

## Rare Case of Left Internal and External Carotid Arteries Originating from the Aortic Arch

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### Abstract

There are many anatomic variations of the great vessels. We report a rare variant of absence of the left common carotid artery (LCCA) and separate origins of the internal carotid artery (ICA) and external carotid arteries (ECA) from the aortic arch.

**Keywords:** Aortic arch variation

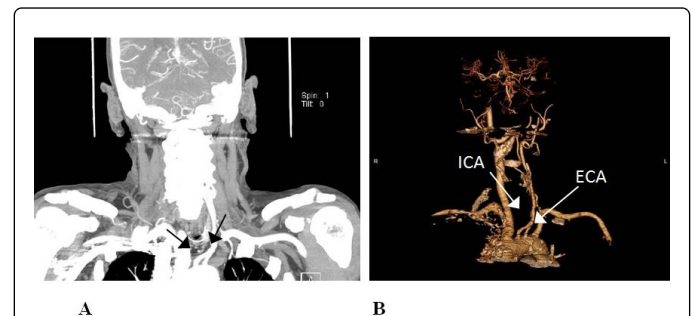
### Introduction

Normal development of the aorta occurs during the third gestational week, during which fusion of two dorsal aortae form the midline descending aorta and fusion of ventral aortic limbs form the aortic sac. The six-paired branchial arches develop into the functioning vessels of the aortic arch circulation. Variant anatomy occurs when segments of the bronchial arch persist that normally disappear, or when certain segments regress that normally remain [1]. In normal anatomy, the developed aortic arch gives off three branches: the brachiocephalic artery, the left common carotid artery, and the left subclavian artery. There are few common anatomical variations for example, failure of normal regression of the 4th arch vessels can lead to a double aortic arch or right sided aortic arch. Cases of bovine arch, thyroidea ima artery, variant origin of vertebral arteries and aberrant right subclavian artery are also common. In this case report, we describe a rare variant of absence of the left common carotid artery (LCCA) and separate origins of the internal carotid artery (ICA) and external carotid arteries (ECA) from the aortic arch.

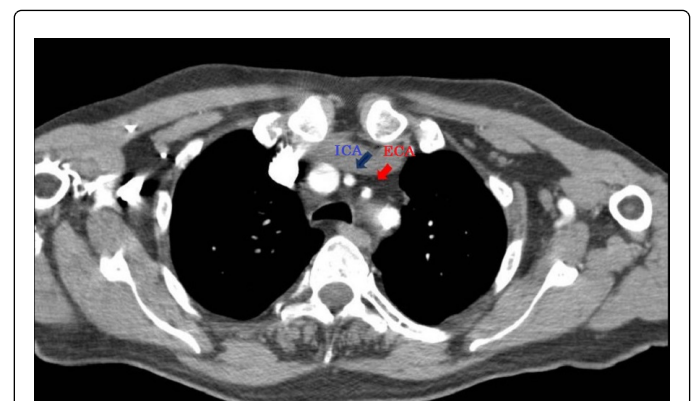
### Case Report

A 74 year old man was referred for neck computed tomographic angiography to evaluate a suspected right carotid aneurysm based on a prior neck CT. CTA showed absence of the left common carotid artery and separate ICA and ECA origins directly from the aortic arch. The ECA arose first and was larger in caliber than the ICA. The two vessels paralleled one another in the lower neck, ICA deviated medially behind the pharynx, and the ICA entered the carotid canal normally. The left carotid canal in the skull base was smaller than the right, corresponding to the smaller caliber of the left ICA compared to the right Figures 1 and 2.

The aortic arch, right carotid circulation, and intracranial posterior circulation were anatomically typical. The right vertebral artery was occluded below C6 and reconstituted by collaterals. The left vertebral artery was patent throughout the course.



**Figure 1:** A Coronal CTA image shows abnormal branching of the aortic arch, with the left internal (blue arrow) and external carotid (red arrow) arteries arising separately from the arch. B Coronal CTA image shows comparison of caliber between the right and left carotid circulations (internal carotid blue arrow and external carotid red arrow).



**Figure 2:** Axial CTA image demonstrates anomalous left carotid circulation. The left internal carotid artery (blue arrow) arises medial to the left external carotid artery (red arrow), both directly from the aortic arch.

## Discussion

Cases like the subject of this report are rare. In one previous report [2], a 38-year-old woman was found to have three branches of the aortic arch on magnetic resonance angiography (MRA): a normal brachiocephalic artery, a left ICA originating directly from the arch, and a common trunk for the left ECA and left subclavian artery. In another report [3], a 68-year-old woman was incidentally found to have an absent left CCA and independent ICA and ECA origins from the aortic arch on MRA, similar to this subject. Awareness of this and other unusual arterial anomalies is important because they are a potential source of confusion on CTA or MRA, and also on catheter angiography.

## Conclusion

We describe a rarely reported variant of absence of the left CCA and separate origins of the ICA and ECA from the aortic arch. We also need to be aware of Dolichocarotid which is atypical elongation,

angulations and undulations of the internal carotid artery [4] can mimic as branches of aortic arch. Awareness of this and other variants is important to avoid interpretative errors on both noninvasive vascular imaging and catheter angiography.

## References

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