



## HIGHER DIVISION OF BRACHIAL ARTERY - A CADAVERIC CASE STUDY

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**ABSTRACT**

Brachial Artery is one of the main arteries of upper extremity. Brachial artery is the continuation of the axillary artery. It extends from the lower border of the teres major muscle to a point in front of the elbow, at the level of the neck of the biceps brachii muscle. Generally the brachial artery divides at the cubital fossa into the superficial radial artery and deep ulnar artery. Occasionally the artery divides proximally into two trunks which reunite. Frequently it divides more proximally than usual into radial, ulnar and common interosseous arteries. Most often the radial branches arise proximally, leaving a common trunk for the ulnar and common interosseous; sometimes the ulnar arises proximally, the radial and common interosseous forming the other division; the common interosseous may also arise proximally. In this case study, the brachial artery was divided near the medial side of the biceps brachii into radial artery and its continuation forms a common stem for the ulnar and common interosseous arteries. This kind of variation in the branching pattern of the brachial artery is important for surgeons as well as clinicians in the treatment aspects.

**KEYWORDS :** Brachial artery, Higher division, Cadaveric case study

### INTRODUCTION – Brachial Artery

The brachial artery, a continuation of the axillary, begins at the distal (inferior) border of the tendon of teres major and ends about a centimeter distal to the elbow joint (at the level of the neck of the radius) by dividing into radial and ulnar arteries. At first it is medial to the humerus, but gradually spirals anterior to it until it lies midway between the humeral epicondyles. Its pulsation can be felt throughout.

### Relations

The artery is wholly superficial, covered anteriorly only by skin and superficial and deep fasciae; the bicipital aponeurosis crosses it anteriorly at the elbow, separating it from the median cubital vein; the median nerve crosses it lateromedially near the distal attachment of coracobrachialis. Posterior are the long head of triceps, separated by the radial nerve and arteria profunda brachii and then successively by: the medial head of triceps, the attachment of coracobrachialis and the brachialis. Lateral are: proximally the median nerve and coracobrachialis and distally the biceps and the muscles overlapping the artery. Medial are: proximally the medial cutaneous nerve of forearm and ulnar nerve, distally the median nerve and basilic vein (separated distally by the deep fascia). With the artery are two venae comitantes, connected by transverse and oblique branches. At the elbow the brachial artery sinks deeply into the triangular intermuscular cubital fossa. The fossa's base is an inter-epicondylar line, the sides being the medial edge of the brachioradialis and the lateral margin of pronator teres; the 'floor' consists of brachialis and supinator. The fossa contains the tendon of the biceps, the terminal part of the brachial artery and accompanying veins, the commencement of the radial and ulnar arteries and parts of the median and radial nerves. The brachial artery is central and it divides near the neck of the radius into its terminal branches, the radial and ulnar arteries. Anterior to it are the skin, superficial fascia and median cubital vein, separated by the bicipital aponeurosis. Posteriorly the brachialis separates it from the elbow joint. The median nerve is medial proximally but is separated from the ulnar artery by the ulnar head of the pronator teres. Lateral are the tendon of biceps and the radial nerve, the latter concealed between supinator and brachioradialis.

### Branches

These are profunda brachii, nutrient, superior and inferior ulnar collateral, muscular, radial and ulnar arteries.<sup>1,2&3</sup>

### Variations

The brachial artery, with the median nerve, may diverge from the medial border of the biceps, descending towards the medial humeral epicondyle, usually behind a supracondylar process from which a fibrous arch crosses the artery, and which then runs behind or through the pronator teres to the elbow. This resembles the normal arrangement in some carnivores. Occasionally the artery divides proximally into two trunks which reunite. Frequently it divides more proximally than usual into radial, ulnar and common interosseous arteries. Most often the radial branches arise proximally, leaving a common trunk for the ulnar and common interosseous; sometimes the ulnar arises proximally, the radial and common interosseous forming the other division; the common interosseous may also arise proximally. Sometimes slender vasa aberrantia connect the brachial to the axillary artery or to one of the forearm arteries, usually the radial. The brachial artery may be crossed by muscular or tendinous slips from the coracobrachialis, biceps, brachialis or pronator teres. According to the literature, the brachial artery might present a deviation from the normal pattern in 20% of the cases. High origin of the radial artery found in 15 % of cases.<sup>1-5</sup>

