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Original Research Article

# SUPERFICIAL ULNAR ARTERY: A CADAVERIC STUDY

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## ABSTRACT

**Background:** The principal arteries of the upper limb show a wide range of variation that is of considerable interest to orthopaedic surgeons, plastic surgeons, radiologists and anatomists. The main arteries of the forearm are the ulnar and radial arteries, which usually arise opposite the neck of the radius in the inferior part of the cubital fossa as terminal branches of the brachial artery. The superficial ulnar artery is an ulnar artery of high origin that lies superficially in the forearm. Its importance lies on the field of vascular grafting. Knowledge of the course of such superficial artery is also important as it may be accidentally injured during surgery. Many studies have been done previously on regard of this aspect.

**Materials and Methods:** In the present study, 30 upper limbs of 15 cadavers were examined for the presence of superficial ulnar artery during routine dissection for the teaching purpose of undergraduate students for a period of three years in the Department of Anatomy, R G Kar Medical College and Hospital, Kolkata. The course of superficial ulnar artery, if any, was observed along with the course of radial and common interosseous artery of both sides.

**Observation:** In two cadavers, (6.66% of total limbs dissected) the ulnar artery had origin from the brachial artery above the cubital fossa in the arm and proceeded superficially in the forearm but had normal termination in the hand. In one cadaver superficial ulnar artery was originating from the distal third of the brachial artery and on the other cadaver, it was arising from the junction of upper and lower half of the brachial artery. In both the cases, the brachial artery had a usual course in the arm but in the cubital fossa they divided into the radial artery and common interosseous artery and both of them followed the normal course.

**Conclusion:** Knowledge of this variation is important for appropriate planning of operative procedures involving superficial ulnar artery. It is also important as it is highly vulnerable to intra-arterial injection.

**KEY WORDS:** Ulnar artery, Brachial artery, Radial artery, Common interosseous artery, Superficial ulnar artery.

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## INTRODUCTION

The main arteries of the forearm are the ulnar and radial arteries, which usually arise opposite the neck of the radius in the inferior part of the cubital fossa as terminal branches of the brachial artery. Ulnar artery, the large

terminal branch of brachial artery, descends inferomedially and then directly inferiorly, deep to superficial and intermediate layers of forearm muscles to reach the medial side of forearm, passes superficial to flexor retinaculum at wrist in ulnar canal to enter hand. The ulnar nerve is on the medial side of the ulnar artery. Radial artery, small branch of brachial artery, runs superficially under cover of brachioradialis muscle. Ulnar artery ends by forming the superficial palmer arch with the contribution from the superficial branch of radial artery [1].

The superficial ulnar artery is an ulnar artery of high origin that lies superficially in the forearm [2] . From its origin the superficial ulnar artery runs superficial to the median nerve, under the brachial fascia. It may pass either deep or superficial to the bicipital aponeurosis at the elbow [3].

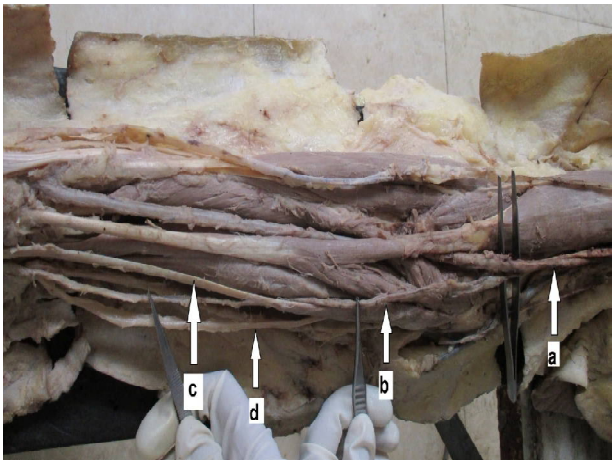
## MATERIALS AND METHODS

The present study was carried out on thirty upper limbs from fifteen embalmed cadavers of both sexes of different ages during routine dissection for teaching undergraduate students in the department of Anatomy, R. G. Kar Medical College, Kolkata over period of three years. In this respect, flexor aspect of arms, forearms including wrists were dissected using standard dissection techniques. The arterial systems of upper limb were traced along with their course and observed carefully for the presence of any superficial ulnar artery. Photographs of observed relevant variation were taken. Then, embryological basis and clinical importance of such variation was stressed upon. Finally, results were compared with other similar type of studies.

