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We read with interest the letter "Common Origin of Brachiocephalic and Left Common Carotid Arteries: Proposal of New Terminology."[1] The authors describe the variations in the origins of arch vessels, including the common origin of the brachiocephalic trunk and left common carotid artery, and propose a new terminology.

The most common variation in aortic arch branching seen is the common origin of brachiocephalic trunk and left common carotid artery commonly called the "bovine arch." The bovine arch (in cattle) bears no resemblance to this branching pattern described in humans.[2] The aortic arch in cattle gives rise to a large trunk, which gives off a bicarotid trunk and both subclavian arteries. The embryologic basis of variations in aortic arch branching in humans can be explained by the aberrations in the 6 embryonic aortic arches. The true bovine aortic arch in humans, which presents a common trunk further branching into the bilateral carotid and subclavian arteries, can be explained by the persistence of the embryonic fifth aortic arch along with involution of the embryonic fourth aortic arch distal to the left subclavian artery.[3,4] The common origin of the brachiocephalic trunk and the left common carotid artery (erroneously called the "false bovine aortic arch") results from the involution of the embryonic fourth aortic arch between the left common carotid artery and the left subclavian artery with a persistent embryonic fifth aortic arch. The second most common variation of aortic arch branching in our Indian population is a separate origin of the left vertebral artery from the aortic arch, which can also be described as a 4-vessel origin from the aortic arch.

The reverse pattern of a common origin of the brachiocephalic trunk and left common carotid artery may be seen in patients with a right aortic arch in whom there may be a common origin of left brachiocephalic trunk and right common carotid artery. This is a commonly seen association in patients with tetralogy of Fallot with a right aortic arch. The bicarotid trunk is basically a common origin of the brachiocephalic trunk and left common carotid artery combined with a variation in the development of the right subclavian artery, in which the right subclavian artery, instead of originating from the brachiocephalic trunk, takes its origin from a bulbous dilation from the proximal descending thoracic aorta. This is due to the involution of the embryonic right fourth aortic arch and persistence of the embryonic proximal right dorsal aorta and seventh intersegmental artery.[5] The bulbous dilation of the embryonic proximal right dorsal aortic component is called the Kommerell diverticulum.

Finally, the authors propose a new terminology for the common origin: "brachio-bicephalic trunk" for its brevity and anatomic correctness. The term "bicephalic" in Latin means having 2 heads.[6] Hence, we think that the term "brachio-bicarotid trunk" may be more appropriate for describing this pattern of aortic arch branching.[7]

REFERENCES

1. Tawfik AM, Sobh DM, Batouty NM. **Common origin of brachiocephalic and left common carotid arteries: proposal of new terminology.** *AJNR Am J Neuroradiol* 2018;39:E86–87 CrossRef Medline
2. Budras KD, Habel RE. **Thoracic cavity.** In: Budras KD, Habel RE. Mülling CK, et al. *Bovine Anatomy: An Illustrated Text*. Hanover: Schlutersche; 2003:62–65
3. Layton KF, Kallmes DF, Cloft HJ, et al. **Bovine aortic arch variant in humans: clarification of a common misnomer.** *AJNR Am J Neuroradiol* 2006;27:1541–42 Medline
4. Naimo PS, Vazquez-Alvarez MC, d'Udekem Y, et al. **Double-lumen aortic arch: persistence of the fifth aortic arch.** *Ann Thorac Surg* 2016; 101:e155–56 CrossRef Medline
5. Kommerell B. **Verlagerung des Osophagus durch eine abnorm verlaufende Arteria subclavia dextra (arteria lusoria).** *Fortschr Geb Rontgenstr Nuklearmed Erganyungsband* 1936;54:590–95
6. American Heritage Publishing Company. *American Heritage Dictionary of the English Language*. 5th ed. Boston: Houghton Mifflin; 2016
7. Szpinda M. **Morphometric study of the brachiobicarotid trunk in human fetuses.** *Ann Anat* 2007;189:569–74 Medline

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