### CADAVERIC CASE STUDY

During routine dissection of first year undergraduate students at the dissection hall of Ashokrao Mane Ayurvedic Medical College and Hospital Vathar Tarf Vadgaon, Maharashtra, India, a variation was found in the division of brachial artery. This variation was found in the 60 year old male cadaver. The brachial artery was showing a higher division in the arm near to the medial aspect of the biceps brachii muscle. In this case study, the brachial artery was divided near the medial side of the biceps brachii into radial artery and its continuation forms a common stem for the ulnar and common interosseous arteries. Further course of the radial artery was as usual running superficially on the lateral aspect of the forearm. The ulnar artery was also having its normal course and which was divided deep to the cubital fossa giving the common interosseous branch. The other branches of the brachial artery were also showing the usual course.



**Photo 1 – Higher Division of Brachial Artery in Arm -**



**Photo 2 – Higher Origin of Radial Artery in Arm and Continuation in forearm**

## DISCUSSION

Information of high division of the brachial artery is imperative as it is one of the main arteries of upper extremity. The brachial artery, a continuation of the axillary, begins at the distal (inferior) border of the tendon of teres major and ends about a centimeter distal to the elbow joint (at the level of the neck of the radius) by dividing into radial and ulnar arteries. At first it is medial to the humerus, but gradually spirals anterior to it until it lies midway between the humeral epicondyles. Its pulsation can be felt throughout. In this case study, the brachial artery was divided near the medial side of the biceps brachii into radial artery and its continuation forms a common stem for the ulnar and common interosseous arteries. Further course of the radial artery was as usual running superficially on the lateral aspect of the forearm. The ulnar artery was also having its normal course and which was divided deep to the cubital fossa giving the common interosseous branch. The other branches of the brachial artery were also showing the usual course<sup>1-3</sup>. According to the literature, the brachial artery might present a deviation from the normal pattern in 20% of the cases. High origin of the radial artery found in 15 % of cases.<sup>4,5</sup>

## CONCLUSION

Brachial artery extends from the lower border of the teres major muscle to a point in front of the elbow, at the level of the neck of the biceps brachii muscle. Generally the brachial artery divides at the cubital fossa into the superficial radial artery and deep ulnar artery. Occasionally the artery divides proximally into two trunks which reunite. Frequently it divides more proximally than usual into radial, ulnar and common interosseous arteries. In this case study, the brachial artery was divided near the medial side of the biceps brachii into radial artery and its continuation forms a common stem for the ulnar and common interosseous arteries. Further course of the radial artery was as usual running superficially on the lateral aspect of the forearm. The ulnar artery was also having its normal course and which was divided deep to the cubital fossa giving the common interosseous branch. The other branches of the brachial artery were also showing the usual course. Exact knowledge of the anatomy of the arteries of the upper limb especially brachial artery and their variations is necessary for designing appropriate invasive or surgical treatments for arm, forearm, and hand disorders.

## Acknowledgement

The coauthor, 1<sup>st</sup> year undergraduate students and nonteaching staff in the department of Rachana Sharir (Anatomy) at Ashokrao Mane Ayurvedic Medical College and Hospital, Vathar Tarf Vadgaon, Maharashtra, India has helped in this study.

## REFERENCES

1. Henry Gray. Gray's Anatomy. 38<sup>th</sup> edition, Edited by Williams PL, Warwick R et

al. Churchill Livingstone, New York, 1995, Section 10- Cardiovascular system.

2. Dr. B. D. Chourasia, Vol. 1, Chapter no.08, 4<sup>th</sup> edition Reprint 2007, CBS Publishers and distributors, Page no. 88-90.
3. Cunningham's Manual of Practical Anatomy, G.J.Romanes, Vol.2, 15th edition, Oxford University press, Page no. 70-71.
4. Bilateral asymmetry of the highly bifurcated brachial artery variation. Panagouli E, Anagnostopoulou S, Venieratos D. Rom J Morphol Embryol. 2014; 55:469-472.
5. High bifurcation of brachial artery with acute arterial insufficiency: a case report. Cherukupalli C, Dwivedi A, Dayal R. Vasc Endovascular Surg. 2007; 41:572-574.