Content available at: https://www.ipinnovative.com/open-access-journals

International Journal of Recent Innovations in Medicine and Clinical Research

Journal homepage: https://www.ijrimcr.com/

Case Report

An ulnar artery of abnormal origin: A clinical case report

Vedant Garg[1]*, **Jayanta Biswas**[2]

[1]*All India Institute of Medical Sciences, New Delhi, India*
[2]*Dept. of Anatomy, All India Institute of Medical Sciences, New Delhi*

ARTICLE INFO

Article history:
Received 12-06-2024
Accepted 07-07-2024
Available online 08-08-2024

Keywords:
Ulnar artery
Variations
Upper limb
Deep ulnar artery
Arterial supply
Surgical importance
Iatrogenic complications

ABSTRACT

The deep ulnar artery was found originating from an unusual place just below the axilla in the left upper limb, which is extremely rare, and not much literature is present on it. The artery was on the most medial side which can get injured during various procedures and can be of clinical importance.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

The arterial system of the upper limb has significant variations, which are well documented in the literature.[1–3] The arterial tree distribution of the upper limb is derived from a left subclavian artery (arising from the arch of the aorta), which continues as the axillary artery after crossing the lateral margin of the first rib, which continues as the brachial artery after crossing the inferior border of teres major, and later divides at the level of the neck of the radius or at the intercondylar line of the humerus in the cubital fossa to give ulnar artery on the medial side and radial artery on the lateral side.[4,5] The ulnar artery further gives a common interosseous branch, which divides to give posterior, anterior, and recurrent interosseous branches.

The variations can include variation in ulnar artery, radial artery, common interosseous artery and its branches etc, however most of the anomalies are involved with the radial artery.[6–8] The variation of ulnar artery includes ulnar artery being superficial or ulnar artery arising from brachial artery higher above the intercondylar line of humerus in the arm or radial artery below the intercondylar line of humerus in the forearm.[5]

2. Case Report

An unusual case was seen while dissecting a male cadaver for study purposes at All India Institute of Medical Sciences, New Delhi. The cadaver presented an unusual/aberrant ulnar artery. After finding the case both the limbs were carefully dissected and the course of the unusual artery was studied in greater detail.

Usually, the ulnar artery is expected to come from the brachial artery around the level of the neck of the radius but the cadaver had the ulnar artery arising from a superior part of arm just below the lower border of teres major, originating from the upper one third of the arm approximately 18.6 cm above the medial epicondyle. The artery came on the medial side lying most medial in the arm, forearm and then crosses the flexor retinaculum superficially

* *Corresponding author*.
E-mail address: Gargvedant2005@gmail.com (V. Garg).

https://doi.org/10.18231/j.ijrimcr.2024.049
2582-1075/© 2024 Author(s), Published by Innovative Publication.

to form major part of the superficial palmar arch along with the superficial palmar branch of radial artery from the lateral side. The artery also gave a branch to the elbow joint anastomosis in the arm slightly above the elbow joint , whereas the brachial artery which gave this branch in the axilla continues forward to form the radial artery around the neck of the radius and since normal ulnar artery is absent there the brachial artery gives a common interosseous branch just before becoming the radial artery, which further divided into anterior and posterior interosseous branch, accompanied by the respective venae comitantes.

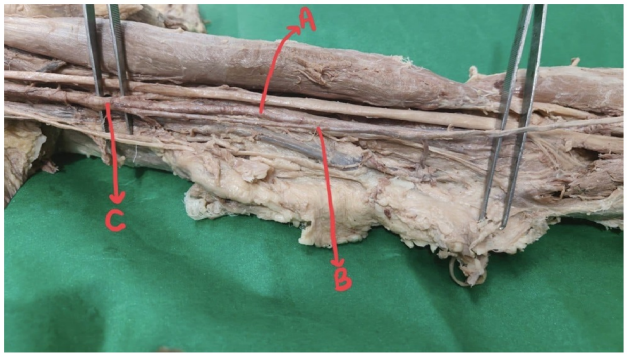

Figure 1: Left arm; A: Brachial artery, B: Unusual ulnar artery, C: Point where the brachial artery gave this unusual ulnar artery, which is from the upper part of the arm.

Each of the arteries, brachial artery, radial artery, common interosseous artery, posterior interosseous artery, anterior interosseous artery, as well as the unusual ulnar artery, were accompanied by the veins present just beside the artery, that is, had their venae comitantes. The common interosseous did not give any recurrent interosseous branch. The branch to the elbow joint, which was before the point where the brachial artery gives the common interosseous branch, joined the elbow joint and can be named the communicating ulnar branch or branch of Garg (Figure 2). Except for the communicating ulnar branch, no other major branches(except a short cutaneous branch) were given by this unusual ulnar artery throughout its course, starting from its origin below the inferior border of teres major till it formed the superficial palmar arch in the palmar surface of the hand. Moreover, palmaris longus was present and had a normal course. [1,9,10]

The radial artery was normal and was on its normal course except at the point where it gave common interosseous, whereas the common interosseous gave a posterior branch, which went behind the interosseous membrane, and an anterior branch which moved over the interosseous membrane. The upper right limb had a normal arterial distribution tree with the brachial artery, ulnar artery, and radial artery and the common interosseous being in the normal place, normal course, and giving usual/normal branches.

