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A Case Report of A High Brachial Artery Bifurcation in Relation to Clinical Significance of Artificial Arteriovenous Fistula

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ABSTRACT

Introduction: The brachial artery starts at the inferior border of teres major and ends by dividing into ulnar and radial arteries in cubital fossa region. The radial artery frequently arises at the level of the neck of the radius and runs along the lateral side of the forearm.
Case report: During routine teaching for undergraduate medical student of the upper limb, atypical brachial artery bifurcation giving a high origin of the radial and ulnar arteries was found in the right upper limb of a male cadaver. The bifurcation level was proximal to the interchonylayar line. After that, the ulnar artery descends and gives prominent common interosseous artery at the neck of radius.
Conclusion: This case report of vascular variability of the upper limb is to alert vascular radiologists and surgeons as well as nephrologist to prepare a modified surgical intervention of arteriovenous fistula in renal haemodialysis. There is always great vascular variability of the upper limb therefore it is important to be aware of anatomical variation and to avoid iatrogenic fault.

Key words: Brachial artery, ulnar artery, radial artery, commonest interosseous artery, arteriovenous fistula

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INTRODUCTION

The brachial artery starts at the inferior border of teres major and ends by dividing into ulnar and radial arteries in cubital fossa region. The radial artery frequently arises at the level of the neck of the radius and runs along the lateral side of the forearm. As the radial artery passes distally in anterior part of the forearm, it is located deep to brachioradialis in proximal half of the forearm, its lateral side is related to superficial branch of the radial nerve in the middle third of the forearm, while it is medial to the tendon of brachioradialis in the distal forearm. In the distal forearm, the radial artery is situated closely lateral to the flexor carpi radialis tendon and ventral to pronator quadratus and the distal end of the radius. It then passes distally between the heads of adductor pollicis and turn out to be the deep palmar arch joining with the deep branch of the ulnar artery. At the wrist, the radial artery runs laterally through the anatomical snuff box to be between the heads of the first dorsal interosseous. The ulnar artery usually arises from brachial artery and runs on the medial side deep to flexor carpi ulnaris up to pisiform and then anastomoses with the radial artery forming superficial and deep palmar arches. During ulnar artery course, it give the commonest interosseous artery and as well as anterior and posterior recurrent ulnar arteries.[1] With coexistence of vascular variability of the upper limb, there will be several clinical significances in surgical interventions. Therefore, understanding the morphological characteristics of radial artery results in reduce the iatrogenic faults.

CASE REPORT

The current study presents a rare vascular variation during practical dissection teaching of upper limb. At the arm, there is a high origin of radial artery arising from the brachial artery 10 cm proximal to the interchonylayar line (Figure 1). As the radial artery descends, it divides into superficial and

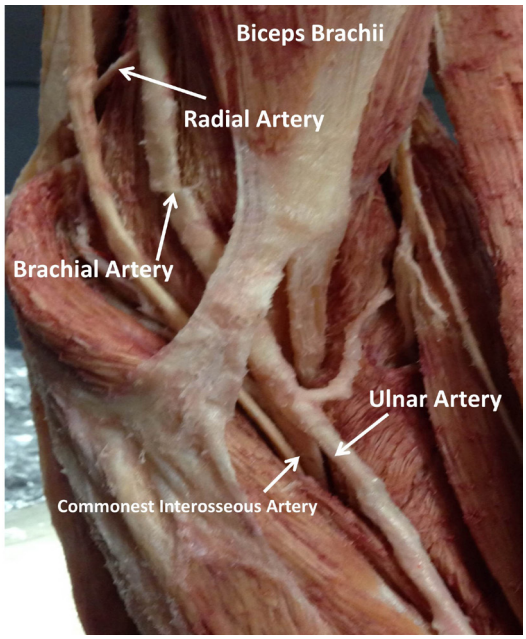

Figure 1: A high origin of radial artery arising from the brachial artery terminates into prominent ulnar artery and commonest interosseous artery.

