



*Original Contribution*

**A CASE OF ORIGINATED HIGH SUPERFICIAL ULNAR ARTERY**

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**ABSTRACT**

Ulnar artery originating from brachial artery higher and coursing superficially was found at the left upper extremity of a male cadaver during routine dissection. The branch originating from the brachial artery at the middle part of the arm reached the elbow at the medial part of this artery. At the elbow region it reached the forearm by crossing it in front of the bicipital aponeurosis. The main brachial artery ended as radial artery after giving rise to the common interosseous artery at approximately 3 cm at the lower part of the cubital fossa.

The clinical importance of this case is discussed here, bearing in mind that it could be confused with superficial veins of the arm and the forearm.

**Keywords:** Superficial ulnar artery, ulnar artery, brachial artery, variation of ulnar artery

**INTRODUCTION**

The ulnar artery may vary in its origin. It may arise proximal to the elbow, the brachial artery being more often its source than the axillary artery. In this case it comes behind the neurovascular sheath in the arm. This is an originating high ulnar artery which is rarely seen. The course of the artery changes very rarely if its origin is normal. If the ulnar artery branches out from the brachial artery in the cubital fossa and courses superficial to the neurovascular sheath, it is called the superficial ulnar artery (1). According to Nakatani et al., Poteat had proposed a new model for the sequence of arterial development in the human upper limb to replace the older model of Singer. In Poteat's model the superficial ulnar artery originating from the brachial artery, in normal circumstances, develops from the anastomotic connection between the brachial and superficial ulnar arteries and then the portion of the superficial ulnar artery proximal to the anastomotic connection disappears to form the ulnar artery (2)

Also in examination of human embryos between stages 12 and 23 of development Rodriguez-Niedenführ et al. had observed that formation of the arterial system in the upper limb takes place as a dual process (3). They

reported that an initial capillary plexus appeared from the dorsal aorta during stage 12 and developed at the same rate as the limb. This differentiation process parallels the development of the skeletal system chronologically. During embryological development, only one trunk, named the axial artery, supplies the limb and the terminal capillary plexus. From this axial artery, which represents the axillary, brachial and anterior interosseous arteries, and the forearm arteries appear successively by means of an angiogenic sprouting mechanism. The median artery develops first, followed by the ulnar and finally the radial arteries (3).

These embryological developments are suggestive of variations that arise through the persistence, enlargement and differentiation of parts of the initial network which would normally remain as capillaries or, in the alternative, may even regress (2,3).

**CASE REPORT**

An originating high superficial ulnar artery was found in the left upper limb of a male cadaver during routine dissection course (**Figure 1**). In the middle part of the arm, a branch emerged from the brachial artery and ran medial and parallel to the median nerve and brachial artery behind the brachial fascia. It did not give out any branch before the cubital fossa. Then it coursed in front of the bicipital aponeurosis through the forearm. In the forearm it coursed in the sulcus between flexor carpi ulnaris muscle and flexor

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digitorum superficialis muscle behind the antebrachial fascia. In the wrist, it coursed in front of the flexor retinaculum and formed the superficial palmar arch. Below the cubital

fossa, the brachial artery gave off the common interosseus and ulnar recurrent arteries, and then coursed as the radial artery.



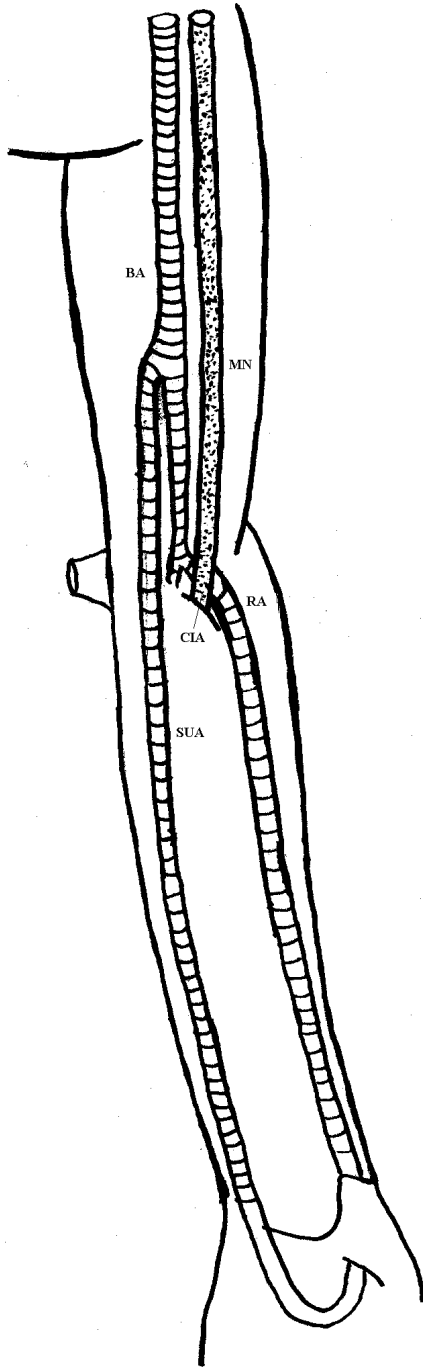
**Figure 1.** Our case. SUA: superficial ulnar artery, BA: brachial artery, MN: median nerve

