

Case Report

AN UNUSUAL AXILLARY ARTERY VARIATION

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ABSTRACT

Background: Axillary artery is the continuation of 3rd part of the subclavian artery and then it is continued as brachial artery at the distal border of teres major.

Objectives: To document unusual variations of axillary artery and to establish embryological & clinico-anatomical correlation of such variation.

Case Report: These finding was observed after meticulous dissection of the upper limbs of both sides of a 75 yr old female cadaver in the department of Anatomy, NBMC, India.

Observations: A rare type of upper limb arterial pattern was observed on the right side of a cadaver during routine dissection. Anterior humeral circumflex, posterior humeral circumflex, sub scapular, superficial and deep brachial artery, all were derived from axillary artery at the level of teres major muscle. Deep brachial artery was crossed by superficial brachial artery in the lower part of arm. Then they were continued as radial and ulnar artery in the forearm.

Conclusion: This variation was useful for physicians, surgeons and radiologist.

KEY WORDS: Axillary, Superficial brachial, Deep brachial, Common interosseus artery.

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INTRODUCTION

Axillary artery is the continuation of third part of subclavian artery and it is divided into three parts by the muscle pectoralis minor. Superior thoracic artery is derived from first part; acromiothoracic and lateral thoracic are derived

from second part of axillary artery. From the third part sub scapular, anterior humeral circumflex and posterior humeral circumflex arteries are derived. Below the lower border of teres major muscle axillary artery becomes brachial artery. Brachial artery runs downward and at the neck

of radius it is divided into ulnar artery medially and radial artery laterally [1,2]. Although this is the classical description of axillary artery, but there is no fixed pattern for branches of axillary artery studied by De Garis and Swartley (1928) [3], Trotter et al. (1930) [4], and Huelke (1959) [5]. According to Bergman (1988), major variations were present in about 25% of the subjects studied for the brachial artery [6]. High division may occur at any point in the normal course of the vessels. Occasionally radial artery arises more proximally leaving a common trunk for ulnar and common interosseous artery [7]. We report a case of high division of the axillary artery into a "superficial brachial artery" and "deep brachial artery," which has rarely been (0.1–3.2%) described (Adachii, 1928 [8]; De Garis and Swartley, 1928 [3]; Mc Cormack et al., 1953 [9]). The variations of the axillary artery can cause problems for plastic and orthopedic surgeons and radiologists in orientation to the region. Therefore, for an accurate diagnosis the variations of the region should be well known.

CASE REPORT AND OBSERVATIONS

During routine undergraduate dissection in the Department of Anatomy of North Bengal Medical College, Darjeeling we found unilateral variation of right axillary artery of a 75 yrs old female cadaver.

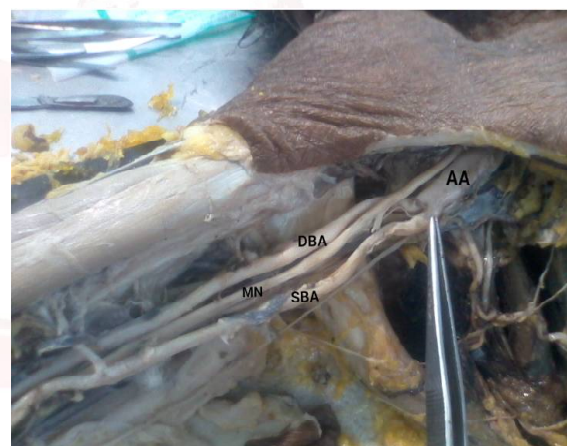
The first two part of axillary artery and its branches were normal. The third part of axillary artery just below the teres major muscle was divided into five branches- anterior humeral circumflex, posterior humeral circumflex, subscapular, superficial brachial and deep brachial artery. Posterior humeral circumflex artery was accompanied by axillary nerve and anterior humeral circumflex artery was anterior to surgical neck of humerus. Subscapular artery was related to subscapularis muscle.

Superficial brachial artery and deep brachial artery were almost in same caliber. Median nerve was lying in between two. Superficial brachial & deep brachial arteries were named according to their position. Superficial brachial artery was placed medially whereas deep brachial artery was lateral in position. About 5 cm. below the origin deep brachial artery which was laterally placed gave rise to arteria profunda brachii

which was very narrow in diameter. About 8 cm. below the origin of deep brachial artery, superior ulnar collateral artery was derived from deep brachial artery. 4 cm. above the elbow inferior ulnar collateral artery was arising from superficial brachial artery. 2.5 cm. above medial epicondyle deep brachial artery was crossed by superficial brachial artery.

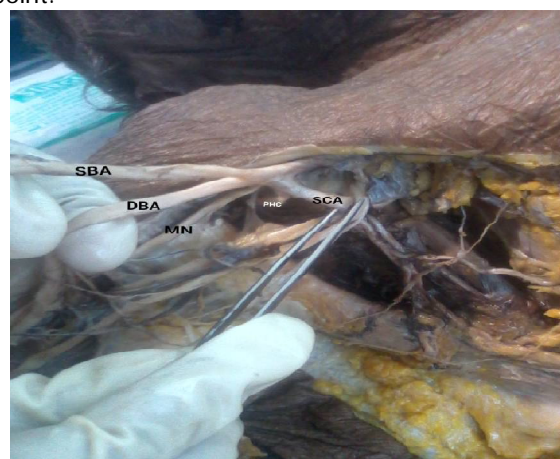
Now the superficial brachial artery was placed radially and deep brachial artery medially. Now they may be named as radial and ulnar artery respectively. 5 cm. below the median cubital vein common interosseous artery derived from ulnar artery and it was connected directly with radial artery. When they were traced below ulnar and radial arteries were related to the superficial & deep palmar arch consecutively. On the left side there was no such variation.

