



# Assessment of three patients with major vascular variations in head and neck region by imaging and clinical findings

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Hanifi BAYAROGULLARI<sup>[1]</sup>

Yasar COKKESER<sup>[2]</sup>

Ercan AKBAY<sup>[2]</sup> ✦

Murat ALTAS<sup>[3]</sup>

Departments of Radiodiagnostics [1], Otolaryngology, Head and Neck Surgery [2] and Neurosurgery [3], Mustafa Kemal University School of Medicine, Antakya, TURKEY.



✦ Dr. Ercan Akbay  
Mustafa Kemal Üniversitesi  
Tıp Fakültesi  
KBB Anabilim Dalı, Serinyol  
Hatay, TURKEY.  
☎ +90 505 4975049  
✉ [ercanakbay@yahoo.com](mailto:ercanakbay@yahoo.com)

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## Abstract

We present three patients with vascular aberrancy in the location and course of the head and neck region accompanied by clinical findings and three-dimensional computed tomography scans. Devastating complications may result from a biopsy or surgical procedures in presence of such variations. Therefore, otolaryngologists should be careful and recognize them.

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**Key words** [internal carotid artery] [external carotid artery] [vertebral artery] [fistula] [malformation]

## Introduction

The purpose of this report is to review the imaging features and clinical significance in variations, especially course of the internal carotid artery (ICA) and major arterio-venous malformations of head and neck region. Such findings are extremely rare but, the awareness of these variations essential for otolaryngologists.

## Case Report

### Case 1

A 30-year-old woman was admitted with a complaint of abnormal sensation on throat and cough present for many years. She was known as suffering from chronic renal failure for 2 years. The physical examination revealed a mass without mucosal abnormality on the right lateral oropharyngeal wall (Figure 1a). The mass showed very little pulsation. Three-dimensional computed tomography (3D-CT) scans showed right tortuous internal carotid artery expanding to oropharynx (Figures 1b, 1c).

### Case 2

A 42-year-old man was referred to ENT clinic for evaluation of a mass on the left parotid region. No other complaint

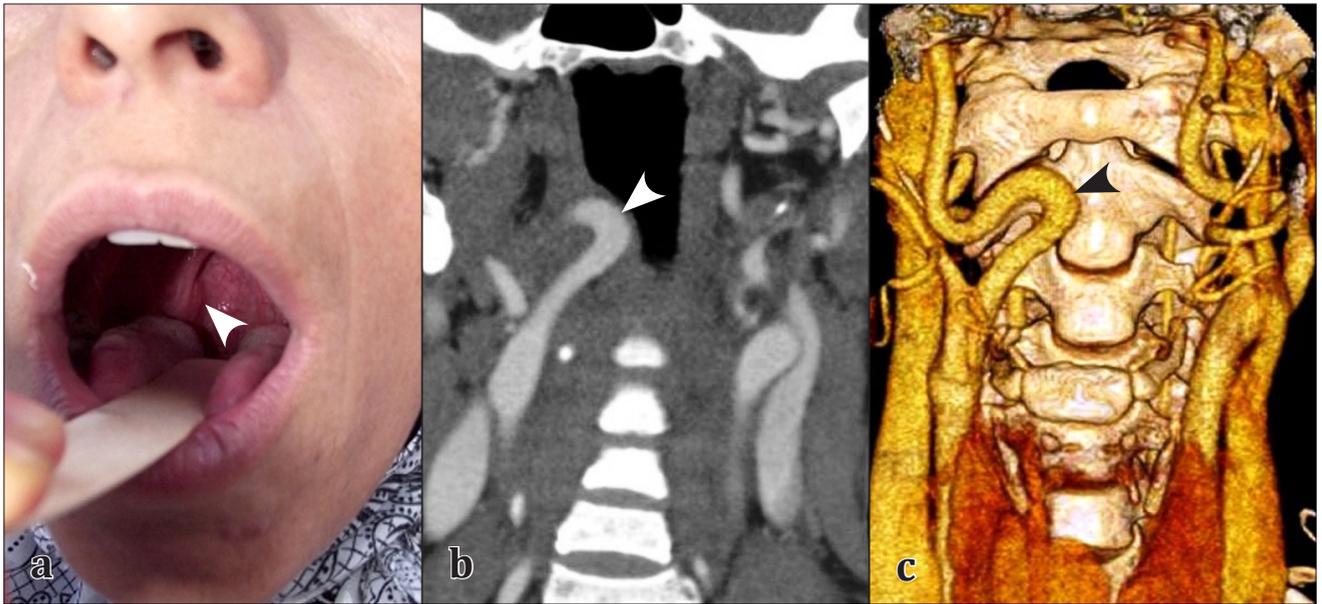
accompanied this swelling. The physical examination revealed a slight mass on the left side of the face. The mass showed very little thrill by auscultation. 3D-CT scans showed an arterio-venous fistula between internal jugular vein and maxillary artery on the left (Figures 2a, 2b). We observed tortuosity at the proximal part of both vessels because of this pathology. No treatment was offered.

