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The Common Brachiocephalic Trunk In Cadaveric Studies In Nigeria

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ABSTRACT

Normally the brachiocephalic trunk arises from the convexity of the arch of the aorta and terminates by given two branches, the right subclavian and right common carotid arteries. The left common carotid and left subclavian arteries arise as separate branches from the aortic arch. Variations in this arrangement including a common brachiocephalic trunk have been reported in literature outside Africa. Studies from the African continent are still scanty. Some of these variations are associated with other congenital cardiac malformations and of clinical significance. This report documented the observation from 50 cadavers dissected during the period between 2004 to 2009. In one cadaver, only two vessels were seen to originate from the arch of the aorta. The first big trunk gave off the left common carotid artery 1.3 cm from the arch and then divided after another 1.7 cm into two, right common carotid and right subclavian arteries. The vessel was therefore named the common brachiocephalic trunk. The other branch from the arch was the left subclavian artery. The common brachiocphalic trunk is present in 2% of adult Nigerian cadavers.

Key words: Common brachiocephalic trunk, Arch of the aorta, Cadaver, vascular malformations, congenital heart defects.

Embryologically, the vascular system begins to develop in the 3rd week of intrauterine life when the nutrition needs of the embryo can no longer be satisfied by diffusion alone (Salder 2000). It is the first system to start functioning in the embryo (Keith 1988, Williams 1999). Incidentally, because of its complex developmental processes, the arch of the aorta and vessels arising from it are associated with diverse anomalies/ developmental defects.

Usually three vessels arise from the arch of the aorta, the brachicephalic trunk, right internal carotid artery and right subclavian artery in that order from right to left. Normally the brachiocephalic trunk arises as the first branch from the convexity of the arch of the aorta and end by dividing into the right subclavian and right internal carotid arteries (Williams 1999, Bregman 1984). Variations have been reported of this normal arrangement and the percentages varied widely (Williams 1999, Bregman 1984, MostKowitz 2003, Whitaker 1998). Some of those anomalies present with symptoms that sometimes required surgical interventions. Some are discovered incidentally during radiological studies/ interventions or during surgery where it is important to distinguish them from serious pathology.

The percentages usually quoted are mostly in literature from other countries. We are not aware of studies on the variations concerning the vessels arising from aortic arch or common branchiocephalic trunk from Nigeria. We have been observing at the pattern of vessels arising from the arch of aorta and branchiocephalic trunk in our cadeavers. Dissection over the past six years and the findings concerning a common branchiocephalic trunk is hereby presented.

MATERIALS AND METHODS

The setting is anatomy dissection hall of the faculty of Basic Medical sciences Nnamdi. Azikiwe University, Nnewi Campus.

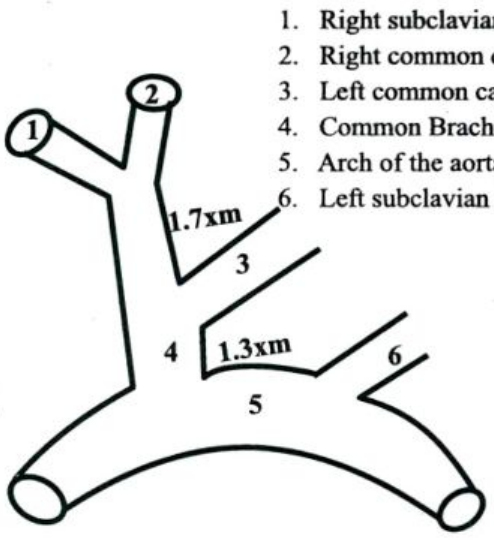
Dissection of cadavers used in the teaching of medical students over the six-year period 2004-2009 were studied. The pattern of vessels arising from the arch of the aorta and the brachiocephalic trunk were documented. Fifty

cadavers were studied over the period under review.

RESULTS

A total of fifty (50) cadavers were studied. In one of the cadavers, only two branches were seen arising from the arch of the aorta: a common branchiocephalic trunk and the left subclavian artery. The common brachiocephalic trunk gave off the left common carotid artery branch 1.3 cm from the aortic arch and then divided in to the two terminal branches of right common carotid and right subclavian arteries 1.7 cm from that point (3cm from arch of the aorta). The findings are shown both diagrammatically and pictorially (fig. 1).

