

Case Report

ARTERIAL AND NEURAL VARIATIONS IN THE RIGHT UPPER LIMB: A CASE REPORT

Mohd Arshad ¹, Fateh Mohammad ^{*2}, Rajesh Kumar ³, Kamil Khan ⁴, Md Tabrej Alam ⁵.

^{1,3,4,5} Assistant Professor, Department of Anatomy, Glocal Medical College, Super Specialty Hospital & Research Center, Saharanpur, U.P., India.

^{*2} Associate Professor, Department of Anatomy, Hind Institute of Medical Sciences, Sitapur, U.P., India.

ABSTRACT

Background: Variations of the arteries, nerves and muscles of the upper limb have both clinical and surgical importance. The superficial brachial artery origination from the third part of the axillary artery, communications between the musculocutaneous and median nerves, variant formation of the brachial plexus, origination of the Profunda brachii artery from the posterior circumflex humeral artery have been well documented. We describe here the other variations in the upper limbs of a male cadaver.

Case Report: During our routine dissection studies on a 50year old male cadaver we encountered variations in Right upper limb.

Observations: In this case we observed the axillary artery gives two terminal branches the first was the superficial brachial artery and the second was a common trunk for the sub scapular, brachial, posterior circumflex humeral and anterior circumflex humeral arteries. Superficial brachial artery give Radial and Ulnar arteries. Variant formations of the brachial plexus i.e., medial root of median nerve originate from both lateral and medial cord.

Conclusion: We think that such variations should be kept in mind during surgical and diagnostic procedures. Variation in the brachial plexus medial root of median nerve originate from both lateral and medial cord might be of significance in diagnostic clinical neurophysiology.

KEY WORDS: Superficial Brachial Artery, Deep Brachial Artery, Axillary Artery, Median Nerve, Profunda Brachii Artery.

Address for Correspondence: Dr. Fateh Mohammad, Associate Professor. Department Of Anatomy, Glocal Medical College, Super Specialty Hospital & Research Center, Saharanpur, U.P., India.

E-Mail: f.mohd98@gmail.com

Access this Article online	Journal Information
Quick Response code  DOI: 10.16965/ijar.2019.158	International Journal of Anatomy and Research ICV for 2016 90.30 ISSN (E) 2321-4287 ISSN (P) 2321-8967 https://www.ijmhr.org/ijar.htm DOI-Prefix: https://dx.doi.org/10.16965/ijar 
	Article Information
	Received: 26 Feb 2019 Peer Review: 28 Feb 2019 Revised: None
	Accepted: 07 Apr 2019 Published (O): 05 May 2019 Published (P): 05 May 2019

INTRODUCTION

Normal course and distribution of upper limb vessels have been described in standard books. The brachial artery, a continuation of the axillary, begins at the distal (inferior) border of the tendon of teres major and ends about a centimeter distal to the elbow joint by dividing

into radial and ulnar arteries. The brachial artery is wholly superficial, covered anteriorly only by skin, superficial and deep fasciae[1, 2]. Injuries of upper limb are the most frequent occupational accidents and various surgical and invasive procedures in the upper limb necessitate the requirement for clear knowledge of

vascular anatomy of the upper limb [3].

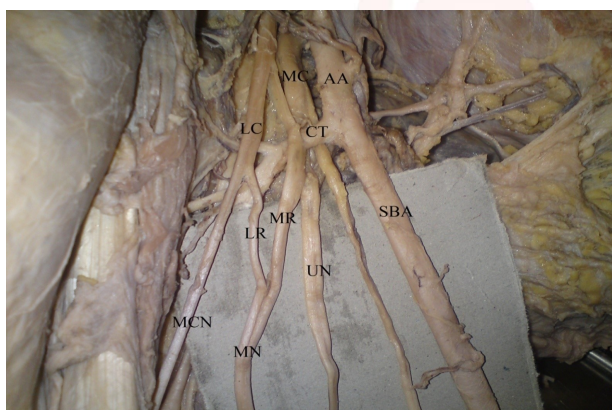
Variations in the branching pattern of the upper limb arteries occur in up to 20% of the population [1, 4].

Awareness of these variations is important to avoid serious complications. variant formation of median nerve and its clinical significance. Variations of the arteries, nerves and muscles of the upper limb have both clinical and

surgical importance. communications between the musculocutaneous and median nerves, variant formation of the brachial plexus, origination of the profunda brachii artery from the posterior circumflex humeral artery and supernumerary tendons of the abductor pollicis longus muscle have been well documented [5]. We describe here some other variations in right upper limb of a male cadaver.

