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Case Report

VARIANT ULNAR ARTERY - A CASE REPORT

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ABSTRACT

During the routine dissection of the axillary region and the arm for the undergraduate student on a 75 year old donated embalmed cadaver in the department of Anatomy of K.J. Somaiya Medical College, Sion, Mumbai, India, an unusual branch of the brachial artery was found. The brachial artery terminated in the cubital fossa into radial and ulnar or interosseous arteries. The radial artery had normal course and branches. The other artery was deeper and gave the common interosseous artery, anterior and posterior ulnar recurrent arteries, and muscular branches to brachioradialis and flexor pollicis longus and ended in the median nerve in the distal part of the forearm. The unusual large branch from the brachial artery was a variant of ulnar artery, arose from the lateral side of the brachial artery, descended on the lateral side up to the cubital fossa and crossed the fossa from lateral to medial, superficial to median nerve. It then descended superficial to the muscles arising from medial epicondyle of the humerus and was covered by the deep fascia of the forearm, pierced the deep fascia proximal to the wrist, crossed the flexor retinaculum, and formed the superficial palmar arch. Throughout its course, this artery gave no branch. The embryological basis of the variation is presented.

Key words: Brachial artery, superficial antebrachial artery, superficial brachial artery, superficial ulnar artery, ulnar artery.

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INTRODUCTION

The brachial artery ends in the cubital fossa by dividing into radial and ulnar arteries. At the elbow, the ulnar artery sinks deeply into the cubital fossa and reaches the medial side of the forearm midway between elbow and wrist. The common interosseous artery is a short branch of the ulnar, passes back to the proximal border of the interosseous membrane and divides into anterior and posterior interosseous arteries. Anterior interosseous artery descends on the anterior aspect of the interosseous membrane with the median nerve's anterior interosseous branch. Median artery, a slender branch from anterior interosseous artery, accompanies and supplies the median nerve. [1]

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MATERIAL AND METHODS

During the routine dissection of the axillary region and the arm for undergraduate student on a 75 years old donated embalmed cadaver in the department of Anatomy of K.J. Somaiya Medical College, Sion, Mumbai, India, an unusual branch of the brachial artery was found. The branches of the brachial, ulnar, and radial arteries were carefully traced. The photographs of the variations were taken for proper documentation and for ready reference. No other neuro-muscular variation was observed in the same upper limb. The left upper limb of the same cadaver was also normal.

Observations:

The brachial artery had the named branches as usual. It terminated into radial and ulnar or interosseous arteries in the cubital fossa at the level of the neck of the radius. Radial artery had normal course and branches. The other artery was deeper and gave the common interosseous artery, anterior and posterior ulnar recurrent arteries, and muscular branches to brachioradialis and flexor pollicis longus and ended in the distal part of the forearm in the median nerve. The unusual large branch from the brachial artery arose from its lateral side at the level of the insertion of the coracobrachialis muscle. It descended on the lateral side up to the cubital fossa and crossed the fossa from lateral to medial, superficial to the median nerve. It then descended over the muscles arising from the medial epicondyle of the humerus and was covered by the deep fascia of the forearm, pierced the deep fascia proximal to the wrist, crossed the flexor retinaculum, entered the palm, and formed the superficial palmar arch, which was completed by the superficial palmar branch of the radial artery. Throughout its course, this artery gave no branch. In the left upper limb. the arterial pattern was normal.

Fig. 1 Showing Photographic presentation of Unusual Branch of Brachial Artery

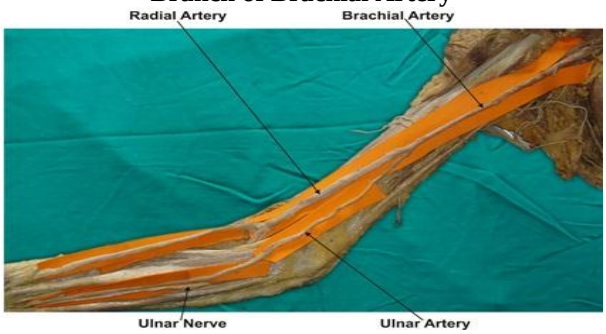


Fig. 2 Showing Photographic presentation of Unusual Origin and Course of Ulnar Artery

