

Case Report

Arterial variations of upper limb: a case report

V. R. Vollala, M. Rao, Deepthinath Prasad

Department of Anatomy, Melaka Manipal Medical College (Manipal Campus), ICHS, Manipal, Karnataka-576 104, India.

Address for correspondence: Venkata Ramana Vollala, Department of Anatomy, Melaka Manipal Medical College (Manipal Campus), International Centre for Health Sciences, Manipal-576104, Karnataka State, India. E-mail: ramana_anat@yahoo.co.in

ABSTRACT

Variations of upper limb arteries are common and there are many reports about this subject. We report multiple variations in arterial pattern of upper extremity, which were encountered in a single cadaver.

KEY WORDS

Arteries, Cadaver, Dissection, Upper extremity, Variation

CASE HISTORY

During the dissection classes in the Department of Anatomy at Melaka Manipal Medical College, a 50-year-old female cadaver showed multiple variations in arterial pattern of both the upper extremities. Some of these variations are well documented, but not collectively in a single subject. The findings included

1. Presence of an anastomotic artery, which connected brachial artery to the radial artery [Figure 1].
2. Radial artery passed deep to the tendon of biceps brachii in the cubital fossa [Figure 2]
3. Median artery arose directly from ulnar artery and pierced the median nerve
4. Formation of superficial palmar arch by superficial branch of ulnar artery and the median artery [Figure 3].

DISCUSSION

The anomalies of upper limb arteries are common and there are reports of presence of vasa aberrantia, variations of radial artery, median artery and superficial palmar arch,

which are described in standard textbooks^{1,2} and in recent papers.^{3,4,5,6,7}

In the present case, the anastomotic artery (vasa aberrantia) arose from the brachial artery and coursed between the median and musculocutaneous nerves in the arm, passed to the forearm under the bicipital aponeurosis and connected to the radial artery after the latter passed deep to the tendon of biceps brachii. Diagnostically, the vasa aberrantia may disturb the evaluation of angiographic images. Interventionally, accidental puncture of superficially placed arteries may occur while attempting venipuncture. Surgically, it is vulnerable in both orthopaedic and plastic surgery operations. Due to the anomalous course, the radial artery may be compressed; in which case, the communicating artery may compensate the blood flow to the forearm. Recently, the radial artery approach for diagnostic cardiac catheterization and interventional procedures has become popular. However, its utility in the present case would be limited since the artery passed deep to the tendon of biceps brachii. It has been reported that, the anatomic variations of the artery such as the radial loop pattern that is encountered close to its junction with

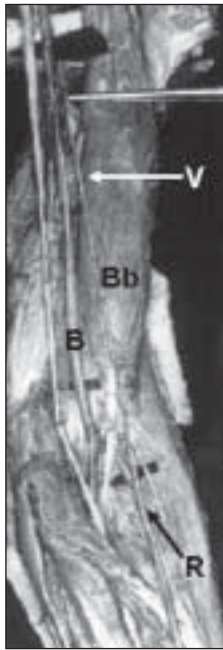


Figure 1: Vasa aberrantia connecting brachial and radial arteries. Bb- Biceps Brachii, V-Vasa Aberrantia, B-Brachial artery, R-Radial artery

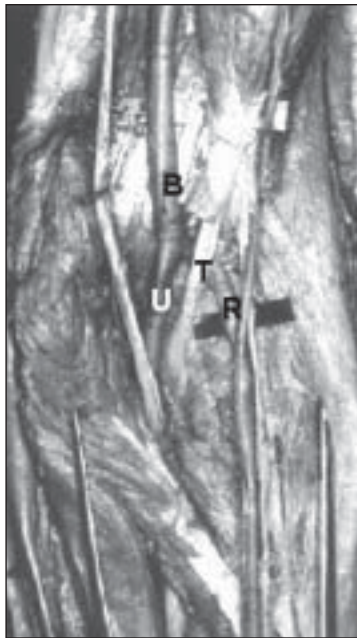


Figure 2: Radial artery passing deep to the tendon of Biceps Brachii. B-Brachial artery, R-Radial artery, U-Ulnar artery, T-tendon of Biceps Brachii.

