Sri Lanka Journal of Medicine **SLJM**

Case Report

Citation: Arudchelvam J, Jayawardena MARC, Cassim R. 2025. Internal Carotid Artery Branch, a Rare Case; a Case Report and Surgical Significance. Sri Lanka Journal of Medicine, pp .73-75.
DOI: https://doi.org/10.4038/sljm.v34i2.593

Internal Carotid Artery Branch, a Rare Case; a Case Report and Surgical Significance

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ABSTRACT

The cervical portion of the internal carotid artery (ICA) arises at the bifurcation of the common carotid artery. The ICA usually does not have branches. We report a case of a 69-year-old female who had an ICA branch. The reported prevalence of ICA branches is 6.9%. During embryonic development, the vertebral artery (VA) receives a series of connections from the ICA. When these connections persists, it remains as branches from the ICA. The ICA branches can be associated with hypoplasia or aplasia of the segments of the VA. These branches should always be preserved during surgeries to prevent posterior circulation ischemia.

Keywords: Internal carotid artery branch, embryonic development, prevalence

INTRODUCTION

The cervical segment of the internal carotid artery (ICA) arises in the neck at the bifurcation of the common carotid artery (CCA) and runs superiorly. It leaves the neck by entering the carotid canal. Then it enters the cranial cavity to supply the brain. The cervical portion of the ICA usually does not have branches. The reported prevalence of branches from the adult ICA is 6.9% (1), (2), (3). We report a case of the right internal carotid artery branch in a patient who underwent carotid endarterectomy (CEA).

CASE REPORT

A 69-year-old female underwent CEA on the right side for symptomatic carotid artery stenosis. The duplex scan demonstrated a significant plaque causing haemodynamic disturbance. The upper end of the ICA was difficult to assess with USS. Therefore a computerised tomographic angiography (CTA) of the carotid arteries was done. CTA demonstrated a carotid stenosis caused by an atherosclerotic plaque extending from the carotid bifurcation for about 3 cm distally causing about 70% luminal narrowing. Near the upper end of the stenosis (at the 3rd cervical vertebral level), an abnormal branch was seen arising from the posterior aspect of the ICA, and running Posterosuperiorly (Figure 1). The rest of the bilateral carotid arteries and the vertebral arteries were anatomically normal.

At surgical exposure a branch arising from the posterior aspect of the ICA was demonstrated (Figure 2). It was running Posterosuperiorly in the direction of the hypoglossal nerve. The CEA was

Received: 2025-02-25 **Accepted revised version: 2025-05-19** **Published: 2025-08-11**

done with a venous patch repair, preserving the patency of the branch. The patient had an uneventful recovery.

Figure 1: Abnormal branch (blue arrow) was seen arising from the internal carotid artery (yellow arrow)

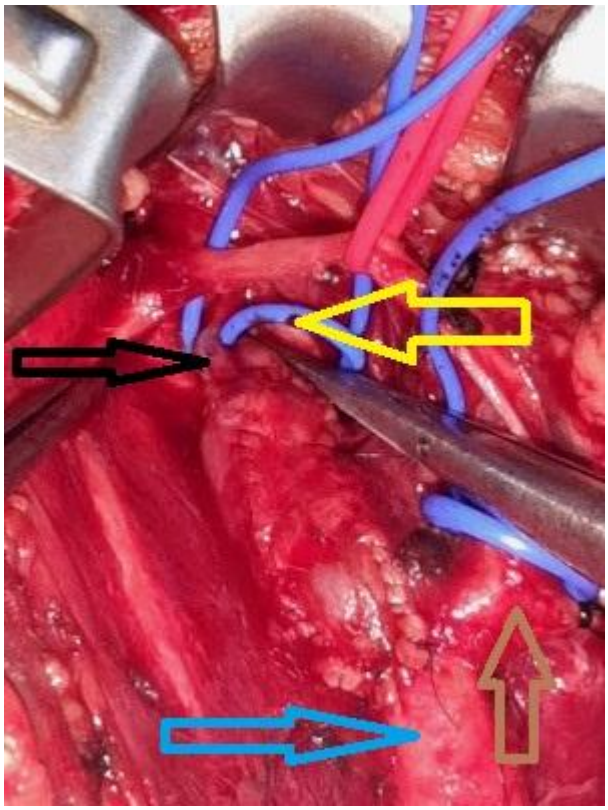

Figure 2: Intra operative image showing abnormal branch (black arrow) arising from the internal carotid artery (yellow arrow)