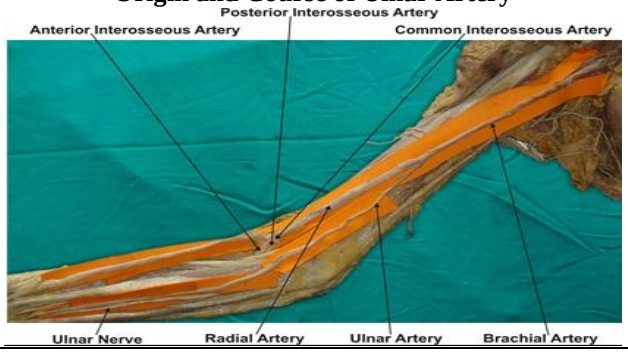
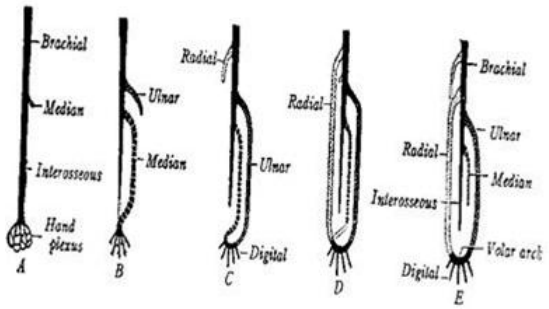


Figure 3. Normal Development of Arteries of Upper limb



DISCUSSION

Variations of the arterial pattern of the upper limb are common and have been reported earlier. (Schwyzer and De Garis, 1935, Coleman and Anson, 1961, Lippert and Pabst, 1985; Rodriguez- Beaza et al, 1995; Aharinejad et al, 1997; Patnaik et al, 2000 a,b; Celik et al 2001; Clerve, et al 2001) [2-9]. Supernumerary accessory branches may arise from the brachial artery [10]. Ulnar artery was found to deviate from its usual mode of origin in one in thirteen cases; frequently it sprang from the lower part of the brachial artery; [11] the position of the ulnar artery in the forearm was more frequently altered; in cases of high origin, it invariably descended over the muscles arising from the medial epicondyle of the humerus and was covered by the deep fascia of the forearm). The present case of ulnar artery is somewhat similar to the variations presented in Quain's Anatomy. Embryological Basis When the brachial artery terminates into radial and ulnar arteries, the embryological basis of the unusual branch of the brachial artery, replacing the ulnar artery in the present case, is as follows. Primitive axis artery and superficial brachial artery are implicated in the morphogenesis of the arteries of the upper limb [12, 13]. The seventh cervical intersegmental artery forms the axis artery of the upper limb (Fig. 3a) and persists in the adult to form the axillary, brachial, and interosseous arteries (Fig. 3b).Transiently, the median artery arises as a branch of the interosseous artery, begins to regress and remains as a residual artery (Fig. 3b) accompanying the median nerve. Radial and ulnar arteries are later additions to the axis artery. An ulnar artery and a median artery are branches (Fig. 3c) of the axis artery [14]. A superficial brachial artery is a consistent embryonic vessel, coexisting or not with the brachial artery [15]. It has two terminal branches (Fig. 3d): a lateral that continues as

a part of the definitive radial artery and a medial, superficial antebrachial artery, which divides into median and ulnar artery branches, which are the trunks of origin of the median and ulnar arteries (Fig. 3d). These trunks of deep origin predominate and the superficial arteries regress. In the present case, the axis artery had formed the interosseous artery and given the trunks of the median and ulnar arteries. The ulnar branch of the superficial antebrachial artery (Fig. 3e) persists independently, without its usual anastomosis to the branch of the axis artery, as the large lateral branch of the brachial artery and the superficial ulnar artery, which is found in the distal part of the forearm and joins the superficial palmar arch. If the brachial artery is taken to terminate into radial and interosseous arteries, the simpler embryological basis of the interosseous artery and the origin and course of the unusual branch of the brachial artery, replacing the ulnar artery, is the following. It appears probable that the abnormal arrangement results from early obstruction of the ulnar artery below the origin of the interosseous, and the development of a superficial vas aberrant, which replaces the portion of vessel below the obstruction and unites with the brachial [16]. The interosseous artery in such cases of abnormality thus comprises not only the interosseous artery but also the portion of ulnar artery above the obstruction and, in accordance with this view; the recurrent branches are derived from it [17].

Clinical Significance

This case is of significance as such an artery may present a superficial pulse and a hazard to venipuncture and lead to intra-arterial injections or ligature instead of the vein in the cubital fossa [18]. Variation in the branching pattern of the brachial artery is of significance in cardiac catheterization for angioplasty, pedicle flaps, arterial grafting or brachial pulse [19].

CONCLUSION

The case reported here may be of significance to physicians, surgeons, angiologists, radiologists especially traumatologists and vascular surgeons. Examination such as color Doppler imaging of arteries must be performed before cardiac catheterization or coronary artery bypass surgery.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Statement of Human and Animal Rights

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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