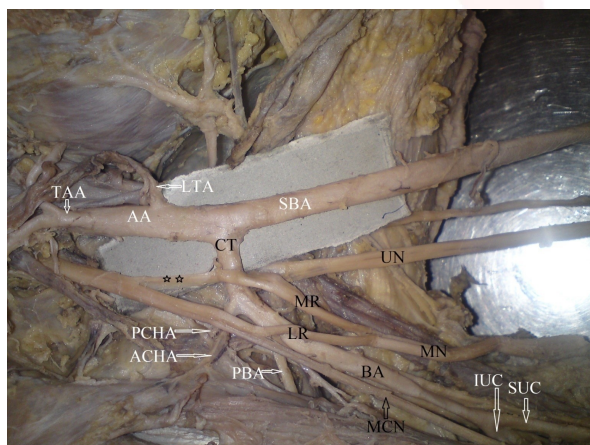
CASE REPORT

Fig. 1: Photograph of the right upper limb showing axillary artery that gives two terminal branches, the first is superficial brachial artery and second is common trunk.



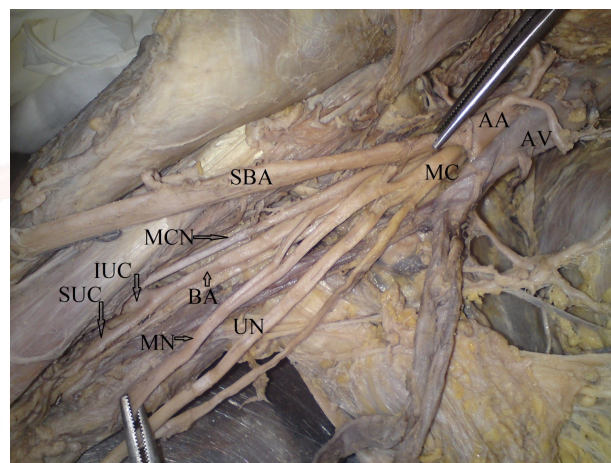
AA — axillary artery, LC— Lateral cord, CT — Common Trunk, LR — Lateral root of median nerve, MN — Median nerve, MCN — Musculocutaneous nerve, SBA — Superficial brachial artery, MR — Medial root of median nerve.

Fig. 2: Photograph of the right upper limb showing the Common trunk which gives anterior and posterior circumflex humeral arteries, Profunda Brachii artery and continue as a brachial artery.



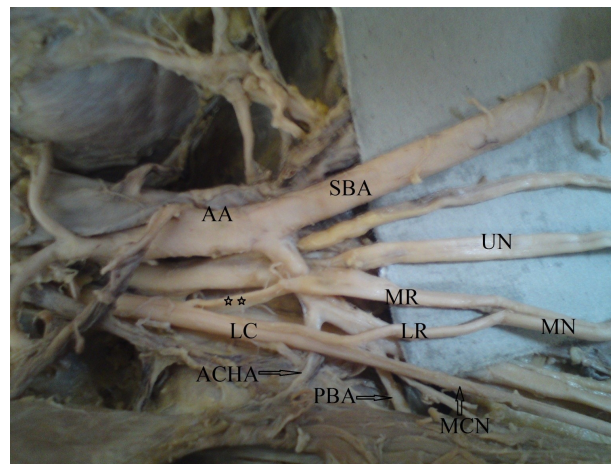
AA — Axillary artery, CT — Common Trunk, PCH — Posterior circumflex humeral artery, ACH — Anterior circumflex humeral artery, PBA — Profunda Brachial artery, BA — Brachial artery, SBA — Superficial brachial artery, MN — Median nerve, LTA— Lateral thoracic artery, TAA— Thoracoacromial artery.

Fig. 3: Photograph of the right upper limb showing the Brachial artery which divides into superior and inferior ulnar collateral arteries.



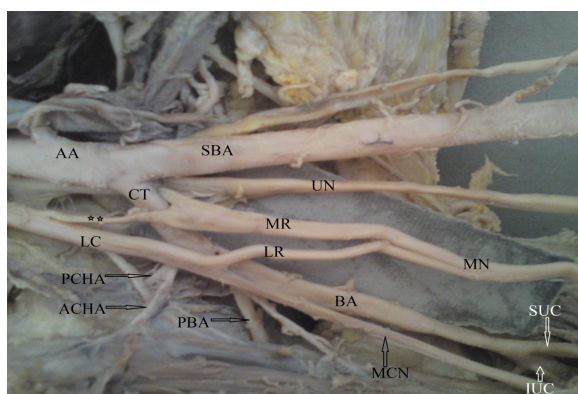
AA — Axillary artery, AV— Axillary vein, UN— Ulnar nerve, LC —Lateral cord, MC —Medial cord, ACHA— Anterior circumflex humeral artery, SBA — Superficial brachial artery, MN — Median nerve, IUC— Inferior Ulnar collateral, SUC— Superior Ulnar collateral

Fig. 4: Photograph of the right upper limb showing Variant formations of the brachial plexus i.e., medial root of median nerve originate from both lateral and medial cord.



