

CASE REPORT

A unique branching pattern of the axillary artery in a South Indian male cadaver

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Abstract: Axillary artery divides into 3 parts by pectoralis minor muscle and classically each part has its own branches. There are many reports to show different variations in the branching pattern of the axillary artery. However, here we have shown an unreported unique branching pattern of axillary artery, where most of the branches of the axillary artery are arising from one common trunk from its 2nd part. Further, with relevant literature review we have also discussed their developmental and clinical importance (Fig. 1, Ref. 16). Full Text (Free, PDF) www.bmj.sk.

Key words: axillary artery, subclavian artery, brachial plexus.

The axillary artery is classically divided into three parts by the pectoralis minor muscle. Six major branches (superior thoracic, thoraco-acromial, lateral thoracic, subscapular, anterior and posterior circumflex humeral arteries) are given off from the 3 parts of the axillary artery (1). Although this is a normal and common description of the axillary artery, many studies show that there is no fixed pattern for branches of the axillary artery (2–8).

Earlier it has been shown that axillary artery gave rise to some unusual branches like thoracodorso-subscapular trunk, which also gave rise to the posterior circumflex humeral artery. This atypical vascular patterns also associated with several nervous anomalies, indicates that the segmental origin of the axillary artery and its pattern of branching may determine the arrangement of the brachial plexus during fetal development (9). In one study, presence of a bilateral common subscapular-circumflex humeral trunk from the 3rd part and presence of a bilateral thoraco-humeral trunk arising from the 2nd part of the axillary artery (which branched into the lateral thoracic, circumflex humeral, subscapular and thoracodorsal arteries) has been reported (10). However, the present variation, a common trunk from the 2nd part of the artery giving rise to many of the branches of the axillary artery has not been reported so far.

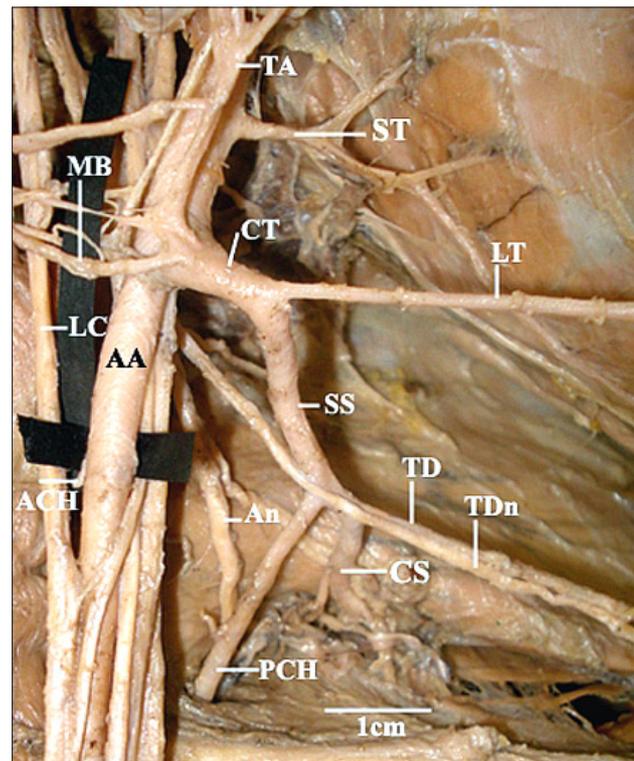


Fig. 1. Axillary artery (AA) of the right side giving rise to Superior Thoracic artery (ST) from its first part, a common trunk (CT) from its second part and Anterior Circumflex Humeral artery (ACH) from its third part. The CT is further dividing into Thoraco-Acromial artery (TA), Muscular branches (MB), Lateral Thoracic artery (LT) and Subscapular artery (SS). Subscapular artery is then giving rise to Posterior Circumflex Humeral artery (PCH), Circumflex Scapular artery (CS) and Thoracodorsal artery (TD). TDn – thoracodorsal nerve, An – axillary nerve, LC – lateral cord of the brachial plexus.

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Materials and methods

During routine educational dissection studies between the years 2006–2008, we found this unique unilateral variation in the right axilla of a 62 years old male cadaver after dissecting 24 cadavers at the Department of Anatomy, Kasturba Medical College, Manipal University, Manipal.

