

## UNUSUAL VARIATIONS IN SECOND PART OF AXILLARY ARTERY – A CASE REPORT

Dr. Sakshi Waghmare<sup>1\*</sup>, Dr. Madhuri Mahadar<sup>2</sup>, Miss Parnika Chaudhari<sup>3</sup> and Master  
Jayesh Bodakhe<sup>4</sup>

<sup>1</sup>HOD & Associate Professor, Rachana Sharir Dept. SMBT Ayurved College, Dhamangaon,  
Igatpuri, Nashik, Maharashtra.

<sup>2</sup>Associate Professor, Rachana Sharir Dept. PDEA'S College of Ayurved and Research  
Center, Akurdi, Pune, Maharashtra.

<sup>3,4</sup>1<sup>st</sup> BAMS Student, SMBT Ayurved College, Dhamangaon, Igatpuri, Nashik, Maharashtra.

Article Received on  
23 May 2023,

Revised on 13 June 2023,  
Accepted on 03 July 2023

DOI: 10.20959/wjpr202312-28954

### \*Corresponding Author

Dr. Sakshi Waghmare

HOD & Associate

Professor, Rachana Sharir

Dept. SMBT Ayurved

College, Dhamangaon,

Igatpuri, Nashik,

Maharashtra.

### ABSTRACT

An unusual variation was observed in the branching pattern of Axillary artery of the left upper limb in an adult male cadaver. The second part of Axillary Artery had given rise to an unnamed artery which in turn gave rise to other branches of Axillary Artery. The knowledge about such variations becomes essential and significant in various clinical procedures performed by the vascular surgeons, radiologists & clinical anatomists. Moreover, the injuries of the brachial plexus are quite common and requires exploration and repair. During such repair surgeries, the abnormal arterial branch may be matter of definite concern if its presence is not kept in mind.

**KEYWORDS:** Axillary Artery, Subclavian Artery, Anterior Circumflex Humeral Artery, Posterior Circumflex Humeral Artery,

Subscapular Artery.

### INTRODUCTION

Axillary artery is the continuation of subclavian artery which extends from the outer border of 1st rib to the lower border of the teres major muscle where it continues as the Brachial artery.

The pectoralis minor muscle crosses the artery and divides it into three parts<sup>[1]</sup>

1) First part, Superior (Proximal)

- 2) Second part, Posterior (Deep)
- 3) Third part, Inferior (Distal) to the muscle

The Axillary Artery gives six branches. One branch arises from the first part, two branches from second part and three branches from the third part.<sup>[1]</sup>

1st part gives:

Superior Thoracic Artery (STA)

2nd part gives:

Thoracoacromial Artery (TAA) Lateral Thoracic Artery (LTA)

3rd part gives:

Subscapular Artery (SCA)

Anterior Circumflex Humeral Artery (ACHA)

Posterior Circumflex Humeral Artery (PCHA)

Variations in the framework of branching pattern of Axillary Artery is common, the awareness of these variations is quite essential as a pre-operative vascular judgement for various surgical and radioactive procedures.

### **Embryological aspect**

Arterial variation was first mentioned by Van Haller in 1813. The persistent enlargement and differentiation of capillaries which form initial plexus may determine the type of variation.<sup>[2]</sup>

As per literature, the Lateral branch of 7th cervical Artery grows to form the Axial artery of upper limb and in course of time a network of capillaries develop.

Variations in the upper limb vessel could also be seen, if the embryonic vascular network follows an abnormal pathway.

Defects in the surrounding tissues are another factor leading to vascular abnormalities.<sup>[3]</sup>

Embryonic studies suggested that the capillaries which are destined to regress or remain as capillaries fail to do so and they persist, enlarge and differentiate leading to arterial variations.<sup>[4]</sup>

### **Clinical aspect**

Tumours, abscess, trauma, lymph nodes are often encountered in the axillary region.<sup>[5]</sup>

Axillary lymph node dissection needs to be done in certain surgical, cases most important being breast carcinoma.<sup>[5]</sup>

The compressive Reconstructive surgery for cases such as aneurysm and trauma of axillary artery and its branches demand knowledge of the variations.<sup>[6]</sup> Axillary artery aneurysms is common in baseball pitchers.<sup>[7]</sup> Constant pressure exerted on the axillary artery in athletes, can cause focal hyperplasia of the tunica intima, aneurysms, segmental dissection predisposing to thrombosis and distal embolism.<sup>[8]</sup>

In cases of chronic shoulder dislocation, the aberrant axillary artery branches are predisposed to bleeding. One should be aware of any abnormal axillary artery branches in chronic shoulder dislocation as its lack of knowledge can lead to bleeding during surgery.<sup>[9,10]</sup>

Axillary artery is frequently lacerated and ruptured during reduction of old shoulder joint dislocation.<sup>[11]</sup>

Hence the complete knowledge of the variations of axillary artery and the frequency is of utmost clinical significance.

