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MORPHOLOGY OF THE BRACHIOCEPHALIC TRUNK IN JACKAL (*CANIS AUREUS*)

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Abstract: Cadavers of nine jackals were dissected within the laboratory of anatomy of the Faculty of Veterinary Medicine of Timisoara. The first branch that arises from the ascending aorta is the brachiocephalic trunk, and the next is the left subclavian artery. The two left and right common carotid arteries arise from the brachiocephalic trunk. The left common carotid artery is the first to detach, approximately next to the first intercostal space, followed by the right carotid artery and later by the right subclavian artery from which the internal thoracic, vertebral and costocervical trunk arteries detach.

The right subclavian artery leaves the thoracic cavity at the level of the cranial aperture of the chest, curves caudo-ventro-laterally, heading towards the axillary fossa, and continue as the axillary artery. Cranially, the superficial cervical artery and caudally the external thoracic artery come off from it.

Introduction

In all mammals the aorta arises from the left ventricle at the level of the aortic bulb than it raises dorsally to curve in the caudal direction forming the aortic arch. Beneath the body of the T₁₁-T₁₂ the descendant aorta extends caudally to the aortic hiatus of the diaphragm as the thoracic aorta, lying on the left side of the ventral aspect of the thoracic vertebrae. In the carnivores within the cranial mediastinum from the aortic arch detaches the brachiocephalic trunk which continues cranially with the left and right common carotid arteries. On the left side of the trunk arises the left subclavian artery, while the right subclavian artery detaches close to the cranial aperture of the thorax.

Material and method

Within the laboratory of Anatomy department from the Faculty of Veterinary Medicine of Timisoara the brachiocephalic trunk and its branches from cadavers of nine jackals were dissected. Histopathological examination of the brachiocephalic trunk and subclavian arteries was made too. All biosecurity measures were respected during the dissection.



Fig. 1. Brachiocephalic trunk in jackal and the origin of the left common carotid artery, ventral view
1. Left common carotid a.; 2. Left subclavian a.; 3. Right common carotid a.; 4. Right subclavian a.; 5. Brachiocephalic trunk; 6. Trachea; 7. First rib; 8. Esophagus; 9. Right auricle; 10. Right ventricle

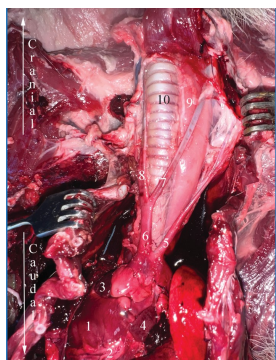


Fig. 2. Internal conformation of the heart in the jackal
1. Right ventricle; 2. Left ventricle; 3. Right auricle; 4. Left auricle; 5. Left subclavian artery; 6. Brachiocephalic trunk; 7. Left common carotid artery; 8. Right common carotid artery; 9. Esophagus; 10. Trachea;

Results and discussions

The first branch that arises in the cranial direction from the ascending aorta is represented by the brachiocephalic trunk, while more distocaudally initiates the left subclavian artery. After the place of origin of the brachiocephalic trunk, the aorta curves caudo-dorsally, forming the arch of the aorta and will continue as the descending aorta. From the brachiocephalic trunk (Fig. 1) separates the two left and right common carotid arteries, thus the bicarotid trunk is absent.

The left common carotid artery is the first to detach, approximately next to the first intercostal space, followed by the right carotid artery and later by the right subclavian artery from which the internal thoracic, vertebral and costocervical trunk arteries will detach.

The right subclavian artery leaves the thoracic cavity at the level of the cranial aperture of the chest, curves caudo-ventro-laterally, heading towards the axillary fossa where continues as the axillary artery. Cranially, the superficial cervical artery and caudally the external thoracic artery issue from it

The left common carotid artery crosses the ventral aspect of the trachea, turning cranio-laterally to the left to heading into the left jugular groove, while the right common carotid artery follows cranio-laterally to the right, but more distal in the right jugular groove.

The two common carotid arteries, immediately at the origin, give off the caudal thyroid artery which crosses the lateral face of the trachea to distribute to the caudal portion of the thyroid gland and, on its trajectory give off tracheal, esophageal muscular branches which are very thin (Fig. 2).

In the cranial mediastinum, the left subclavian artery crosses the ventral face of the trachea and esophagus, turning cranio-laterally to the left to leave the thoracic cavity at the level of the cranial aperture of the thorax. Upon exiting the thoracic cavity, it curves caudo-ventro-laterally to the left and continues at the level of the axillary region as the axillary artery. Before leaving the thoracic cavity the left subclavian artery gives off the internal thoracic, costocervical and vertebral trunk. From the left axillary artery, the superficial cervical artery branches more cranially than in the right side, while the external thoracic artery comes off caudally.

In Fig. 3 and 4 is presented the histopathological structure of the common carotid artery: the intima marked with L3 with a thickness of 240 µm, the tunica media marked with L2 with a thickness of 221 µm and the adventitia marked with L1 with a thickness of 70 µm. The architecture of the wall of the common carotid and subclavian arteries in the jackal is similar to other domestic animals as reported in the literature.

Thus, at the level of this layer, an overlap of collagen fibers and lamellae with longitudinal, transverse and oblique arrangements was usually noted. Elastic fibers and lamellae also showed a variable pattern, with an apparent predominance of longitudinal dispositions, followed by connections between collagen and elastic fibers. The presence of collagen-elastic connections and the different spatial arrangements of connective fibers observed in the adventitia contribute to maintaining the integrity of the vascular wall and to its mechanical protection, as was similarly reported for the structure of the aorta.

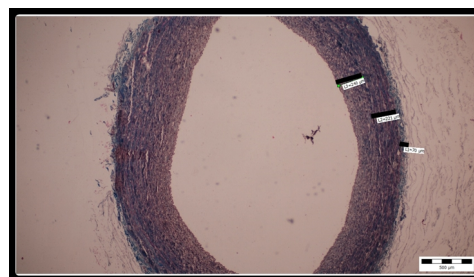


Fig. 3. Common carotid artery in the jackal, col. HEA, obj.x4 - intima (yellow), tunica media (orange), adventitia (green), vasa vasorum (dotted boundaries)

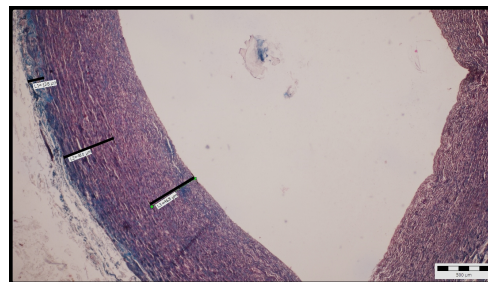


Fig. 4. Right subclavian artery in jackal - (col. HEA, obj. x4)
the intima labeled with L3 with a thickness of 468 µm, the tunica media labeled with L2 with a thickness of 480 µm and the adventitia labeled with L1 with a thickness of 138 µm.

Conclusions

The dissections of the brachiocephalic trunk in jackal showed a significant branching of arteries according with specie. The left subclavian artery detached distocaudally, while the right subclavian artery and the two common carotid arteries craniodorsal.

Since in the literature there are not found measurements of the wall of the branches of brachiocephalic trunk it is difficult to make a certain comparison with other carnivores. Gaps in the current knowledge include the comparative studies between the domestic and wild mammals. Further investigations are required for establishment of this purpose.