## OBSERVATIONS

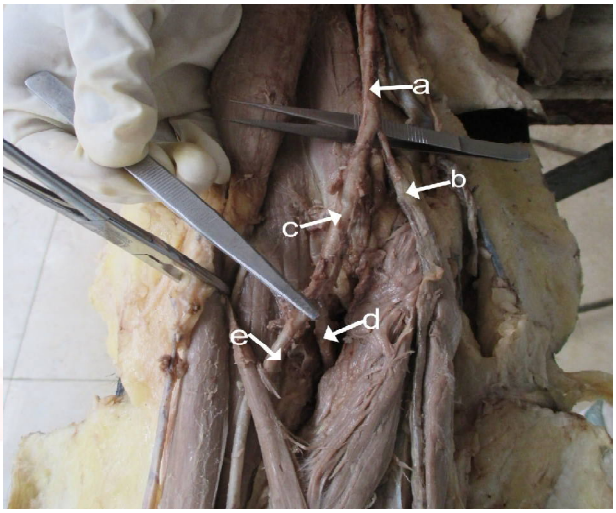
Superficial ulnar artery was observed in two ( 6.66% of total limb dissected ) left sided upper limbs of two different male cadavers. In one cadaver of approximately 50 years old, the ulnar artery originated from the brachial artery at the junction of middle and distal 1/3$^{rd}$ of the arm, ran downwards medial to the median nerve, just deep to the brachial fascia to reach the cubital fossa

**Fig. 1:** Showing distribution of the superficial ulnar artery.



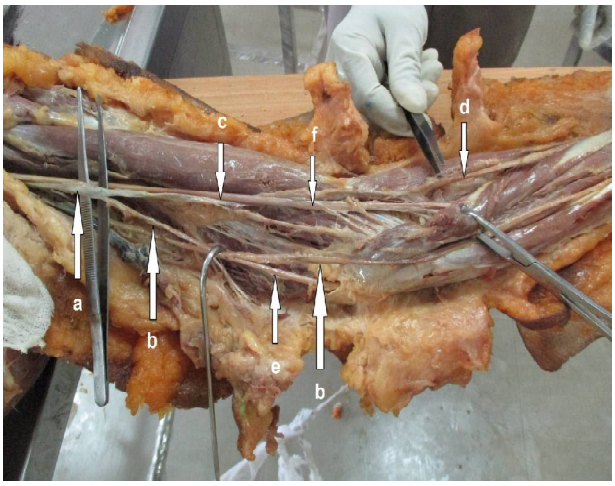

a: Brachial Artery, b. Superficial ulnar artery, c. Palmaris Longus tendon, d. Ulnar Nerve.

**Fig. 2:** Showing distribution of the superficial ulnar artery.



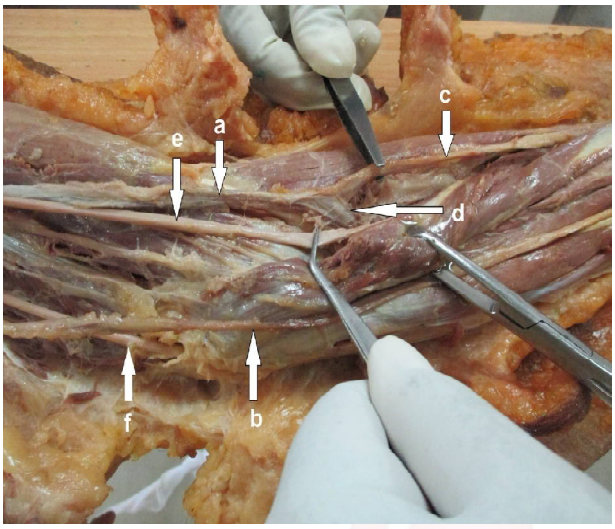

a,c: Brachial Artery, b. Superficial ulnar artery, d. Common interosseous artery, e. Radial artery.