brachial artery may render the cardiac catheterization method not feasible.⁸

The persistent median artery may cause carpal tunnel syndrome and may cause damage to the median nerve in two different ways: compression and ischaemia.⁵ The persistent median artery piercing the median nerve may

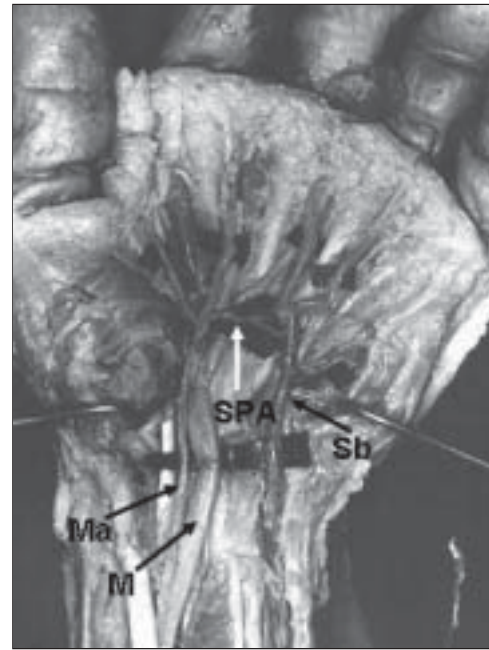


Figure 3: Superficial palmar arch formed by union of median and superficial branch of ulnar arteries. SPA-Superficial palmar arch, Sb-Superficial branch of ulnar artery, M-Median nerve, Ma-Median artery

be clinically important because symptoms of median nerve compression arising from similar variations are often confused with more common causes such as radiculopathy and carpal tunnel syndrome.

The source for both the vessels, which are forming the superficial palmar arch in the present case, is the ulnar artery proper. In case of bleeding from the palm, if the ulnar artery is ligated at its origin close to the bifurcation of brachial artery, the blood flow in this arch via both these routes gets completely cut off. Then the only source of blood supply is via the radial artery, deep palmar arch and then through perforating arteries indicating their importance. The radial artery is being used for transplant surgery in cases of coronary artery disease. So, one should be careful under such circumstances that if the radial artery is removed then the ulnar artery cannot be ligated as then the blood supply to hand will be totally jeopardized.⁷

In a recently reported clinical case, the absence of the ulnar artery was responsible for hand ischaemia after radial artery grafting for coronary bypass.⁹

The number and the form of these variations in a single cadaver have not been reported previously and our observations may be of interest to surgeons and anatomists.

REFERENCES

1. Bergman RA, Thompson SA, Afifi AK, Saadeh FA. Compendium of human anatomic variations. Urban & Schwarzenberg. Baltimore-Munich. 1988.
2. Williams P. Gray's Anatomy, 38th edn. Churchill & Livingstone, Baltimore; 1995.
3. Uzun A, Seelig LL Jr. The anastomotic artery connecting the axillary or brachial artery to one of the forearm arteries. *Folia Morphol* 2000;59:217-20.
4. John Gourassas, Usama Albedd, Christodoulos E. Papadopoulos, Georgios Louridas Anomalous origin of Right Radial Artery as a cause of Radial approach Failure of Coronary Angiography. *Hellenic J Cardiol* 2003;44:226-29.
5. Galassi E, Benfenati A, Tognetti F, Pozzati E. Persistence of median artery: possible cause of carpal tunnel syndrome. *Riv Neurol* 1980;50:159-66.
6. Porter CJW, Mellow CG. Anatomically aberrant forearm arteries: an absent radial artery with co-dominant median and ulnar arteries. *Br J Plast Surg* 2001;54:727-8.
7. Patnaik VVG, Kalsey G, Singla Rajan K. Palmar arterial arches- A morphological study. *J Anat Soc India* 2002;51:187-93.
8. Louvard Y, Lefevre T. Loops and transradial approach in coronary diagnosis and intervention. *Catheter Cardiovasc Interv* 2000;51:250-2.
9. Nunoo-Mensah J. An Unexpected complication after harvesting of the radial artery for coronary artery bypass grafting. *Ann Thoracic Surg* 1998;66:929-31.