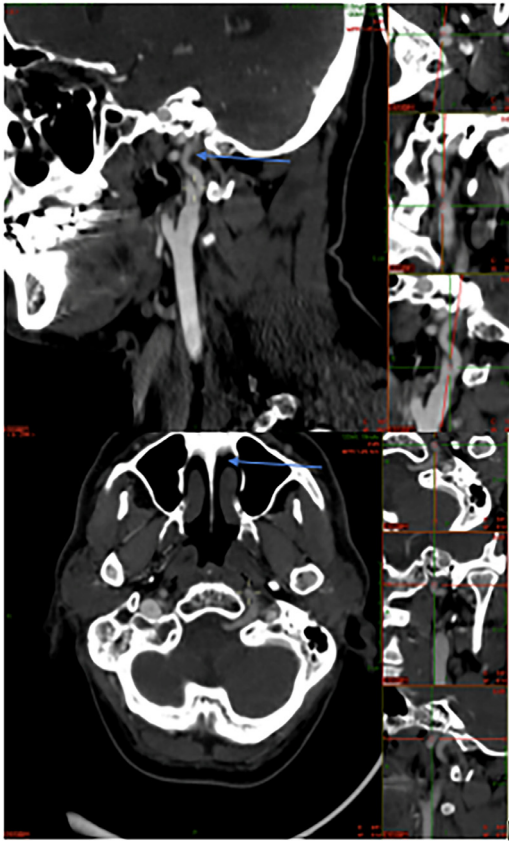


Fig. 1 – Axial and sagittal CT brain and neck angiogram shows persistent hypoglossal artery that continue as basilar artery.

ED midnight nonwitnessed syncope. Patient glasgow coma scale (GCS) was 15. No neurological deficits. Unenhanced computed tomography (CT) scan of the brain (not shown) was negative. Labs were unremarkable. Emergency physician asked for computed tomography angiography (CTA) of the brain to rule out any posterior circulation insults. CT angiogram of the brain shows a very rare caroto-basilar anastomoses anomaly with persistent primitive hypoglossal artery taking off from the distal left cervical internal carotid artery traveling through the hypoglossal canal and continuing as basilar artery, no flow limiting stenosis or aneurysms were found (Figs. 1 and 2). Coronal CT 3D reformat shows the basilar artery is coming through the hypoglossal canal (Fig. 3).

Discussion

Rare congenital remains of the cerebral arteries are persistent carotid vertebra-basilar anastomoses. The longitudinal neural arteries, which are first nourished by the carotid arteries through arterial anastomoses, provide the dorsal embryonic hindbrain circulation in the early stages of human embryonic development [7]. The trigeminal, hypoglossal, otic, and proatlantal intersegment arteries are the four basic anastomoses [8]. These embryonic veins persist as normal anatomic forms

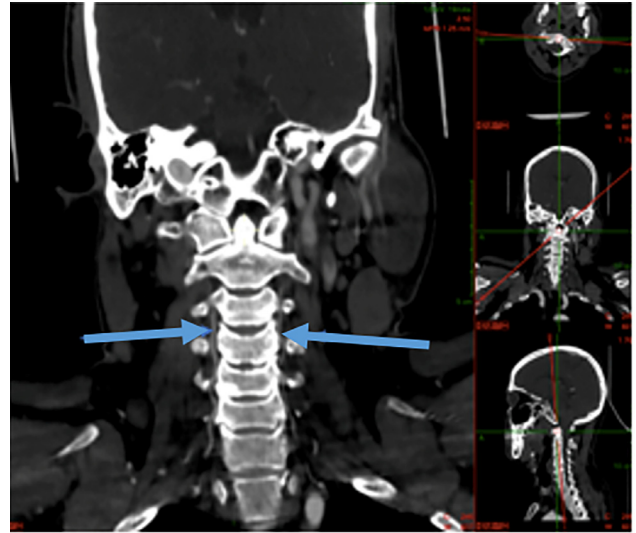


Fig. 2 – Coronal CT brain and neck angiogram shows vertebral arteries are hypoplastic arrows.