### Case 3

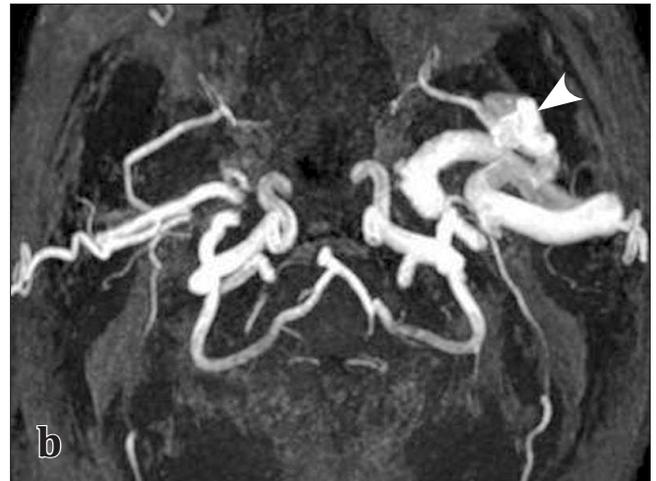
A 17-year-old boy was referred to ENT clinic for consultation from neurology department with a complaint to sudden fall down for 1–2 seconds. The physical examination was normal. 3D-CT scans revealed an unusual origin of the right vertebral artery from the right internal carotid artery (Figures 3a, 3b). At the same side vertebral artery was seen as rudimentary (Figure 3c). We informed the patient about this vascular variation and no treatment offered.

## Discussion

Anomalies of the ICA in the head and neck are rarely seen [1, 2]. Anatomical variants of the ICA have been reported with a large variability of pattern and degree [3]. In our case 1, there was no mucosal abnormality on the pharyngeal wall. But we have seen the pulsation of the ICA. We have



**Figure 1.** a) View of a mass on the lateral pharynx wall (*white arrowhead*). b) Coronal CT section. (*White arrowhead*: right tortuous internal carotid artery expanding to oropharynx) c) 3D-CT image showing the elongated internal carotid artery (*black arrowhead*) towards the right oropharynx wall.



**Figure 2.** a) 3D-CT image showing the fistula between internal jugular vein and maxillary artery on the left side (*black arrowhead*). b) Axial view of MR-angiography. (*White arrowhead*: fistula between internal jugular vein and maxillary artery)

suspected a vascular pathology and then this way confirmed by radiodiagnostic study. The aberrant and tortuous ICA is at high risk of injury during routine surgical procedures if the vessel is running near the pharyngeal wall. Tortuous ICA may cause a several morbidity or mortality during surgeries such as uvulopharyngoplasty, velopharyngeal surgery, routine tonsillectomy and drainage of peritonsillar abscess. These major vascular variations do not need any treatment if the patient does not have central vascular ischemic symptoms [4].



**Figure 3.** Anterior (a) and posterior (b) view of unusual course of the right vertebral artery (black arrowhead) from the right internal carotid artery (white arrowhead) by 3D-CT imaging. c) Rudimentary vertebral artery at the right side (white arrowhead).

Many times, giving the patients an information form make sure to show it to their doctors, especially before surgical operation is necessary [1].

The second case had an arterio-venous fistula between internal jugular vein and maxillary artery in the left infratemporal region. Most fistulas between major artery and vein are associated with sharp injury. But the patient claimed no history of previous injury or surgery to the neck. This fistula was thought to be congenital in nature. However, the genesis of this vascular variation remains uncertain. During the time the fast growing of left parotid side secondary to tortuosity of proximal part of vessels is possible. If otolaryngologists suspect this variation preoperatively, they

can prevent serious hemorrhage and unnecessary parotid surgery.

Third case had a variant vertebral artery in the origin and course. An unusual origin of the vertebral artery from the common carotid artery was reported by Chen et al. [5]. It occurs on the right or left side with complex embryonic mechanisms. Chan et al. discussed a congenital anastomosis between the vertebral artery and internal carotid artery [6]. Multiple variations in the origin of right vertebral artery have been reported in literature [7]. To best of our knowledge, a direct branching of the right vertebral artery from the right internal carotid artery as seen our case 3 has not been yet reported.

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