

A macroanatomical study of the arcus aortae in the fox (*Vulpes vulpes*)

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Abstract: The present study was aimed at the investigation of the anatomy of the arcus aortae in 5 adult female foxes. It was determined that 2 main arteries, namely the truncus brachiocephalicus and arteria subclavia sinistra, originated from the fifth intercostal space at the arcus aortae. It was ascertained that, firstly, the arteria carotis communis sinistra stemmed from the truncus brachiocephalicus, and the continuation of the artery bifurcated into the arteria subclavia dextra and arteria carotis communis dextra. The first branch, which had its origin at the arteria subclavia sinistra, was the arteria vertebralis. Further along its course, the artery gave off the truncus costocervicalis, arteria thoracica interna, and arteria cervicalis superficialis. It was observed that the arteria subclavia dextra gave off the same branches with the arteria subclavia sinistra. Both arteriae subclaviae, after giving off the branches described above, left the thoracic cavity as the arteria axillaris. The results of the present study are expected to contribute to the body of knowledge in the field of anatomy.

Key words: Arcus aortae, fox

1. Introduction

The arcus aortae, which displays a craniodorsal curvature within the cavum thoracis, supplies the head, neck, front extremities, and the proximal half of the thorax (1–3). In Equidae and Ruminantia, only the truncus brachiocephalicus stems from the arcus aortae (2–4). On the other hand, in carnivores and the *Sus*, the truncus brachiocephalicus and arteria subclavia sinistra originate from the arcus aortae (1–5). Several studies are available on the arcus aortae and its branches for rabbit (6,7), chinchilla (8), guinea pig (9), squirrel (10), and hedgehog (11). To the authors' knowledge, no previous study exists on the arcus aortae and its branches in the fox. In this respect, the present study was aimed at contributing to anatomical literature by providing data on the arcus aortae and its branches in the fox.

2. Materials and methods

In the present study, 5 adult female foxes, which died due to car accidents, were examined. After the animals were brought to the laboratory, the abdominal cavity of the foxes was opened by a median cut extending from the distal end of the processus xiphoideus to the proximal aspect of the os pubis. The tissues were fixed in 10% formaldehyde solution. The dissected materials were imaged using a Fujifilm Finepix S5700 model camera. The terminology of *Nomina Anatomica Veterinaria* (12) was followed.

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3. Results

It was determined that the localization of the arcus aortae (Figure 1) within the thoracic cavity extended from the aortae descendens at the level of the fifth costae to the level of the seventh costae. During its course, it was observed that the arcus costae displayed a craniodorsal curvature. It was determined that 2 main arteries originated from the arcus aortae at the level of the fifth intercostal space, namely the arteria subclavia sinistra (Figures 1 and 2) and the truncus brachiocephalicus (Figures 1 and 2). In 1 of the cadavers examined, these 2 main arteries were determined to stem from a common root on the arcus aortae.

In the present study, it was determined that the first branch that ramified from the arteria subclavia sinistra was the arteria vertebralis (Figure 2). Along its further course, the artery was observed to yield off to the truncus costocervicalis (Figure 2), arteria cervicalis superficialis (Figure 2), and arteria thoracica interna (Figure 2). It was ascertained that the arteria subclavia dextra (Figure 3) gave off the same branches with the arteria subclavia sinistra. It was seen that arteria thoracica interna (Figure 3) and arteria vertebralis (Figure 3) were ramified from the arteria subclavia dextra mutually and along its course the artery branched off into the truncus costocervicalis (Figure 3) and arteria cervicalis superficialis (Figure 3). It was observed that following the above-mentioned branches, both arteriae subclaviae left the thoracic cavity as the arteria

