



ORIGINAL RESEARCH PAPER

Anatomy

HIGH ORIGIN OF BRACHIAL ARTERY - A CASE STUDY

KEY WORDS: Brachial artery, Radial artery , Ulnar artery

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ABSTRACT

Brachial artery, is the main artery of the arm, usually distribute at the level of neck of radius into two branches. The present paper is the document that the variation in the brachial artery which the authors noticed during routine dissection. In routine dissection, it was found that in left side of upper limb the brachial artery gives high division into radial and ulnar artery 1.5cm below the profunda brachii artery. Knowledge of these variation is important especially in the field of vascular surgery and arteriograms of upper limb, and the feasibility of this variation should be kept in mind before any vascular surgery in the region of forearm.

INTRODUCTION

Brachial artery is the main artery of the arm. It is continuation of the axillary artery, it begins at the distal border of the tendon of Teres Major. The artery is superficial throughout its course in the arm, lying immediately deep to the deep fascia and is accompanied by a pair of venae comitantes. It is central in position and lies just medial to the biceps brachii muscle. Opposite the neck of radius, it divides into radial and ulnar arteries.^{1,2} . The two arteries run parallel to each other at level of the elbow, in the usual position of the brachial artery. Superficially the artery is crossed by the median nerve from lateral to medial. The brachial artery gives origin to profunda brachii, nutrient, superior and inferior ulnar collateral, muscular , radial, and ulnar arteries. High division may occur at any point of the artery, but it is more common in the middle third.³ Variations in the arterial supply of the upper limb are relatively usual, ranging from 11 to 24.4%. They can be found at different situations along the axillary, brachial, radial, or ulnar arteries, as well as in the palmar arches.⁴

CASE REPORT

A variation in the brachial artery was found during routine dissection of the left upper limb of 51 year male cadaver at P.G. department of Rachana Sharira, J.S. Ayurved , Mahavidyalaya , Nadiad, Gujarat.

In the arm: Profunda brachii artery arise from the one common trunk from proximal part of brachial artery before its termination.

- The brachial artery divided into radial and ulnar artery about 1.5cm below the profunda brachii artery in upper third of arm.
- The median nerve crossed radial artery from lateral to medial which passed through cubital fossa.
- The radial and ulnar arteries travel parallel to each other in the arm over biceps brachii. (figure -1)

In the cubital fossa

- The radial artery passed through the apex of cubital fossa which lying medial to median nerve whereas ulnar artery passed deep to deep head of pronator teres muscle.
- The branching pattern of both arteries normal in forearm.(figure-2)

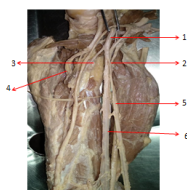


Figure : 1 High division of Brachial Artery in left upper third of arm
1 - Brachial Artery, 2 - High division of Brachial Artery, 3- Profunda brachii Artery, 4- Radial Nerve, 5- Radial Artery, 6- Ulnar Artery



Figure : 2 Left cubital fossa
1-Ulnar Artery, 2-Median Nerve, 3-Radial Artery, 4- Pronator teres muscle

DISCUSSION

The upper limb arterial anomalies are common. These anomalies because of their multiple and plexiform sources, the temporal succession of emergence of principal arteries , anastomoses and periariculation network followed by regression of some path. In the study high division of brachial artery is most common variation. The bifurcation of brachial artery into radial and ulnar at high division is highest percentage. High origin of radial artery occurrence is 3 to15% reported by different authors^{5,6,7,8}. They found high origin of ulnar artery in 1% case only^{7,8}. Ronald A. bergmen et al mentioned that one of the major variations is a high proximal division into terminal branches. (radial 15%), (ulnar2%)⁹ George joseph lufukuja et al reported that high origin of radial artery occurrence between 3 to 15%.¹⁰ karlsson and niechajev mentioned that high origin of radial artery is commonest vascular pattern variation in upper extremity observed in angiography of10% patients.¹¹ similar result were reported by patnaik et al, Anson et al and miller et al. Patnaik et al reported 14.27% variation in radial artery.¹² Anson et al mentioned radial artery variation in 15%.¹³ Miller et al reported 3% variation of radial artery.¹⁴ Mc cormark et al calling high origin of ulnar artery found in 2.26%.¹⁵ Muller et al mentioned 2% of high origin in ulnar artery.¹⁶ Quains et al reported high origin of ulnar artery in 1.7%.¹⁷

Author's name	High division of Radial artery	High division of Ulnar artery
Ronald A. bergmen et al	15%	2%
George joseph lufukuja et al	3 to 15%	-
karlsson and niechajev et al	10%	-
Patnaik et al	14.27%	-
Anson et al	15%	-
Miller et al	3%	-
Mc cormark et al	-	2.26%
Muller et al	-	2%
Quains et al	-	1.7%

The light to the embryological development was observed in the high division of radial and ulnar artery. The early limb bud receives blood through inter segmental arteries, which contribute to a primitive capillary plexus. There is a terminal plexus at the tip of the

limb bud, that is constantly renewed in a distal direction as the limb grows. One main vessel supplies the limb and the terminal plexus; it is termed as axis artery. The aforementioned terminal plexus at the tip of the limb bud is separated from the outer ectodermal sleeve of the limb by an avascular zone of mesenchyme. The avascular region contains an extracellular matrix having largely of hyaluronic acid. Removal of this hyaluronic acid by hyaluronidase results in vascularization of the tissue meanwhile partial degradation products of hyaluronic acid are angiogenic. Thus extracellular matrix components and ectodermal-mesenchymal interactions are controlling the initial patterning of blood vessels within the limb.¹⁹ The axis artery of upper limb-bud is derived from the lateral branch of the seventh inter segmental artery (subclavian). Arterial trunk is grows outward along the ventral axial line and terminates in the deep plexus in the developing hand. The main trunk of Proximal part forms the axillary and brachial artery and its distal part persists as the anterior interosseous artery and the deep palmar arch. The radial and ulnar arteries are the last arteries to appear in the forearm from the axis artery (brachial). Firstly the radial artery arises more proximally than the ulnar artery. Later, nearer to origin of the ulnar artery connect with main trunk and the upper portion of its original stem usually disappears to a large extent more proximally from the brachial artery leading to the formation of an unusually short segment. The narrow brachial artery divided into radial and ulnar arteries at proximal level near to the middle of the arm.²⁰

Clinical importance

The variation of brachial artery is clinically important for vascular surgery and radiology. While performing plastic and orthopaedic surgeries these arteries more prone for damage.

Diagnostically it may disturb the evolution of angiographic images.

It may causes difficulties while measuring blood pressure. In venepuncture procedure the superficial artery may punctured.¹⁸

CONCLUSION

The vessels of the upper limb have more significant role in different kinds of diagnostic, systemic and therapeutic studies. Diagnostically, this variation may disrupt the assessment of arteriography images and can have serious complication in orthopaedic and vascular surgery. knowledge of this variation is important for the clinicians in day to day practice for measurement of blood pressure.

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