The ulnar nerve and veins were not found with the originating high superficial ulnar artery. There was no anatomical variation in the right upper limb (Figure 2).

## DISCUSSION

The frequency of brachial artery anomaly has been reported as 5.5 % cases by Mesut et al. and 7.5 % by Soyluoglu et al. in the Turkish population (4). This incidence varies between 7.5 % and 18.5 % in the literature (4). The incidence of superficial ulnar artery ranged from 0.6 % to 9.4 % in the current study (2-14). The frequency of unilateral variations is higher than the bilateral. The wide difference of incidence may be due to racial factors. This anomaly is relatively rare in the Japanese and relatively common among Indians (2). A 3% incidence of superficial ulnar artery has been found by Lippert and Pabst (5). Uzun et al. found a 5% incidence of superficial ulnar artery in a study with 40 Turkish infant cadavers (6). The existence of superficial ulnar artery has been documented by various investigators. For example, Adachi recorded

0.7%, McCormack et al. 2.26%, Hazlett 3.1%, Couloma et al. 3.4 % incidences (7). Hazlett et al. also reported finding superficial ulnar artery in 2.7 % of 542 living humans with the inspection-palpation method (7). Weathersby found 3 in 451 upper limbs (0.6 %). Quain found 29 in 442 upper limbs (6.8%) (7); Rodriguez-Baeza et al. found 8 in 151 upper limbs (5.3%) (8). Nakatani et al. found 1 superficial ulnar artery in 150 upper limbs (0.7%) (2). Ugletta and Kadir found 1% by angiographic method (9); Devansh reported the incidence of superficial ulnar artery in 9.2 % during the elevation of radial flap and 9.4 % in Indians (7). Fadel and AmonooKuofi found 2.8 % in a study made in Egypt and Saudi Arabia (7). However Miller could not find any in 480 upper limbs (10). McWilliams and Sodha have reported a case which was determined by Doppler ultrasonography during examination (11).



**Figure 2.** Our case. SUA: superficial ulnar artery, BA: brachial artery, MN: median nerve, CIA: common interosseous artery, RA: radial artery

Fatah et al. have reported a case like ours (12). Nakatani et al.(13), Ozan et al. (10), Yazar et al. (14) have reported cases with superficial ulnar artery originating from axillary artery unilaterally and Jacquemin et al. have reported superficial ulnar artery originating from axillary artery bilaterally (7).

The clinical relevance of superficial ulnar artery is important. This artery is more vulnerable to trauma because of its superficial course. It can also be mistaken for a superficial vein, with the risk of potential intra-arterial injection, secondary gangrene

and even amputation (2, 7, 14). Radiographically, this artery can lead to misinterpretation of incomplete angiographic pictures (7, 10, 14). It can also cause problems in brachial artery catheterisation (7). Besides, it is important in elevation of a radial forearm flap and during any surgical operation on the arm (2, 7, 11). During the elevation of a radial forearm flap it can be mistaken for a superficial vein and ligated. On the contrary, if a superficial ulnar artery has been detected before surgery, it can be used for easy and fast elevation of a reliable forearm flap with neurosensory potential (2, 7, 11). Also it can be used for arterial catheterisation (7).

The existence of superficial ulnar artery is not very rare. Therefore, one should always keep in mind this anatomic variation and try to detect it by using methods like Doppler sonography, angiography and palpation before any surgical operation.

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