Fig. 1 A: Common brachiocephalic trunk in Nnewi



1. Right subclavian artery
2. Right common carotid artery
3. Left common carotid artery
4. Common Brachipcephalic trunk
5. Arch of the aorta
6. Left subclavian artery.

Fig 1B: Diagrammatic representation of the common brachiocephalic truck

DISCUSSION

Normally the arch of the aorta gives off three large braches-Brachiocephalic trunk which ends by dividing in to two: right subclavian and right common carotid arteries, the left common carotid and the subclavian arteries. Variations in this normal arrangement have been reported and varied widely (Williams 1999, Mostkowitz 2003). A common brachiocephalic trunk is an anatomic variant in which both common carotid arteries and the light subclavian artery arise via a single trunk (Whitaker 1998). While Moskowitz and Topaz reported a 3.2% of common brachiocephalic trunk in studies of 1480 cardiac catherizations (Whitaker 1998), Bergman, (1984) reported 10% in 500 studies. Williams(1999) reported 7% in heir studies but quoted a study that contrasted sharply with others as 27% (Anson 1963). In our study, 2% of the cadavers studied showed the variant of a common brachiocephalic trunk. This agrees with more recent study from cardiac catheterizations and closer to the other studies of 7-10%. However, those reported percentages are from outside Nigeria. We are not aware of any study yet in either living humans or cadavers in Nigeria on the common brachiocephalic trunk or the branching pattern of vessels arising from the arch or the aorta.

Congenital abnormalities of the heart, arch of the aorta and thoracic vascular system are common. Some are compatible with life while some are not. Some present with symptoms usually in childhood that may require surgical intervention while some remain astymptomatic and are discovered incidentally either during radiological studies or intervention for other problems or surgery. In these cases it is important to recognize and distinguish them from any serious pathology.

Embryologically, the arch of the aorta and great vessels are derived from the aorta sac, the aortic arch arteries and dorsal aorta (Sadler 2000, Keith 1988), by series of degeneration, involution and remodeling. The presence of a common brachiocephalioc trunk can be a pointer to a more series congenital anomaly as it was found in a study that 98% patients with a

common brachiocephalic trunk had associated congenital cardiac malformations (Whitaker 1998). Our study was in adult cadavers. In Nigeria, cadavers are usually sourced from people of low economic status who resorted to crime. Hence our findings are in those who survived to adult hood without intervention. This may account for the low percentages (2%) seen in our study. The percentage of the population with common branchicephaloc trunk may be higher when the study is done in infants and children especially those presenting with congenital cardiac anomalies. It is important that cardiologists, interventional radiologists, cardiothoracic surgeons, pediatric surgeons, and pediatricians are aware of this as they carry out their work. More studies are therefore needed in our environment.

This study will serve as a reference for further epidemiological studies on the variation and implications of the common brachiocephalic trunk in Nigeria.

CONCLUSION

Common brachiocephalic trunk in which the left common carotid artery also arise from the brachiocephalic trunk is present in 2% of Nigerian cadavers.

REFERENCES

Anson BH (1963) The aortic arch and its branches. In: Luisada A (Ed) Cardiology Volume 1 McGraw-Hill: New York: pg. 115

Bergman RA, Thompson SA, Afifi AK. (1984) Catalog of Human Variation. Urban & Schwartzenberg Maryland USA pg. 88-94

Keith L. Moore (1988) The developing human. Clinically oriented embryology 4th Ed. W.B. Saunders Company, Philadelphia pg. 286-333.

Mostkowitz WB (2003) Topaz on The implications of common brachiocephalic trunk on associated congenital cardiovascular defects and their management; cardiology in the young, volume 13, number 6, December ph. 537 543.

Sadler TW (2000) Langman's Medical Embryology; 8th Lippincott and Williams, USA pg, 208

Whitaker RH, Borely NR (1998) Instant Anatomy. Blackwell Science Inc. Oxford pg. 5

Williams PL (1999) Gray's, Anatomy 38thEd. Church hill Livingstone Great Britain pg. 1513,314