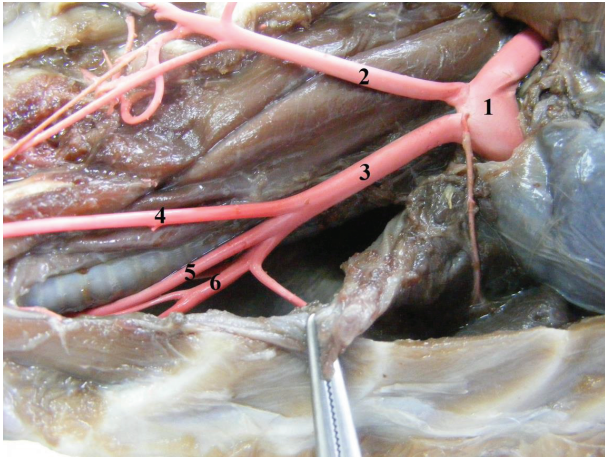


Figure 1. 1) Arcus aortae, 2) arteria subclavia sinistra, 3) truncus brachiocephalicus, 4) arteria carotis communis sinistra, 5) arteria carotis communis dextra, 6) arteria subclavia dextra.

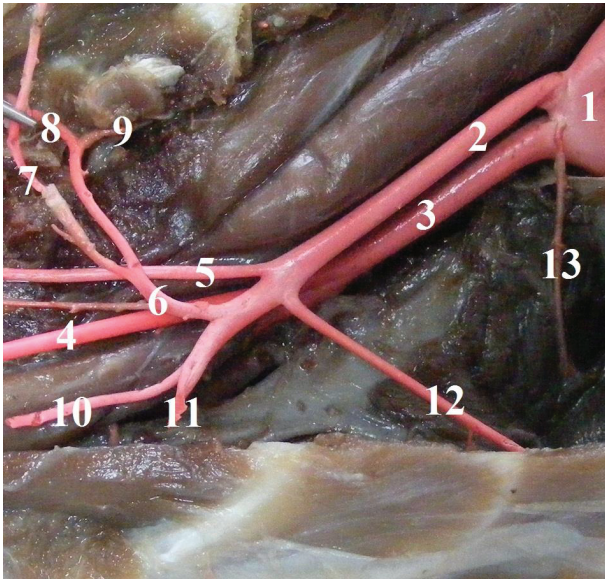


Figure 2. 1) Arcus aortae, 2) arteria subclavia sinistra, 3) truncus brachiocephalicus, 4) arteria carotis communis sinistra, 5) arteria vertebralis, 6) truncus costocervicalis, 7) arteria cervicalis superficialis, 8) arteria thoracica interna, 9) arteria axillaris, 10) arteria scapularis dorsalis, 11) arteria cervicalis profunda, 12) arteria vertebralis thoracica, 13) rami thymici.

axillaris (Figure 2,3). Arteria scapularis dorsalis (Figures 2 and 3), arteria cervicalis profunda (Figure 2, 3), and arteria vertebralis thoracica (Figures 2 and 3) stemmed from the truncus costocervicalis. It was determined that rami thymici (Figure 2) was ramified from the arteria thoracica interna. In one of the specimens, the rami thymici was detected to be ramified just from the beginning of truncus

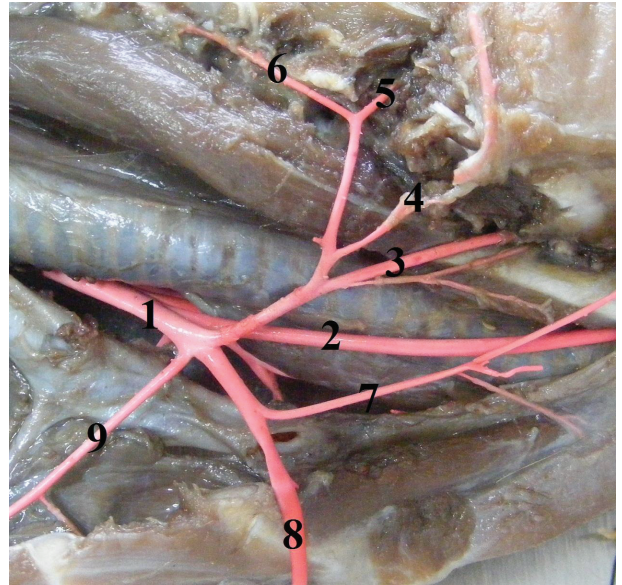


Figure 3. 1) Arteria subclavia dextra, 2) arteria carotis communis dextra, 3) arteria thoracica interna, 4) arteria vertebralis, 5) truncus costocervicalis, 6) arteria cervicalis superficialis, 7) arteria cervicalis profunda, 8) arteria vertebralis thoracica, 9) arteria axillaris, 10) arteria scapularis dorsalis.