Observation

We report a case of 2nd part of the axillary artery giving all of its common branches (except from superior thoracic artery and anterior circumflex humeral artery) from a single trunk, which has not been reported in the available literature yet (Fig. 1). The axillary artery of the right side had normal course and relations in the axilla. After giving rise to superior thoracic (ST) artery from its first part, about 1.5 cm distal to ST there was a large common trunk with about 0.5 cm diameter. From this common trunk, following arose: 1) two muscular branches (MB) supplying pectoralis major and deltoid muscle, 2) Thoraco-acromial artery (TA) with its usual branches, 3) Lateral thoracic artery (LT) running towards lateral thoracic wall across the axilla 4) A large subscapular artery (SS) which further divided into posterior circumflex artery (PCA) and a common stalk. The common stalk was then branched into thoracodorsal artery (TA) and circumflex scapular artery (CS). PCA was accompanied by the axillary nerve (An) before both entering to quadrangular space. Circumflex scapular artery had very short course before it disappears through triangular space. Thoracodorsal artery had its normal course along with thoracodorsal nerve (TDn).

However, although the common trunk from the 2nd part of the axillary artery is the source of the above said branches is an unreported variation, the further course and area of supply is normal as explained in the standard gross anatomy textbooks (1, 11).

The course, relations and branching pattern of the left axillary artery was normal.

Discussion

Saeed and his co-workers have explained similar variation, where a common trunk from 2nd part of the axillary artery gave rise to lateral thoracic, circumflex humeral, subscapular and thoracodorsal arteries (10). However in the presented variation, in addition to the above mentioned branches, this common trunk also gives thoraco-acromial artery and two muscular branches. In this variation only posterior humeral circumflex artery is arising from subscapular artery and anterior circumflex humeral artery is arising from 3rd part of the axillary artery.

Normally, the axial artery extends to include both the subclavian and axillary in the developing upper limb bud at the 15th stage of development (7+9 mm; 33rd day of development). After closure of the neural plate, these arteries ramify into its capillary network (12). The origin of anomalies in the branching pattern of the upper limb arteries is attributed to defects in the

embryonic development (sprouting and regression) of the vascular plexus of the upper limb buds. An arrest at any stage of development, showing regression, retention, or reappearance, may produce various variations in the arterial origins and courses of the major upper limb vessels (13). The defects in the normal pattern of the branching may also be due to the developmental defects in the surrounding tissues. Slight alteration in the spatial and temporal regulation and impaired association between vascular network and the development of neighboring tissues/organs may also cause these kinds of variations.

Variations in the origin and course of principal arteries are of significant practical importance for the vascular radiologist and surgeons of various clinical disciplines. Angiographic images with such vascular patterns may lead to confusion in interpretation. Moreover, abnormal branching of the axillary artery itself presents an abnormal relationship to the brachial plexus and other branches of the axillary artery. Uglietta and Kadir (7) had reported variations in the major arteries of the upper extremities to be 11–24%. The large percentage of variations makes it worthwhile to take any anomaly of the axillary artery into consideration.

Presence of such variation, a large common trunk as a branch of the axillary artery is worth considering: i) during antegrade cerebral perfusion in aortic surgery (14), ii) while creating the bypass between axillary and subclavian artery in case of subclavian artery occlusion, iii) while treating the aneurysm of axillary artery, iv) while reconstruction of axillary artery after trauma, v) while treating the axillary haematoma and brachial plexus palsy, vi) while considering the branches of the axillary artery for the use of microvascular graft to replace the damaged arteries, vii) while creating the axillary-coronary bypass shunt in high risk patients, viii) during surgeries involved in breast augmentation, ix) radical mastectomy, x) catheterization/cannulation of axillary artery for various purposes, xi) while treating the axillary artery thrombosis (15), l) while analyzing the axillary region using imaging systems or ultrasonography, xii) while using the medial arm skin as free flap (16), xiii) during surgical intervention of fractured upper end of humerus and shoulder dislocations. Therefore, both the normal and abnormal anatomy of the axillary artery should be well known for accurate diagnostic interpretation and surgical intervention.

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