DISCUSSION

The cervical part of the ICA usually does not have any branches in adults. During the embryonic development of the arteries (Figure 3), two primitive aortas (right and left) appear on either side of the foregut. The part of the primitive aortas ventral and dorsal to the foregut is called the ventral and dorsal aorta, respectively (4) (5) (6). Two ventral aortas fuse at the proximal end to form the aortic sac, and the rest of the ventral aorta remains as right and left aortic horns. A series of arterial arches appear in the pharyngeal arches, and these connect the aortic horn and the dorsal aorta. During further development, the 3rd arch forms the common carotid artery and the ICA (7).

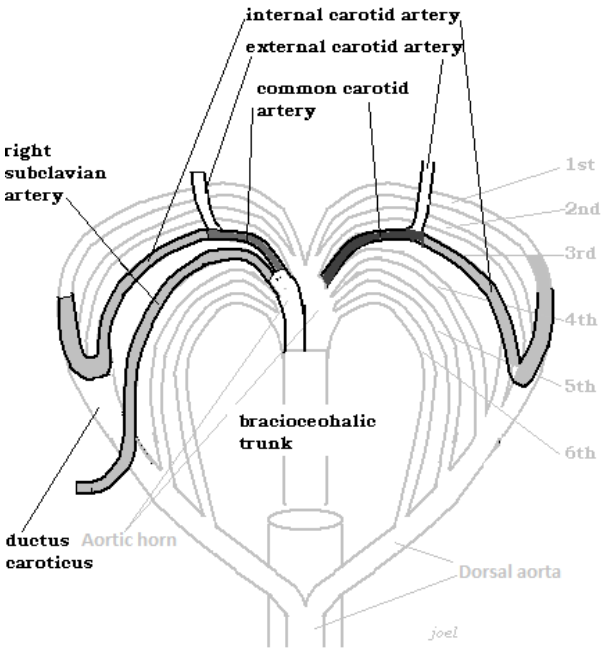

Figure 3: Embryonic development of the carotid arteries

In addition, the developing posterior part of the brain receives the blood supply from the neural arteries (future vertebral - VA and the basilar arteries). The VA receives the blood supply from a series of connections from the ICA. These connecting arteries are the trigeminal (TA), otic (OA), hypoglossal (HA), and the pro-atlantal (PA) arteries (8). During further development, these communicating arteries regress. Persistence of

these communicating arteries results in abnormal branching from the cervical ICA in adults. In adults, the persistent hypoglossal artery and the PA arise from the cervical ICA.

The PA has a horizontal course in the suboccipital region. The hypoglossal artery arises from the ICA and runs Posterosuperiorly and enters the cranial cavity through the condylar canal and connects with the VA. The persistent HA occur in 0.02% to 0.10% of individuals (9). The artery that was found in the above-described case is probably HA.

When the connecting arteries persist in adults, there can be associated hypoplasia or aplasia of the segments of the VA. Therefore, if these branches are ligated during carotid surgeries, ischemia of the posterior circulation of the brain can occur. Therefore, the awareness of the branches arising from the ICA is essential. These branches should always be preserved to prevent posterior circulation ischemia (10).

Author declaration

Acknowledgement
None.

Authors' contributions:
Conceptualisation and Design: JA, KPDJKG, RC; Writing – Original Draft: JA; Literature Review: JA; Image Preparation: JA; Writing – Review & Editing: JA, KPDJKG, RC.

Conflicts of interest:
The authors declare that there is no financial or non-financial conflict of interest.

Funding statement:
Self-funded.

Ethics statement:
Written informed consent was obtained from the patient before they participated in the case, ensuring their understanding of the purpose, procedures, and potential implications involved.

Statement on data availability:
Data, including the consent form, is available on request.

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