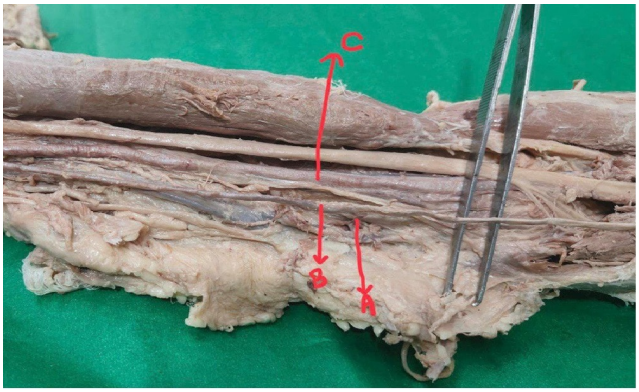

Figure 2: Lower part of the left arm and cubital fossa; A: Communicating ulnar artery or branch of Garg, B: The unusual ulnar artery, C: Brachial artery.

3. Discussion

Some variations in the ulnar artery are well documented in the literature; the common variation being talked about in these variations is the position of the ulnar artery at most of the places with a normal course in the distal part of the forearm to further form a superficial palmar arch in hand. [3] In contrast, in this case, the artery was not superficial; its origin was deep in the flexor compartment of the arm in between the flexors of the elbow joint, and further ahead on its way, it was found within the muscular compartment of the arm along with the flexor muscles and on its further course, it was found along with the superficial flexors of the forearm, but it formed superficial palmar arch in hand as any other usual artery.

The superficial ulnar artery variations are common, being 1 in 13 cases, whereas this type of comparatively deep ulnar artery is not common and not very well documented in the literature. [4,7] The chances of an ulnar artery originating from the axillary artery are 28%, which is seen mostly in superficial ulnar arteries, whereas the artery in our case was not superficial. [11,12] The artery was earlier confused with the basilic vein, and it was thought that the vein had become deep, but on further dissection, the structure was found to form a superficial palmar arch, and hence the structure was identified as an ulnar artery (Figure 3). The structure, which was identified earlier as the ulnar artery (before dissecting the superficial palmar arch), was identified as common interosseous after dissecting it further and checking its course. The case was similar to the case described by Kithsiri J Senanayake et al. and many others, but in our case, the artery was deep, not superficial. [12,13]

4. Limitation

The presence of high amounts of fats and other structures hindered some findings. For instance, the communicating ulnar branch could not be dissected much to find its

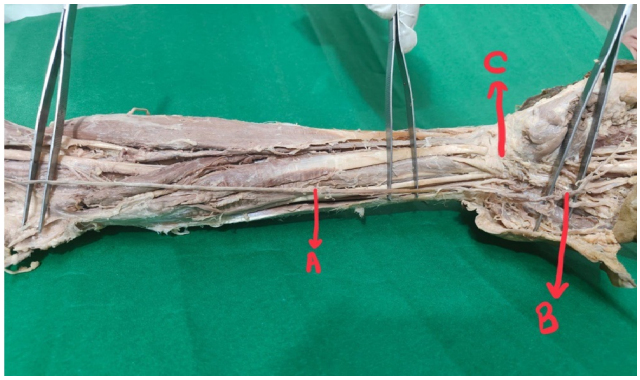

Figure 3: Left forearm and hand; A: Unusual ulnar artery, B: Superficial palmar arch, C: Flexor retinaculum.

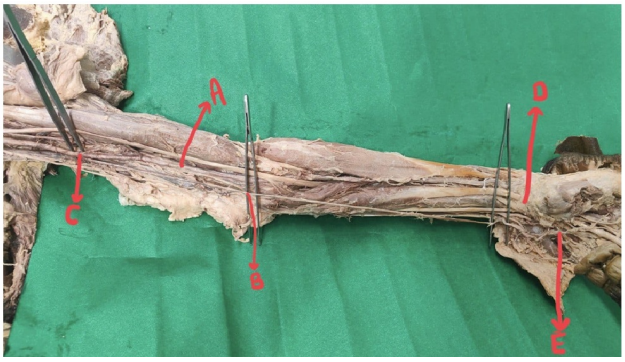

Figure 4: Left upper limb; A: Brachial artery, B: The aberrant ulnar artery, C: Point of origin of unusual ulnar artery, D: Flexor retinaculum, E: Superficial palmar arch.

course and branches as further cadaver dissection would lead to damage of structures, including various muscles, nerves, and vascular structures around the cubital fossa.[7] Also, during observation, identification, and dissection, the unusual ulnar artery was sometimes pulled, which has led to little deviations from its original course and position, but the images are so taken that they show maximum possible similarity with the original anatomical version.

