Computed tomographic angiographic study of common carotid artery anatomic relationships in the dog

Jenna Feyler, Etienne Côté, Susan Dawson and Chick Weisse

Departments of Companion Animals (Côté) and Biomedical Sciences (Dawson), Atlantic Veterinary College (AVC), University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada

Department of Interventional Radiology and Endoscopy (Weisse), Schwarzman Animal Medical Center, New York, NY

Although the common carotid arteries and brachiocephalic trunk are essential to the arterial system in dogs, little is known about their “normal” anatomic pathway. Current research has focused on the variations of branching patterns of these vessels, but no study has yet quantified these vessels’ spatial relation to each other and other anatomic structures that cross the thoracic inlet such as the trachea. Computed tomographic (CT) images from the Atlantic Veterinary College database were selected utilizing inclusionary criteria; the animal is a dog that received radiopaque contrast and underwent both thoracic and neck/cervical CT imaging on the same day between July 2nd 2020 - June 17th 2022. Dogs were excluded on the basis of having any lesions or if the animals positioning was perceived to alter the anatomic positioning of internal structures. Currently, 20 CT studies from dogs of various breeds are being evaluated utilizing open source software (https://horosproject.org) to evaluate brachiocephalic trunk length, inter-carotid distance, thoracic inlet height and width, and the vertebrae at which vessels are directly lateral and directly ventral to the trachea. Additional components of the software such as 3D image rendering and 2D orthogonal multiplanar reconstruction (MPR) are being utilized to increase the accuracy of measurements. Our hypotheses are that there will be variation between the vessel spatial distance and length, and that these variations can be detected applying the methods previously described. The data from this study may be utilized for surgical procedures and as an identification tool for anatomical variations which may be associated with pathophysiological conditions.

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