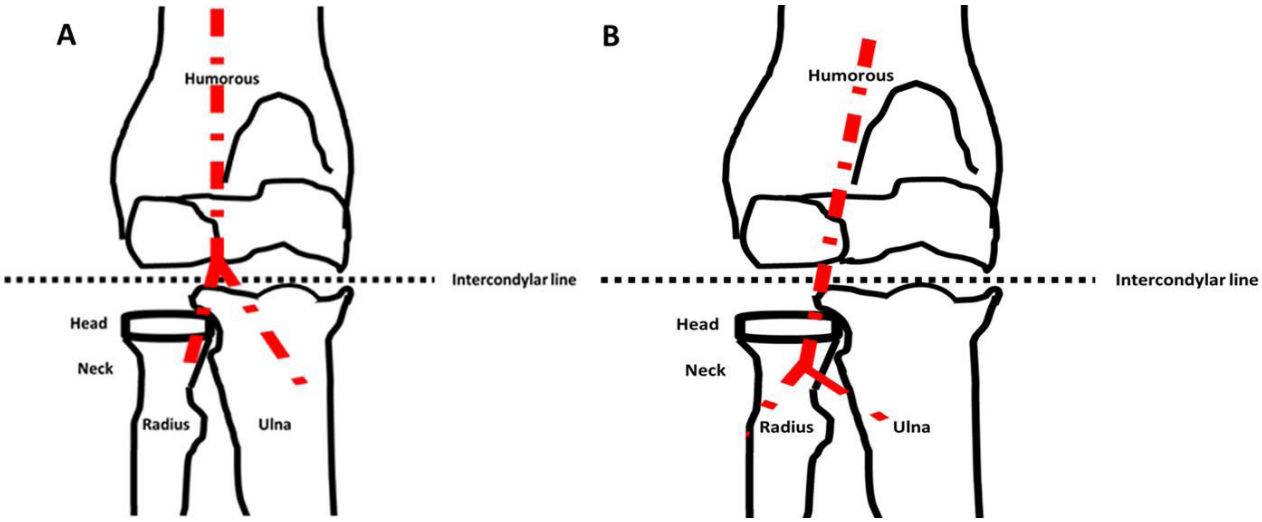

Figure 1: High origin of radial artery A. Bifurcation level of the brachial artery occurring proximal to interchondyler line. B. Bifurcation level of the brachial artery occurring just below the interchondyler line and at the level of neck of radius. .

deep radial artery deep to brachioradialis and three cm above the elbow joint. Therefore the ulnar artery passes through cubital fossa and gives a prominent interosseous artery at the neck of radius.

DISCUSSION

A detail description of upper limb vascular variability has been described by Rodriguez- Niedenfuhr et al [2] and estimated to be between 9% and 18.5% .[3] The vascular variability has been linked to growth or regression of vascular plexus embryological development of upper limb .[4] Beside, Singer [5] stated that the primitive plexus begins from the artery based on embryological study of the upper limb. In bud, failure of plexuses grow is due to blood flow and vascular tissue demand in which other plexuses provide the dominant sufficient blood supply up to the 9 mm embryo stage.[5-7] Therefore the brachial artery regress in grow due to their branches grow and provide the vascular tissue demand.

In cubital fossa, the brachial artery usually divides into radial and ulnar artery at the level of neck of radius.[1] The high origin of radial artery is due to bifurcation level of the brachial artery which occurred proximal to interchondyler line [8] and found to be in 12.3% [9] or 10% [10]. However, the high origin of the radial artery is referred as it starts from the level of neck of radius just below the interchondyler line and found to be

in 11.7% by Al-Sowayigh et al [10], in 5% by Vandana et al [11] and in 5% by Al Talalwah.[12] (Figure 2. A & B).

Furthermore, the ulnar artery frequently arises from the brachial artery just distal to the superior margin of the head of the radius in 82.65% .[13] In current case report, the ulnar artery gives common interosseous arteries proximal to the superior margin of the head of the radius. This variation found to be in 7.35% in previous study.[13]

The common interosseous artery is usually a branch of ulnar artery dividing into anterior and posterior interosseous branches running on the interosseous membrane in forearm. it arises just distal to ulnar artery origin ranging from 33.11 to 33.45 mm[14] whereas it arises with ulnar artery from brachial artery at same origin level in present study.

The high bifurcating level of brachial artery or unrecognized brachial artery bifurcation branches is associated has been accounted be predictor of brachiocephalic fistula failure.[15] Consequently, it is important for radiologists and surgeons to be aware of the variable morphology of brachial artery and its branches to minimize surgical complication during operation. In case of high bifurcation of brachial artery, the clinician has to detected appropriate alternative artery prior to surgery. This leads to improve outcomes of the artificial arteriovenous fistula rather than failure.

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COMPETING INTERESTS:

The authors declare that they have no competing interests.

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