

Anatomical Variation Of The Origin, Course And Distribution Area Of The Radial Artery

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ABSTRACT The study of the anatomical variations draws the attention of the surgical medical practice on the fact the vessels may differ from the classic description, regarding their origin, trajectory and distribution territory. Dissection performed for didactic purpose was made upon 7 subjects; this revealed a case where the radial artery had high origin, was distributed to the anterior brachial space, with a superficial course into the upper half of the forearm. In the same subject, the variation described above was found only in one arm.

KEY WORDS radial artery, origin, course, distribution

Introduction

Therapeutic gestures in the emergency surgery are more based on the classic descriptions of the trajectory and distribution territories of the limb vessels. That's why the anatomists have described, for a long time ago, anatomic variants which differed from the „rule”; there were even created atlases of anatomic variants and statistic studies designated to draw surgeons' attention.

Classic description of the origin of radial artery from the humeral is at the elbow fold level or, more often a little under it, into the medial bicipital channel limited by the biceps muscle tendon outside, pronator round muscle towards the medial and deeply the brachial muscle tendon. At that level, usually, humeral artery bifurcates into two terminal branches: radial and ulnar arteries. Radial artery follows a downside trajectory to lateral, into the upper 1/3 of the forearm being covered by the brachioradial muscle. It becomes superficial in the lower region of the forearm, into the pulsation channel limited by the brachioradial tendon and the radial flexor tendon of carpus. At the level of the radio-palmar junction it bifurcates into the two branches (radio-palmar and dorsal of carpus) that would take place the formation of the two palmar vascular arches together with the homonymous branches of the ulnar artery. On its trajectory, into the forearm upper part, it will give off radial recurrent artery and then, many collaterals of different sizes which, together with the collaterals coming from the ulnar artery and from the two interosseous, would supply the forearm.

We suggested that brief description in order to emphasize the behaviour of the radial artery of our study and clinical implication it could have.

Material and methods

Our study was performed on dissecting a number of 7 cadavers of adults fixed in

formaldehyde with a didactic purpose, within the Department of Anatomy of the University of Medicine and Pharmacy of Craiova.

Dissections were made on anatomical planes, on the whole length of the upper limbs including the axillary regions.

Results

In a male cadaver, advancing our dissection from the axillary fossa downside, we established: at the level of the lower margin of the great pectoral muscle (representing the origin limit of the brachial artery) on the posterior face of the vascular axis, the deep brachial artery detaches. At about 1 cm lower, on the anterior face of the brachial artery, a vessel of a quasi-equally size as that of the brachial, detaches. The latter accompanies the left side of the brachial and median nerve up to about 2 cm above the elbow fold. We established that, here, collateral branches of that vessel take equally part, with branches of the brachial, into the supplying the anterior brachial space (**figure 1**).



Figure 1: Radial artery origin from brachial artery

- 1.Radial artery; 2.Radial artery origin from brachial artery;
- 3.Brachial artery; 4.Muscular branches from brachial artery;
- 5.V. Brachial artery; 6.Median nerve; 7.Ulnar nerve;
- 8.Antebrachial cutaneous medial nerve; 9.Muscular venous branch from biceps muscle (passes over the radial artery)

Above the elbow fold, that vessels leaves the left side of the brachial, becomes superficial, crosses the elbow to lateral and down, passes over the muscles of the ½ lateral of the anterior antebraial space and finally employs into the pulse channel as a radial artery where, inferiorly will bifurcate in the two known arteries to participate in the palmar arches forming (figure 2).



Figure 2: Radial artery: distribution and direction

1- Radial artery; 2.Radial artery origin from brachial artery covered by median nerve; 3.Brachial artery; 4.Muscular branches from radial artery for biceps muscle; 5.Brachial vein; 6.Median nerve; 7.Ulnar nerve; 8.Medial antebraial cutaneous nerve; 9.Muscular venous branch from biceps muscle (passes over the radial artery).

Remarkably, in that spece, it was not revealed another vessel which might be taken as radial artery. In the antebraial spece, the only collateral emitted by that vessel into the superior 1/3 of the space, is a recurrent artery running to lateral and upside and having the radial recurrent traject. Other collaterals proving the participation of that vessel into the forearm vascularization were not revealed.

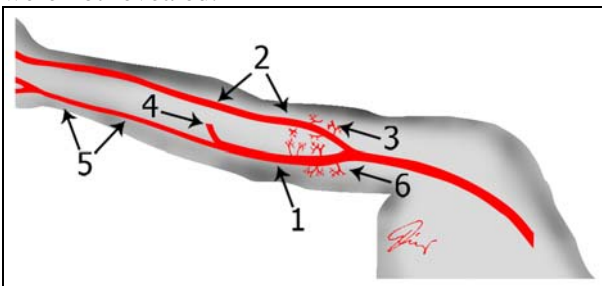


Figure 3: The high origin of the radial artery, anatomical variation, schematical representation:

1.Brachial artery; 2.Radial artery; 3.Muscular branches of the radial artery; 4.Interosseous artery; 5.Ulnar artery; 6.Muscular arteries, branches of the brachial artery

After removing that vessels from its left side, humeral artery joined by the median nerve, follows its normal course and, at about 1,5-2 cm under the elbow fold, deeply into the clasicly described median bicipital channel, it bifurcates into an ulnar artery and an interosseous trunk. The latter, in turn, divides into two interosseous trunk

are equally sized and their collaterals are to be responsible for the forearm vascularization (figure 3).

Remarkably, dissection of the contralateral upper limb in the same subject revealed an origine, a traject and a clasic distribution territory for the radial artery but it revealed another vascular, nervous and muscle anatomic variants that will be subsequently communicated.

Discussion

In one of the upper limb of the subject studied by us, the radial artery detaches of the humeral artery near its origin and joins it along its left side in the humeral region up to 2 cm above the elbow fold. From here, it situates on a superficial plane up to the pulse channel of the radio-carpian region where, by clasic bifurcation, it participates into forming the palmar arches. In the humeral region it emitted collaterals that participate the same way as the collaterals of the humeral artery, to supply the anterior brachial space. In the anterior antebraial region, the only emitted collateral is the radial recurrent, otherwise it does not present collaterals to participate into the forearm supplying; it is made by the collaterals of the ulnar artery and the two interosseousarteries.

Vascular anatomic variants of the upper limbs have been described in literature for a long time ago, both for the radial and ulnar or humeral arteries; we have just brought a new case in the speciality literature.

In the medical usage (especially the surgical one) the surgeon must know and take into account the possibility that other anatomic variants should exist as (in our case, for example) the ulnar artery ligation in emergency surgery, under the circumstances of clasic disposition and distribution of the upper limb vascularization, could change the case into a medico-legal one.

CONCLUSSIONS

All those anatomic variants described in literature up to nowadays and further on,, may prove that, within the medical practice, each individual is and must be considered as a particular entity, from the ultrastructural to macroscopic levels, he/her following the „clasic” described before, only generally.

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