Fig. 1: Showing origin of superficial and deep brachial artery.



AA: Axillary Artery, SBA : Superficial brachial artery, DBA: Deep Brachial Artery, MN : Median Nerve

Fig. 2: Showing origin of superficial brachial , deep brachial , anterior humeral circumflex, posterior humeral circumflex and subscapular artery arising from same point.



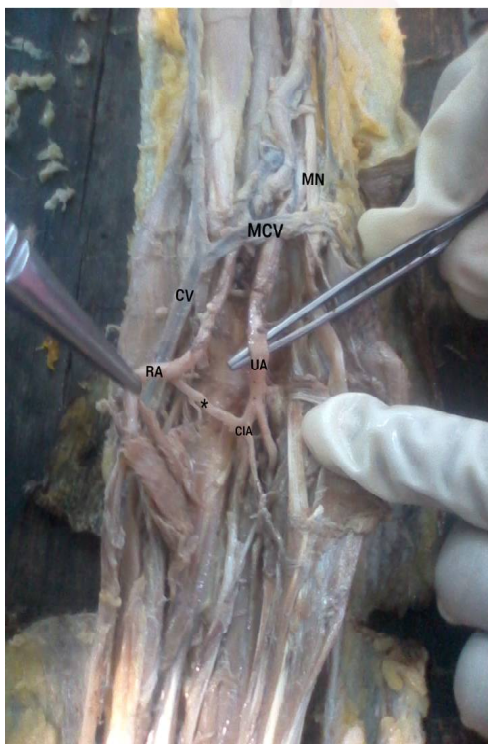
SCA : Subscapular artery, PHC : Posterior Humeral circumflex artery

Fig. 3: Showing crossing deep brachial artery by superficial brachial artery.



MCV : Median Cubital Vein, CV : Cephalic Vein, BV: Basilic Vein

Fig. 4: Showing the communication of common interosseous artery arising from ulnar artery directly connected with radial artery.



RA: Radial Artery, UA: Ulnar Artery, CIA : Common Interosseous Artery, * : Connection between Common Interosseous Artery and Radial Artery

DISCUSSION

Variation in the arterial pattern of upper limb is mostly embryonic in origin. This attributed to the

defect of vascular plexi. An arrest at any stage of development of vessels which was followed by regression, retention and reappearance producing variation of actual origin and its path [10]. The developmental defect of surrounding tissue may also lead to vascular variations [11].

During embryogenesis the lateral branch of seventh cervical intersegmental artery becomes enlarged to form axial artery of upper limb which on further development becomes axillary, brachial artery & it gives rise to radial and ulnar artery [12,13]. Anomalous blood vessels of upper limb are of common occurrence [14-15].

They may be due:

1. To the choice of unusual paths in the primitive vascular plexus.
2. To the persistence of vessels normally obliterated.
3. To the disappearance of vessels normally retained.
4. To incomplete development.
5. To fusion and absorptions of parts usually distinct.

Because this development can be interrupted at any stage, it can be readily appreciated that many variants occur in the arteries of the upper extremities [15,16].

The pattern of the course and branching of the axillary artery was reported to vary between race and sex [4]. The division of the axillary artery into superficial and deep stems was found to be more frequent in black persons (13.4%) than in white (4.6%) [3].

In our case, Anterior humeral circumflex, posterior humeral circumflex, sub scapular, superficial and deep brachial artery, all were derived from 3rd part of axillary artery. Probably in this case, the axis artery (here axillary artery) divide into 5 branches, among them two are continue in arm. Altered hemodynamic environment may give rise to variant patterning of blood vessels [17].

Cavdar et al. reported that, 3rd part of the axillary artery unilaterally divided into deep and superficial brachial artery [18]. They also reported that, the superficial brachial artery is larger in caliber than the deep brachial artery and gives no branches in the arm region. In the cubital

fossa it gives the ulnar and the radial arteries. This case is a variant of the axillary artery that has been rarely (0.12–3.2%) documented in the literature. In our case, superficial brachial artery and deep brachial artery were almost in same caliber and 2.5 cm. above medial epicondyle deep brachial artery was crossed by superficial brachial artery. Now the superficial brachial artery was placed radially and deep brachial artery medially. Now they may be named as radial and ulnar artery respectively.

Therefore, this case can be regarded as one of the rare variations of the axillary artery.

CONCLUSION

Awareness about details and topographic anatomy of variations of axillary artery may serve a useful guide for both radiologist and vascular surgeons [17]. It may help to prevent diagnostic errors and avoid complications during any surgical procedures.

The clinical importance of the axillary artery is mainly for surgeons, cardiologists and radiologists in orientation to the region. It should be kept in mind while performing bypass between axillary & subclavian artery in case of subclavian artery occlusion. Cases with this kind of variation should be examined or operated carefully during breast augmentation surgery or in mastectomy. Chronic dislocation of shoulder the incision is transverse and may injure the branches of axillary artery. So during surgery the abnormal branches will be responsible for bleeding if its presence is not kept in mind [19,20].

The knowledge of variation is important in case of axillary artery because apart from popliteal artery, axillary artery is most frequently lacerated by violence than any other surgery. It has been ruptured in attempt to reduce old dislocation especially when the artery is adherent to the articular capsule [21]. Therefore both normal and abnormal anatomy of the region should be well known for accurate diagnostic interpretation and surgery.

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Conflicts of Interests: None

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