AA — axillary artery, UN— Ulnar nerve, LC —Lateral cord, **—Origin of medial root of median nerve which arise from Lateral cord, ACHA— anterior circumflex humeral artery, SBA — superficial brachial artery, PBA —Profunda Brachial artery, MR— Medial root of median nerve, MN — Median nerve

Fig. 5: Photograph of the right upper limb showing Common trunk which passes between two origins of the medial root of median nerve.



AA — axillary artery, UN — Ulnar nerve, LC — Lateral cord, ** — Origin of medial root of median nerve which arise from Lateral cord, ACHA — anterior circumflex humeral artery, SBA — superficial brachial artery, PBA — Profunda Brachii artery, MR — Medial root of median nerve, MN — Median nerve

During our routine dissection studies on a 50 year old male cadaver in department of Anatomy, Glocal Medical College, Super Specialty Hospital & Research Center, Saharanpur, we encountered following variations in Right upper limb.

In this case we observed in Right upper limb.

1. The axillary artery gives two terminal branches, the first is superficial brachial artery and second is common trunk (Fig 1).
2. Superficial brachial artery gives radial and ulnar artery.
3. The Common trunk which gives anterior and posterior circumflex humeral arteries, Profunda Brachii artery and continue as a Brachial artery (fig 2).
4. Variant formations of the brachial plexus i.e., medial root of median nerve originate from both lateral and medial cord (fig 3).
5. Common trunk which passes between two origins of the medial root of median nerve. (Fig 4).
6. The Brachial artery which divides into superior and inferior ulnar collateral arteries (fig 5).

DISCUSSION

Arterial pattern of upper limb showing highly variations in the origin and course. This have been the subject of many anatomical studies due to their higher incidence and well documented [1-7]. These variations are the range of morphologies that are normal but less frequent.

The arterial variations have been implicated in different clinical situations. In the present case, we observe the axillary artery give two terminal branches the first was the superficial brachial artery and the second was a common trunk for the posterior circumflex humeral, anterior circumflex humeral arteries, Profunda brachii artery and brachial artery (Fig 1). Few authors was reported the similar incidences of a superficial brachial artery originating from the axillary artery as 3% (3/100 limbs) by Müller [8], 0.24% (1/410 limbs) by Adachi [6], 0.1% (1/960 limbs) by Miller [9], 0.1% (1/750 limbs) by McCormack et al. [7] and 4.5% (9/200 limbs) by Fuss et al. [10].

It has been found in various studies that variations in the arterial pattern of the upper limb are caused by deviations from the normal developmental process. According to Jurjus et al. [11], anomalous vessels may occur due to the following reason.

- (a) Choice of unusual paths in the primitive vascular plexuses.
- (b) Persistence of vessels normally obliterated.
- (c) Disappearance of vessels normally retained.
- (d) Incomplete development.
- (e) Fusion and absorption of parts usually distinct.

In the present case superficial brachial artery gives radial and ulnar arteries. Common trunk which gives anterior and posterior circumflex humeral arteries, Profunda Brachii artery and continue as a brachial artery (Fig 2), which divides into superior and inferior ulnar collateral arteries (Fig 3&5),.

This may be attributed to the persistence of the vessels normally obliterated, as described by Jurjus et al. [11]. Persistent anastomotic vessels between the main arteries of the upper limb have been reported in the literature [1, 12-14].

It has been suggested that the arterial variation of the upper limb is associated with the presence of the surrounding neural variations [15-17]. Variant formation of the median nerve is quiet common. But medial root of median nerve originate from both lateral and medial cord (Fig4) and brachial artery pass between two origins of medial root of median nerve (Fig 5)

is not common as reported in the present case [18, 19].

Abnormal formation of median nerve may strangulate the Common trunk leading to decreased blood flow through its branches. In addition the medial root of the median nerve might get compressed when passing deep to the Common trunk, leading to nerve compression symptoms [18]. Variant formations of the brachial plexus i.e., medial root of median nerve originate from both lateral and medial cord (Fig 4) that's why confirm these reports. Although many of these variations cause no disturbance in the function of the upper limb, they may be of considerable interest for surgeons and radiologists.

