Case Report

High origin and superficial course of radial artery

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ABSTRACT

The aim of the present study is to report the variation of the radial artery in its origin and superficial course. During routine dissection in the Department of Anatomy, Narayana Medical College, Nellore, a higher bifurcation of radial artery, the brachio-radial from the brachial artery on right side upper limb of a male cadaver was observed. Since the brachio-radial artery was superficial throughout its course till it reached the palm it is known as superficial brachio-radial artery. The incidence of this type of vascular pattern can be a result of developmental anomaly during the formation of blood vessels of the upper limb. Arterial variations of the upper limb are more common and have long received the attention of clinicians and vascular surgeons during diagnostic purposes. © IJAV: 2010; 3: 162–164.

Key words [brachial artery] [superficial brachio-radial artery] [superficial radial artery] [anatomical variations] [arterial variations]

Introduction

Normally the brachial artery is the continuation of axillary artery from the lower border of teres major which courses in the anterior compartment of arm. As it enters the cubital fossa at the level of neck of radius it divides into radial and ulnar artery. The median nerve first lies anterior to the third part of the axillary artery and then along its course it crosses the brachial artery anteriorly from lateral to medial side. The formation, origin and distribution of blood vessels may vary at any level of upper limb during its development and it can be demonstrated on the developmental basis.

The variations of the arterial system of the upper limb have been well documented by many authors and have a considerable significance towards the clinical and surgical point of view [1,2]. The major variations in the arterial patterns reported are the higher origin of radial or ulnar arteries

Some of the other unusual presentations of upper limb arteries are the presence of vasa aberrentia, variations of radial artery in its higher origin, median artery and variations in the formation of superficial palmar arch which are described in standard textbooks [3] and reported by various authors in early and recent papers [4].

Case Report

The present case demonstrates the variations of radial artery in its higher origin and course on the right upper extremity of a 52-year-old male cadaver during routine dissection in the Anatomy Department of NMC, Nellore. The artery had a superficial course throughout, hence termed as superficial brachio-radial artery. In the right upper extremity, as usual axillary artery continued as brachial artery from the lower border of teres major. At the middle of arm, the brachial artery bifurcated into brachio-radial and brachio-ulnar arteries.

The brachio-radial artery was superficial, throughout its course from its origin. In the arm, the artery crossed the median nerve superficially and continued down on the lateral side of the cubital fossa. In the cubital fossa the artery was superficial to bicipital aponeurosis and to the muscles of the forearm but lying deep to the antebrachial fascia along its radial border. Throughout its course this superficial brachio-radial artery supplied the flexor compartment muscles of arm and forearm by giving numerous branches (Figures 1, 2).

The brachio-ulnar artery coursed on medial side of biceps brachii till up to the cubital fossa. After entering the cubital fossa it continued as ulnar artery and passed deep to bicipital aponeurosis, had a normal course where it gave common interosseus and other muscular branches to forearm.

Discussion

Variations in the vascular patterns are usually the result of developmental anomaly during the formation of blood vessels in any respective part of the body. These variations
are encountered only during the surgical procedures or at the time of angiographic procedures or at the time of materialistic studies obtained from cadaveric dissections. Most common variations of vascular pattern are observed in the upper extremities which have been reported by many authors. The earliest studies of variations in the arterial system have been given by Senior [5] and Singer [6].

According to Singer the adult pattern of arterial system develops from the axial artery, which arises from the 7th cervical intersegmental artery which gradually gives rise to other branches supplying the upper limb. The proximal portion of axial artery above the level of teres major forms the axillary artery and beyond its level continues as brachial artery. Distally, in the cubital fossa it continues as interosseous artery. The radial and ulnar artery arises late in the development and gets established; subsequently interosseous artery reduces in size and becomes a branch of ulnar artery [6].

The morphology of upper limb arterial variations have been studied and classified by Rodriguez-Niedenfuhr [7]. Arteries of upper limb initially start as a capillary plexus which gradually enlarge, differentiate and regress to form the appropriate blood vessels of the respective areas of the limb. Variations in the formation of stages of this capillary plexus forming into definitive blood vessels gives rise to variations of the arterial pattern of the upper limb [2,3,6,8].

In our case, the right side showed variations in the vascular distribution in which the radial artery arose from the brachial artery in the middle of the arm, proximal to its usual level of origin. Variations of superficial brachial artery have been reported by Hee-Jun Yang et al., in which the course of the superficial brachial artery is similar to our findings except in its origin from the axillary artery and continued in the forearm as the radial artery [9].

Clemente reported the higher origin of radial artery which is one of the common variations of upper limb arteries [10]. The higher origin of radial artery in our case was superficial throughout its course from its origin in the arm to palm where it continued with the superficial palmar arch. The part of the radial artery arising in the arm is brachio-radial, since in our case it is superficial throughout, it is known as superficial brachio-radial artery [11].

The incidence of superficial radial artery is most frequent variation and is observed to be 14.26% in cadaveric
studies and 9.75% in angiographic studies [12]. The higher origin of radial artery as brachio-radial and continuing as superficial brachio-radial artery in our case may be because of the variations in the stages of formation of brachial artery and into its bifurcating branches the radial and ulnar arteries [11].

The presence of any such variations in the arm and forearm is vulnerable and prone for injury at times of surgical procedures, accidents and crush injuries. The variations observed in our case with the higher origin and superficial course of radial artery may be of significant in clinical point of view especially to vascular and plastic surgeons. The knowledge of this type of variation is important in diagnostic purposes like cardiac catheterization, arterial grafting and other angiographic procedures.

References