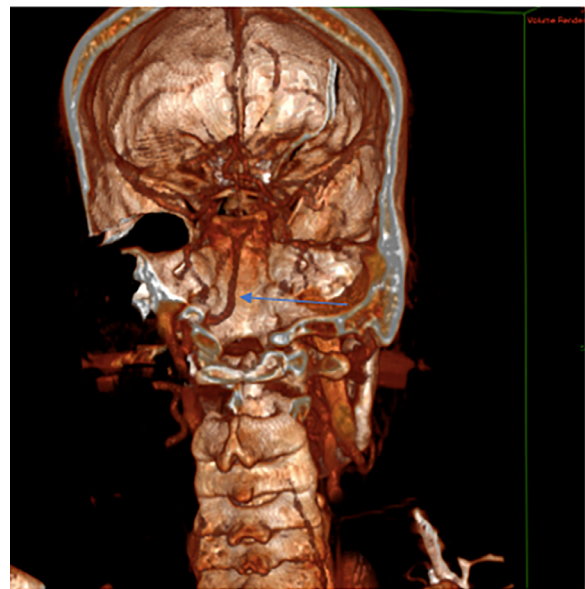


Fig. 3 – Coronal CT 3D reformat shows the basilar artery is coming through the hypoglossal canal.

when they fail to destroy [9]. After the persistent trigeminal artery, PPHA is the second most common persistent carotid vertebra-basilar anastomosis [4]. Herein we present a rare case of PPHA.

A hypoglossal nerve (XII) palsy and a neuralgia of the glossopharyngeal nerve (IX) due to irritation by the big PHA are 2 clinical symptoms linked with a PHA [10–12]. However, the PHA is most commonly discovered during an angiographic examination, as was the case in our patient who was admitted with midnight nonwitnessed syncope and diagnosed with CTA, despite the fact that no notable clinical complaint could be linked to this finding.

A male instance with a left-sided PHA is described. Only 1.4 percent of the time, the hypoglossal artery is bilateral, and it is slightly more common in women and on the left side [1]. The PHA emerges from the cervical ICA's posterior side, usually ahead of the C1-C2 space but never below the C3-C4 space [1]. In our case, it was in front of the C1-C2 space.

The majority of PPHA patients are discovered during catheter angiography. The emergence of modern technologies such as CT and MR angiography has made PPHA diagnosis easier and safer. Both MR and CT angiography are non-invasive procedures that allow for multiplanar PPHA visualization using 3D reconstruction. Furthermore, MR angiography can detect PPHA without the use of intravenous contrast and without exposing the patient to radiation [13,14]. Because it can reveal the vessel entering the larger hypoglossal canal, computed tomography angiography provides excellent anatomic localization, and it has the advantage of multiplanar demonstration, especially when utilizing 3-dimensional reconstruction. The gold standard for the diagnosis and secure detection of chronic anastomoses is computed tomography angiography [15]. Regarding our case, its diagnosis depended on CT, CTA and coronal CT 3D. Unenhanced computed tomography (CT) scan of the brain was negative. CT angiogram of the brain showed a very rare caroto-basilar anastomoses anomaly with PPHA taking off from the distal left cervical internal carotid artery traveling through the hypoglossal canal and continuing as basilar artery, no flow limiting stenosis or aneurysms were found. Coronal CT 3D reformat shows the basilar artery is coming through the hypoglossal canal.

The absence of branches in the cervical part of the internal carotid artery simplifies surgical procedures. Regardless, the Vascular Surgeon must be familiar with the anatomic variations and anomalous branches that can occur in this arterial segment in order to avoid traumatism and complications during open procedures or endovascular surgery, including through the use of transoperative cerebral protection methods [16].

Conclusion

Our case was a rare case of PPHA. Midnight nonwitnessed syncope was the major complain. The diagnosis mainly depended on CTA.

Patient consent

The patient gives his consent for this information to appear in a journal article, or to be used for the purpose of a thesis or presentation.

I confirm that consent is available for review by the Editor-in-Chief of this journal on request.

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