

Case Report

Higher branching pattern of brachial artery of a single cadaver: A case report

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Abstract

Brachial artery is the main artery of the arm. Brachial artery usually begins as a continuation of the axillary artery at the distal border of tendon of teres major and ends at about centimeter distal to the elbow joint at level of neck of radius by dividing into radial and ulnar arteries. In the forearm, radial artery had more superficial course than the ulnar artery. A variant course and branching pattern of right & left brachial artery was recorded in cadaver. Variations in arterial patterns of the upper limb in adult human bodies have been frequently observed in routine dissection. Accurate information regarding these variations is important during vascular & reconstructive surgery.

Keywords: brachial artery, bifurcation, radial artery, ulnar artery

1. Introduction

Brachial artery is the main artery that supplies the superior extremity. It begins as the continuation of axillary artery at the distal border of teres major muscle and terminates in the cubital fossa at the level of neck of radius into ulnar and radial arteries and these are the main arteries responsible for blood supply to the forearm. The profunda brachii artery took origin from the short segment brachial artery along with its bifurcation. At first it lies medial to the humerus, but it gradually spirals to the front of the arm and the midpoint between the humeral epicondyles at the elbow. The median nerve from lateral to medial side crosses in front of the artery at the middle of the arm at the level of cubital fossa it is crossed by bicipital aponeurosis which separates the artery from the medial cubital vein. The knowledge of variation in course and branching pattern of arteries of upper limb is important. It seems necessary to identify unusual arterial pattern of upper limb. There may be persistence of vessels which normally obliterate and disappearance or failure of development of vessels which normally persist¹. The presence of arterial variation in the upper limb may be due to chemical factors, hemodynamic forces & foetal position in the uterus and developmental changes. Such variations might affect dynamics of limb function or alter the course of interventional procedures. The aim of this study is to provide information regarding anatomical variation of higher bifurcation of brachial artery the altered anatomy of the blood vessels may make them vulnerable to trauma and to hemorrhage.

2. Case report

During routine dissection of 60 year old male cadaver in Anatomy department of Dr. S. N. Medical College. When right hand dissected from the pectoral region to arm and forearm, we observed that the brachial artery is the continuation of axillary artery and high origin of radial and ulnar arteries in the upper one third of instead of cubital fossa in the forearm. This bifurcation is found in the region where the lateral root and median root of median nerve unite to form the median nerve. In these region radial and ulnar arteries has also given their further branches. The course and branching pattern of the radial and ulnar arteries in the forearm and palm were usual.

Figure: The photographic presentation of the front of the left arm showing the high level origin of ulnar (U) and radial (R) arteries from the brachial artery (B)



2.1 Embryological explanation:

Feinberg RN. 1991 the early limb receives blood via intersegmental arteries, which contribute with to a primitive capillary plexus. At the tip of limb bud there is a terminal plexus that is constantly renewed in a distal direction as the limb grows. Later one main vessel supplies the limb and the terminal plexus, it is termed the axis artery. The aforesaid terminal plexus at the tip of limb bud is separated from the outer ectodermal sleeve of the limb by an avascular region contains an extracellular matrix consisting largely of hyaluronic acid. Removal of this hyaluronic acid by hyaluronidase results in vascularization of the tissue since partial in degradation products of hyaluronic acid are angiogenic. Thus ectodermal mesenchymal interactions and extracellular matrix components are controlling the initial patterning of blood vessel within the limb.⁵

3. Discussion

Brachial artery divides into higher level than usual and the vessels resulting from this higher division are two which are radial and ulnar arteries. Most frequently the radial artery is given off high up then the other limb of division consisting of ulnar originates above the ordinary level. The profunda brachii artery took origin from the short segment of brachial artery along with its bifurcation. However, the subsequent distribution of the radial and ulnar arteries was normal.

Williams PL highlighted Anomalies of the forelimb arterial tree are fairly common. This is mainly because of their multiple and plexiform sources, the temporal succession of emergence of principal arteries, anastomoses and periarticular networks & functional dominance followed by regression of some path.¹²

Keen mentioned high origin of radial artery from the brachial artery. He explained this variant on the basis of Arey's observations regarding anomalous blood vessels. Infact, Keen highlighted that there were persistence of the upper portion of the radial artery arising from the brachial proximal to the origin of ulnar artery followed by failure of development of the new connection of the radial artery with brachial artery at the level of origin of ulnar artery.^{8,11}

Guha *et al* observed that high up division of brachial artery into radial and ulnar artery in the middle of the arm associated variant median nerve and absent of musculocutaneous nerve.⁷

Compta highlighted diagnostic, interventional & surgical significance of such a variation may disturb the evaluation of angiographic images. Further knowledge of such variation has got clinical importance especially in the field of orthopaedic, plastic & vascular surgeries.⁶

Clinical

Being superficial, the radial artery may be mistaken for a vein and accidental injection of certain drugs in this artery may cause reflex vascular occlusion.

4. Conclusion

Anomalies in origin and course of arteries have shown practical importance for orthopaedicians, radiologists and vascular surgeons. In addition knowledge of such variation is important for carrying out surgical procedure in the arm.

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