brachiocephalicus. In one of the specimens examined, it was observed that after ramifying from the arcus aortae, the first branch given off by the arteria subclavia sinistra was the common root of the arteria vertebralis, truncus costocervicalis, and arteria cervicalis profunda. In another specimen the truncus costocervicalis and arteria vertebralis were ramified from the arteria subclavia dextra with a common root. Furthermore, in one specimen, the arteria vertebralis and truncus costocervicalis were ramified parallel with each other from the arteria subclavia dextra just across from the arteria thoracica interna. First the arteria carotis communis sinistra (Figures 1 and 2) is given off by the truncus brachiocephalicus, and after that the truncus divides into the arteria subclavia dextra (Figures 1 and 3) and arteria carotis communis dextra (Figures 1 and 3).

4. Discussion

It was observed that the arcus aortae curved craniodorsally, as reported in the literature (3,13). It has been reported that in Ruminantia and Equidae, only the truncus brachiocephalicus is given off by the arcus aortae (2-4). However, Atalar et al. (11) in the hedgehog and Oto et al. (14) in the spiny mouse reported that 3 main arteries stemmed from the arcus aortae, namely the truncus brachiocephalicus, arteria carotis communis sinistra, and arteria subclavia sinistra. Similar to the fox, it was reported for the guinea pig (9,15), rabbit (6,7), chinchilla

(8), squirrel (10), and Kangal dog (13) that the truncus brachiocephalicus and arteria subclavia sinistra originate from the arcus aortae.

Previous literature reports (3,5) indicate that, in Ruminantia and Equidae, the truncus brachiocephalicus first gives off the arteria subclavia sinistra, and immediately afterwards, the arteria subclavia dextra. It has been reported that, in Carnivora, first the arteria carotis communis sinistra is given off by the truncus brachiocephalicus, and the continuation of the artery bifurcates into the arteria carotis communis dextra and arteria subclavia dextra (1,3). Furthermore, in the genus *Sus*, it has been ascertained that the truncus brachiocephalicus divides into the truncus bicaroticus and arteria subclavia dextra (3). In reports by Atalar et al. (11) and Oto et al. (14), it was stated that in the hedgehog and spiny mouse the arteria subclavia dextra and arteria carotis communis dextra have their origin at the truncus brachiocephalicus. Furthermore, previous studies report that, in the guinea pig (9,15), rabbit (7), chinchilla (8), squirrel (10), and Kangal dog (13), initially the arteria carotis communis sinistra is given off by the truncus brachiocephalicus, and later the artery divides into the arteria subclavia dextra and arteria carotis communis dextra. In the present study, it was observed that the ramification of the truncus brachiocephalicus in the fox

was similar to that in the guinea pig, rabbit, chinchilla, squirrel, and Kangal dog.

In the present study, the first branch that arose from the arteria subclavia sinistra was the arteria vertebralis. During its course, the artery gave off the truncus costocervicalis, arteria cervicalis superficialis, and arteria thoracica interna. The arteria subclavia dextra gave off the same branches with the arteria subclavia sinistra. After giving off the above-mentioned branches, both arteriae subclaviae left the thoracic cavity as the arteria axillaris. These findings are similar to those reported for the rabbit (7) and Kangal dog (13). In agreement with the report of Evans (1), it was determined that the arteria scapularis dorsalis, arteria cervicalis profunda, and arteria vertebralis thoracica stemmed from the truncus costocervicalis. Ramification of the rami thymici from the arteria thoracica interna was consistent with the literature (1,3,13).

To summarize, the present study is the first description of the macroanatomical investigation of the arcus aortae in the fox (*Vulpes vulpes*). The present study has demonstrated that the ramification of the arcus aortae in the fox displays similarity to that in guinea pig, rabbit, chinchilla, squirrel, and Kangal dog. The results of the present study are expected to contribute to anatomy by providing data on an untouched subject.

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