**Fig. 3:** Showing distribution of the superficial ulnar artery.




a,c: Brachial Artery, b. Superficial ulnar artery, d. Radial artery, e. Ulnar Nerve, f. Medial nerve.

**Fig. 4:** Showing distribution of the superficial ulnar artery.




a. Brachial Artery, b. Superficial ulnar artery, c. Radial artery, d. Common Interosseous artery, e. Medial nerve, f. Ulnar nerve.

(Fig-1). Then it passed deep to the Palmaris longus tendon in the forearm. It ran parallel to the ulnar nerve. At the wrist, it ran infront of the flexor retinaculum to enter the palm. The brachial artery had a usual course till the cubital fossa, where it divided into two branches; a common interosseous artery and a radial artery (Fig-2). The radial and common interosseous artery had a usual course and branching pattern.

On the other cadaver of approximately 65 years old male, the superficial ulnar artery originated from the junction of upper and lower half of brachial artery of left arm (Fig 3). Then it ran superficial to the flexor muscles of forearm parallel to the ulnar nerve to enter the palm and form superficial palmer arch. The brachial artery divided into radial and common interosseous artery (Fig-4) which followed the normal course and branching pattern. The arterial system of opposite upper limbs of both the above cadavers showed normal course and branching pattern. Other 13 cadavers showed normal course and branching pattern of arterial system of upper limb.

## DISCUSSION

Knowledge of origin, course and distribution of superficial ulnar artery is important as it may present a superficial pulse and a hazard to venipuncture [4] and presence of it can be advantageous, since it can be used to supply blood to forearm flap [5]. Anatomical variations in the major arteries of the upper extremities have been reported in 11-24.4% of limbs [6]. Presence of unusual blood vessels may be due to the persistence of vessels that normally obliterated during the process of development [7]. The incidence of superficial ulnar artery varies between 0.67%- 9.38% as reported by various authors (Table 1) [5, 8, 9, 10]. In our study we also found the incidence rate of 6.66% that correlates with the previous studies.

**Table 1**: Incidence of Superficial ulnar artery in literature by various authors.

| Authors (year) | Sample | Incidence | % | Specimen | Method |
|---|---|---|---|---|---|
| Devash M S (1996) [5] | 32 | 3 | 9.38 | Cadavers | Dissection |
| Nakatani T et al. (1998) [8] | 150 | 1 | 0.67 | Cadavers | Dissection |
| Rodriguez-Niedenfuhr M et al. (2001) [9] | 384 | 16 | 4.17 | Cadavers | Dissection |
| Latha V P et al (2002) [10] | 100 | 1 | 1 | Cadavers | Dissection |

Pulakunta.T et al (2009) [11], have reported a variation of co-existence of superficial ulnar artery and aneurysm of the deep palmer arch in hand. Surekha D S et al (2013) [12], have also reported, a case of superficial ulnar artery, originating from the junction of the upper and middle third of the brachial artery. Presence of bilateral superficial ulnar arteries with an unusual arch in the forearm has been reported by Shankar N et al (2009) [13].

## CONCLUSION

In the present study course of superficial ulnar artery is really notable and important as in one cadaver it obliquely crossed the cubital fossa superficially to reach the pronator teres (Fig 2). Such a oblique course may expose to inadvertent injections and injuries. Superficial ulnar artery is a good source of blood for the forearm flap. Its importance also lies on embryological ground as such an artery may be due to persistence of blood vessels that normally obliterates.

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**Conflicts of Interests: None**

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