

Stapedial Artery: An Enigma!

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Short Communication

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ABSTRACT

In the standard textbooks of human embryology, the chapters dealing with the pharyngeal arch arteries and their fate in adult life, describe the stapedial artery as representing the second arch artery. Any structure to be described as a “derivative” of a fetal structure, has to be present in the normal adult and there is no stapedial artery in “normal” adult human body. The stapedial artery appears transiently during fetal life before it regresses (involutes). This article attempts to discuss this anomalous description of a structure as a representative (in spite of its absence in healthy adults!) which seems to be continuing in certain textbooks and hence in teaching as well and wonders whether it is time to modify this much accepted view in the descriptive embryology.

INTRODUCTION

The embryologic development of the branchial system produces six paired aortic arches and corresponding arteries. These arches connect the dilated portion of the ventrally located truncus arteriosus, the aortic sac, to the dorsal aortas. The six arches develop in numerical order and all are not present at the same time.

The adult maxillary artery is described as representing the first arch artery and the stapedial artery is described as “derived” from the second arch artery [1, 2, 3, 4]. While the maxillary artery is very much present in the adult anatomy, the stapedial artery is conspicuous by its absence.

Review of Literature

- The first and second arches disappear early, but the dorsal end of the second gives origin to the stapedial artery, a vessel “which atrophies in humans” but persists in some mammals [5].
- Regarding the artery associated with each arch, the first and second arch arteries typically degenerate. A persistent stapedial artery is an example of failure of the second branchial arch artery to degenerate [6].
- The persistent stapedial artery refers to failure of regression of the stapedial artery [7].
- Only very rarely does the artery of the second arch persist, as the stapedial artery, and courses through the crura of the stapes [8].
- 5. The second arch artery, often vestigial, may persist as the stapedial artery, which is significant when encountered during stapes surgery [9].
- The artery of the second arch “may” persist as the stapedial artery [10].
- The first arch gives rise to the maxillary artery. The dorsal segment of the second arch forms the stapedial artery [11].

- Postembryonic persistence of the stapedia artery is rare. The stapedia artery may present as a pulsatile middle ear mass or may be found incidentally during middle ear surgery. The presence of a persistent stapedia artery (PSA) may be recognized with plain radiography [12].

DISCUSSION

Terms like “derived” or “representative” understandably indicate a fetal structure persisting in adults with some modifications. The classical description of ligamentum arteriosum as a “representative” of fetal ductus arteriosus and the fetal left umbilical vein “persisting” as ligamentum teres hepatis can be quoted as examples among several others.

As there is no stapedia artery in normal adults, it may not be described as a derivative or representative of the second arch artery. A persistent stapedia artery is a pathological condition.

CONCLUSION

The second arch artery becomes the hyoid artery. The hyoid artery is prominent in early development and normally “persists” as the carotico tympanic branch of the internal carotid artery [12].

The dorsal stem of the original second arch artery remains as one or more carotico tympanic branches of the internal carotid artery. The carotico tympanic branches of internal carotid artery qualify to be the representatives of the second arch artery.

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