CONCLUSION

We think that variations in arterial pattern of upper limbs have clinical and surgical significance. Knowledge of variations in the relation between closely associated nerves and vessels is highly crucial for surgeons who need to be aware of these possibilities, especially, when they need to access or approach this areas. Variations in the brachial plexus might be of significance in diagnostic clinical neurophysiology. And additionally, we think that the co-existence of such arterial and neural variations should not be overlooked in surgical and diagnostic procedures. Hence, a thorough knowledge of superficial brachial artery and associated variations is of paramount importance to general, vascular and neurosurgeons.

Conflicts of Interests: None

REFERENCES

- [1]. Rodriguez- Niefenfuhr M, Vazquez T, Nearn L, Ferreira B, Parkin I, Sanudo JR. Variations of the arterial pattern in the upper limb revisited: a morphological and statistical study, with a review of the literature. *J Anat*, 2001;199:547–566.
- [2]. Susan Standring. *Gray's Anatomy* (London, Elsevier Churchill Livingstone Publishers, 2008) 856.
- [3]. Jacquemin G, Lemaire V, Medot M, Fissette J. Bilateral case of superficial ulnar artery originating from axillary artery. *Surg Radiol Anat*. 2001;23:139–143.
- [4]. Casal D, Pais D, Toscano T, Bilhim T, Rodrigues L, Figueiredo I, Aradio S, Angelica-Almeida M, Goyri-O'Neill J. A rare variant of the ulnar artery with important clinical implications: a case. 2012- Published in 2013
- [5]. Bergman R, Thompson SA, Afifi AK. Catalog of human anatomical variation. Urban Schwarzenberg, Baltimore 1985;108–114.
- [6]. Adachi B. Das arteriensystem der Japaner. Maruzen Co, Kyoto, 1928;326–374.
- [7]. McCormack LJ, Claudwell EW, Anson BJ. Brachial and antebrachial arterial patterns. A study of 750 extremities. *Surg Gynecol Obstet*, 1953;96: 43–54.
- [8]. Müller E. Beiträge zur morphologie des gefässsystems. *Anat Hefte*, 1903;22: 379–574.
- [9]. Miller RA. Observations upon the arrangement of the axillary artery and brachial plexus. *J Am Anat Rec*, 1939;64:143–163.
- [10]. Fuss FK, Matula CW, Tschabitscher M. Die arteria brachialis superficialis. *Anat Anz*, 1985;160:285–2947.
- [11]. Jurjus AR, Correa-De-Aruaujo R, Bohn RC. Bilateral double axillary artery: embryological basis and clinical implications. *Clin Anat*, 1999;12:135–140.
- [12]. Cavdar S, Zeybek A, Bayramicli M. Rare variation of the axillary artery. *Clin Anat*. 2000;13:66–68.
- [13]. Gonzalez-Compta X. Origin of the radial artery from the axillary artery and associated hand vascular anomalies. *J Hand Surg Am*. 1991;16:293–296.
- [14]. Sarikcioglu L, Coskun N, Ozkan O. A case with multiple anomalies in the upper limb. *Surg Radiol Anat* 2001;23:65–68.
- [15]. Anagnostopoulou S, Venieratos D. An unusual branching pattern of the superficial brachial artery accompanied by an ulnar nerve with two roots. *J Anat*. 1999;195:471–476.
- [16]. Sahin B, Seelig LL. Arterial, neural and muscular variations in the upper limbs of a single cadaver. *Surg Radiol Anat*. 2000;22:305–308.
- [17]. Sarikcioglu L, Yildirim FB. High origin of the radial artery accompanied by muscular and neural anomalies. *Ann Anat*. 2003;185:179–182.
- [18]. George BM, Nayak S and Kumar P. Clinically significant neurovascular variations in the axilla and the arm – a case report. *Neuroanat* 2007;6:36–38.
- [19]. Rao TR, Shetty P and Suresh R. Abnormal branching pattern of the axillary artery and its clinical significance. *Int. J. Morphol* 2008;26(2):389–392.

How to cite this article: Mohd Arshad, Fateh Mohammad, Rajesh Kumar, Kamil Khan, Md Tabrej Alam. ARTERIAL AND NEURAL VARIATIONS IN THE RIGHT UPPER LIMB: A CASE REPORT. *Int J Anat Res* 2019;7(2.2):6527–6530. DOI: 10.16965/ijar.2019.158