

Case Report



High Division and Variation in Branching Pattern of Brachial Artery with Superficial Course of Radial Artery: A Case Report

Pratima Baisakh, Biswa Bhusan Mohanty, Sitansu Kumar Panda*, Prafulla K Chinnara
Department of Anatomy, IMS and SUM Hospital, SOA University, Bhubaneswar, Orissa, India.
*Corresponding author's E-mail: sitansupanda2011@gmail.com

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ABSTRACT

Vascular anomalies especially involving the arteries of the upper limb are fairly common. However, mid-arm variations of brachial artery are relatively infrequent. These variations are very important to surgeons and other clinicians to prevent untoward bleeding during surgical intervention and to avoid false interpretation during angiography. During routine dissection for undergraduate students in a 45yr old male cadaver, we found higher bifurcation of brachial artery into radial and ulnar artery in the right upper limb with superficial course of radial artery. We also found a common arterial trunk arising from the brachial artery which gives profunda brachii, superior ulnar collateral and nutrient artery to humerus. Rest of the course and distribution of radial and ulnar artery are normal.

Keywords: Brachial artery, profunda brachii, superior ulnar collateral, nutrient artery.

INTRODUCTION

The brachial artery (BA) is the continuation of axillary artery at the lower border of teres major and end 1cm below the flexure crease of elbow joint by dividing into radial and ulnar arteries. In the arm it is crossed superficially by the median nerve from lateral to medial side. The main branches of BA in arm are profunda brachii, nutrient artery to humerus, superior ulnar collateral, inferior ulnar collateral and muscular branches¹. The course of the BA is almost straight and oblique and it is represented by a line extending from apex of axilla to apex of cubital fossa. Various anomalies involving arteries of upper limb are previously reported²⁻⁴. Information regarding these variations is important to surgeons for vascular and reconstructive surgeries and angiographic interpretation. High division of BA is reported in upper, middle or lower third of arm. However, it is found more frequently at upper third than rest. In our case, high division of BA was found in middle third with a superficial course of radial artery from its origin to forearm. The branching pattern of BA is also found different from normal pattern. This type of variation in arterial system can be explained by its embryogenesis.

CASE REPORT

During routine dissection for undergraduate teaching, we found the following variations in brachial artery in the right upper limb of a 45yr old male cadaver. Profunda brachii artery, nutrient artery and superior ulnar collateral artery were arising as a common trunk from BA, 11cm from the coracoid process. Bifurcation of brachial artery was found 13 cm from coracoid process which is 5 cm from the lower border of teres major (Figure 1). Inferior ulnar collateral originated from ulnar artery just above the medial epicondyle.. The radial artery had undergone a

superficial course along the medial margin of brachioradialis muscle. In the arm, it crossed the median nerve and in cubital fossa, it passed superficial to bicipital apponeurosis just below brachial and antibrachial fascia (Figure 2). The ulnar artery coursed along the medial border of biceps and it was crossed by median nerve and passed deep to bicipital apponeurosis. Rest of the distribution of radial and ulnar arteries were found normal.



Figure 1: High division of brachial artery with superficial course of radial artery

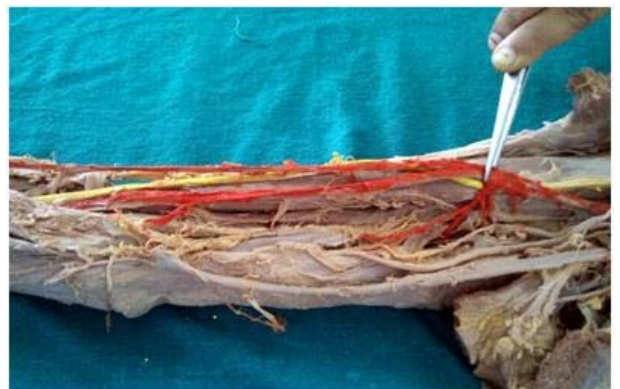


Figure 2: Common trunk giving origin to profunda brachii, nutrient artery to humerus and superior Ulnar collateral.



DISCUSSION

Variation in arterial pattern and anomalies of upper limb arteries are relatively common. Majorities involve radial artery followed by ulnar artery. However, the anomalies involving the Brachial artery (BA) especially the mid arm division is very rare as seen in our case.

High origin of radial artery is responsible for the variations of brachial artery. Different authors described high origin of radial artery from parent axillary artery in 12.5%, proximal 1/3rd of brachial artery in 62.5% and middle 1/3rd of brachial artery in 25%^{3, 5}. The origin of profunda brachii artery from BA occurs as a common trunk with superior ulnar collateral artery or with posterior circumflex humeral artery. In the present case, profunda brachii artery has originated as common trunk with superior ulnar collateral artery and nutrient artery to humerus. Such variations can be explained on the basis of embryonic development. It can be due to regression or persistence of one or other segment of the axis artery of the upper limb^{2, 5, 6}. The normal process of vascular development and patterning of the blood vessels are largely influenced by the altered local haemodynamic environment. In the upper limb during normal developmental process, axis artery is derived from 7th cervical intersegmental artery which forms a plexus in the developing hand. It's proximal part, forms axillary & brachial artery. The distal part persists as anterior interosseous artery and deep palmar arch. Radial artery and ulnar artery develop from Brachial artery in the forearm. The high origin of the radial artery in the present case is explained by persistence of radial artery in the arm and failure of development of the communication between radial and axis artery in the cubital fossa. Moreover, the superficial course of the radial artery is determined by superficial hemodynamic predominance leading to persistence superficial terminal branch of radial artery as normal radial artery and regression of deeper branches^{2, 6}.

CONCLUSION

Knowledge of this vascular variation is very important in the field of orthopaedic, plastic and vascular surgeries. In diagnosis, it is also important for angiographic interpretation. Superficial radial artery can be used for cannulation and arterial graft for CABG. This is also helpful to the clinicians for their day to day practice to avoid false measurement of blood pressure and also to avoid bleeding consequences during intravenous injections in median cubital vein.

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