5. Clinical Significance

The variation of ulnar artery originating from axillary artery, as well as being deep is not well studied because of its rare occurrence. This case should be kept in the mind of surgeons, nurses, practitioners as well as orthopedics while performing surgeries because it can be identified as a vein and can be wrongly used for intra-arterial injections and various other procedures.[6,7]

The ulnar artery can be damaged in case of self-inflicted injury. Since the chances of potential hazard intra-venous injections in the case of the superficial ulnar artery are well known, this deep variation can also be injured as intravenous drug injections can wrongly perfuse in this artery, considering it a basilic vein.

Also, this unexpected origin of the artery could get damaged during surgery, which can lead to distal limb/hand ischemia, which, for a prolonged period, can be fatal as the ulnar artery supplies to muscles in the hand via the superficial palmar arch.

Knowledge about this arterial variation should be studied and kept in mind so as to avoid any iatrogenic complications due to variation in the arterial system.

6. Clinical Recommendations

1. Intraoperative Doppler ultrasound should be used for reconstructive and orthopedic surgeons.
2. The structures should be examined first to be at their normal anatomical position with the use of various markers like neurovascular relations or muscle-vessels relations.
3. The variations in the arterial tree distribution of extremities should be kept in mind so that any iatrogenic complication can be avoided or if that happens, that complication can be tackled well in time.
4. A preoperative angiogram in flap surgery may help to trace the course of the variant artery and its site of origin.

7. Conclusion

The ulnar artery shows many variations in the upper limb; it can be superficial or deep, originating from various points, etc. The deep ulnar artery originates from the axilla, passes medially, and then goes superficial to the flexor retinaculum to form a superficial palmar arch. There are very few reports of deep ulnar artery variations, and hence, it should be kept in mind due to its clinical implications.

8. Source of Funding

None.

9. Conflict of Interest

None.

References

1. Chin KJ, Singh K. The superficial ulnar artery: A potential hazard in patients with difficult venous access. *Br J Anaesth*. 2005;94(5):692–3.
2. Solan S. Accessory superficial ulnar artery: A case report. *J Clin Diagn Res*. 2013;7(12):2943–4.
3. Panicker JB, Thilakan A, Chandi G. Ulnar artery: A case report of unusual origin and course. *J Anat Soc India*. 2003;52(2):177–9.
4. Senanayake KJ, Salgado S, Rathnayake MJ, Fernando R, Somarathne K. A rare variant of the superficial ulnar artery, and its clinical implications: A case report. *J Med Case Rep*. 2007;1:128.
5. Clarke E, Skrzat J, Mazur M, Musiał A, Sienkiewicz J, Radek M, et al. Anatomical variations of the superficial ulnar artery: Case

series observed on historical specimens prepared by Ludwik Karol Teichmann. *Folia Morphol (Warsz)*. 2022;81(1):227–33.
6. Ohana E, Sheiner E, Gurman GM. Accidental intra-arterial injection of propofol. *Eur J Anaesthesiol*. 1999;16(8):569–70.
7. Nakatani T, Tanaka S, Mizukami S, Shiraishi Y, Nakamura T. The superficial ulnar artery originating from the axillary artery. *Ann Anat*. 1996;178(3):277–9.
8. Sawant SP, Shaikh ST, More RM. A case report on variant ulnar artery. *Int J Med Sci Public Health*. 2012;1(2).
9. Salunke AA, Nambi GI, Dhanwate AD, Siriwardana HA. Superficial ulnar artery: Clinical recommendations to avoid iatrogenic complications due to variation in arterial system. *Niger Med J*. 2014;55(3):276–7.
10. Fadel RA, Amonoo-Kuofi HS. The superficial ulnar artery: Development and surgical significance. *Clin Anat*. 1996;9(2):128–32.
11. Goldberg I, Bahar A, Yosipovitch Z. Gangrene of the upper extremity following intra-arterial injection of drugs. A case report and review of the literature. *Clin Orthop Relat Res*. 1984;(188):223–9.
12. PeterL W. Arteries of the upper limb. *Grays Anat*;38:318–20.
13. D'Costa S, Shenoy BM, Narayana K. The incidence of a superficial arterial pattern in the human upper extremities. *Folia Morphol (Warsz)*. 2004;63(4):459–63.

Author biography

Vedant Garg, MBBS Student https://orcid.org/0009-0005-9127-7463

Jayanta Biswas, Senior Resident

Cite this article: Garg V, Biswas J. An ulnar artery of abnormal origin: A clinical case report. *Int J Recent Innov Med Clin Res* 2024;6(2):49-52.