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ATYPICAL ORIGIN OF ARTERIA CAROTIS COMMUNIS SINISTRA

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The most frequent variation of the origin of a. carotis communis sinistra is its common trunk with truncus brachiocephalicus, or as a branch arising from the truncus.

The aim of this study was to present the variation of the origin of a. carotis communis sinistra from the aortic arch.

The examination was made on 110 unselected human hearts without pathoanatomical changes, obtained after autopsy of newborns, fixed in 10% formaldehyde, at the Institute of Anatomy, Medical Faculty, Skopje. The hearts were taken with the aortic arch, proximal part of thoracic aorta and lig. arteriosum.

Standard anatomical methods, inspection and dissection, were used for analyzing the origin of a. carotis communis sinistra from the aortic arch.

The awareness of vascular variations is imperative in diagnostic procedures and in planning surgical interventions during clinical practice.

Key words: aortic arch, a. carotis communis sinistra, anatomy, variations

Introduction

Anatomic variations of the aortic arch and its branches are well documented as seen during autopsies, anatomical and clinical studies. The most common pattern in the origin of the great vessels of the aortic arch as described in standard anatomical texts is where the truncus brachiocephalicus is the first and the largest vessel arising from the aortic arch, followed by a. carotis communis sinistra and a. subclavia sinistra [1, 2]. The three branches may arise from the beginning of the arch or the upper part of the ascending aorta. Variations in their origins, with reducing or increasing of the number of aortic arch branches, are not unusual. The most frequent variation of the origin of a. carotis communis sinistra is its common trunk with truncus brachiocephalicus, or as a branch arising from the truncus [1, 2].

The knowledge of the morphological features and topographic relations of the aortic arch branches is very important in everyday clinical practice. It is indispensable in the correct interpretation of diagnostic imaging methods, in applying the invasive diagnostic and interventio methods and in successful surgical interventions in upper mediastinum.

The aim of this study was to present the variation of the origin of a. carotis communis sinistra from the aortic arch.

Material and Methods

The examination was made on 110 unselected human hearts without pathoanatomical changes, obtained after autopsy of newborns, fixed in 10% formaldehyde, at the Institute of Anatomy, Medical Faculty, Skopje. The hearts were taken with the aortic arch, proximal part of thoracic aorta and lig. arteriosum.

Standard anatomical methods, inspection and dissection, were used for analyzing the origin of a. carotis communis sinistra from the aortic arch.

Results

The examinations showed that 4 (3.6%) of the cases had atypical origin of a. carotis communis sinistra from common trunk with truncus brachiocephalicus, and reduction of the aortic arch branches in two (Fig. 1 and 2).

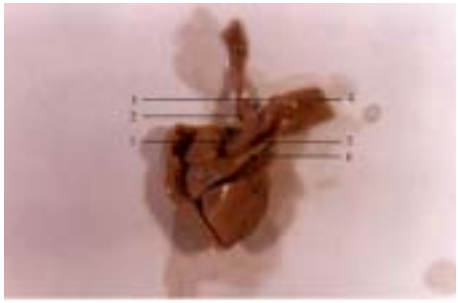

Fig. 1. Common trunk of truncus brachiocephalicus and a. carotis communis sinistra
1. arcus aortae; 2 common trunk of truncus brachiocephalicus and a. carotis communis sinistra; 3. a. subclavia sinistra; 4. aorta descendens; 5. ductus arteriosus; 6.truncus pulmonalis.

Fig. 2. Common ostium of truncus brachiocephalicus and a. carotis communis sinistra
1. Common ostium of truncus brachiocephalicus and a. carotis communis sinistra; 2. ostium of a. subclavia sinistra; 3. lig. arteriosum

Discussion

Anatomic variations of the aortic arch branches are caused by the changes occuring during the development of the embryonic aortic arches. The changes in the development of the third embryonic aortic arch result with anomalies of truncus brachiocephalicus and a. carotis communis sinistra [2,3, 4].

According to Gray's anatomy [2], primary branches may be reduced to one, more commonly two, a. carotis communis sinistra arising from the truncus brachiocephalicus (7%), or a. carotis communis and a. subclavia arising from a truncus brachiocephalicus sinister or a. carotis communis dextra and a.subclavia dextra arising separately, in which case the latter, more often branches from the left end of the arch and passes behind the esophagus. Very rarely, external and internal carotid arteries arise separately, the a. carotis communis being absent on one or both sides; or both carotids and one or both vertebral may be separate branches. In case of right aorta, the arrangement of its three branches is reversed. The common carotids may have a single trunk, the subclavians separate, right arising from the left end of the arch.

An analysis of variations in branches from 1000 aortic arches (Anson 1963) showed in 65% the usual pattern; in 27% a. carotis communis sinistra shared the truncus brachiocephalicus; in 2.5% the four large arteries branched separately. The remaining 5% showed a great variety of patterns, the commonest (1.2%) being symmetrical right and left truncus brachiocephalicus [2].

According to Grant the most common variations, which represent 73% of all variations of the number of the aortic arch branches, are common trunk of truncus brachiocephalicus and a. carotis communis sinistra (15%), and arising of a. carotis communis sinistra from truncus brachiocephalicus (7%). Other variations are arising of a. subclavia sinistra from common carotid trunk; left or right brachiocephalic trunk; truncus brachiocephalicus giving rise to a. carotis communis sinistra and a. subclavia sinistra; separate arising of all three branches (without truncus brachiocephalicus) [5].

An analysis made by Saadoon Kadir showed that 70% of population had the usual pattern of the aortic arch. The most frequent variation was arising of truncus brachiocephalicus and a. carotis communis sinistra from the common trunk (22%). About 6% of analyzed cases had separated arising of a. vertebralis sinistra. Left and right common carotid arised together in 1% of cases, and less than 1% (0.1%) have separated arising of all three branches [6, 7].

According to Moore the common trunk for truncus brachiocephalicus and a. carotis communis sinistra is the most frequent variation (11%) [1].

Despite the fact that variations of the aortic arch branches are usually asymptomatic, they may cause dyspnea, dysphagia, intermittent claudication, misinterpretation of radiological examinations and complications during neck and thoracic surgery. Furthermore, these variations may be accompanied by other congenital abnormalities [4, 8, 9, 10].

In conclusion, awareness of vascular variations, especially in this region, is imperative in diagnostic procedures and in planning surgical interventions during clinical practice.

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