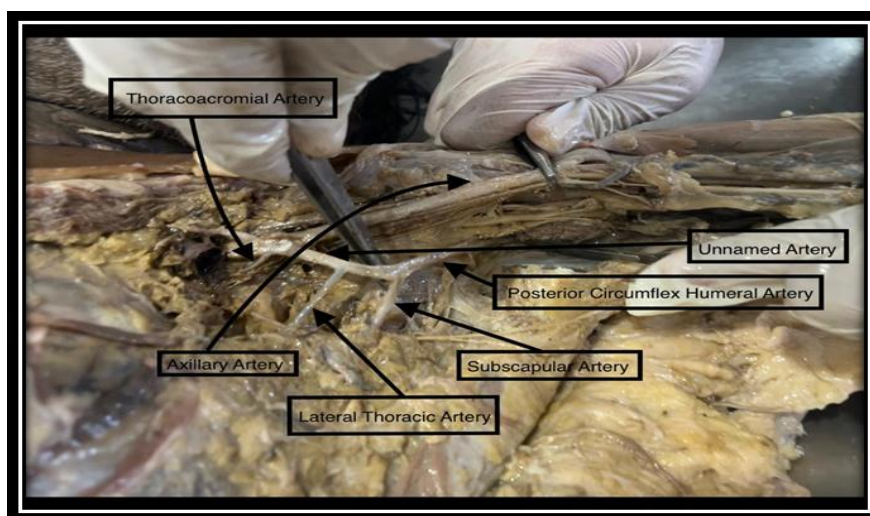
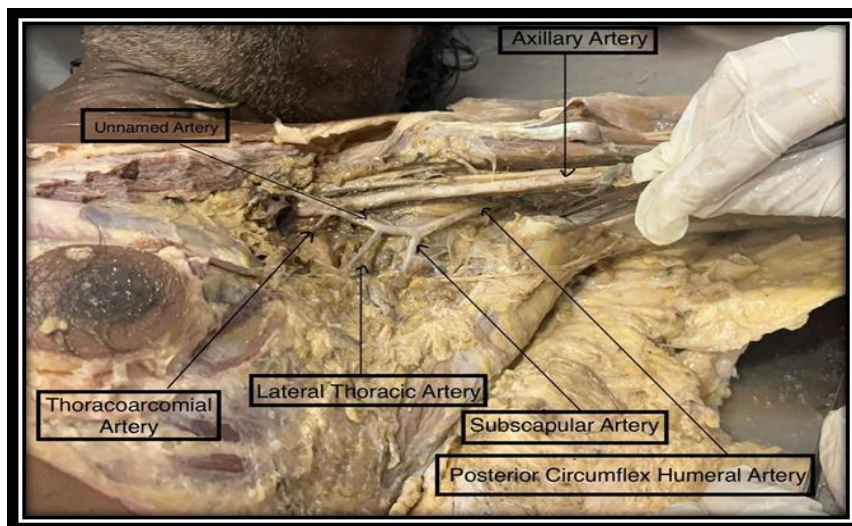
### **CASE REPORT**

Anatomical variation was observed in branching pattern of Axillary Artery in the left limb of middle-aged male cadaver during the routine dissection of 1st year undergraduate students in the dissection hall of SMBT AYURVED COLLEGE, NASHIK and was observed that the branching pattern was not normal as described in Modern Anatomical Texts.

Firstly midline incision was taken on the thorax from suprasternal notch to xyphoid process, the skin of Pectoral and Axillary region was removed after the removal of superficial fascia. Pectoralis major was identified and a cut was taken at its origin. Pectoralis major muscle was reflected from thorax to shoulder. Pectoralis minor muscle was identified and Axillary artery was exposed by removing the fascia. Pectoralis minor muscle was cut from its origin and retracted completely to visualize the whole branching pattern of Axillary Artery present beneath it.

The first part's branch was seen as mentioned in the Anatomical texts but there was an unusual branching variation in the second part of Axillary Artery. From the second part of Axillary artery, thoracoacromial artery arised normally but one branch from it continued as an

unnamed artery which in turn gave rise to the LTA and runs parallel to the main Axillary Artery. This unnamed artery further gave rise to SCA and continued as PCHA which would have arisen from the third part. From third part of Axillary Artery only one branch ACHA arise instead of 3 branches. After that ACHA formed the anastomosis with the PCHA which is the continuation of unnamed artery around the head of humerus.



## DISCUSSION

Anatomical variations are very common regarding branching pattern of AA as described by many previous researchers,<sup>[12,13,14]</sup> there is no fix pattern of origin and number of branches of AA. Any branch may originate from any part of AA.<sup>[15,16,17]</sup>

In the present study, the unnamed artery gave off Subscapular and Posterior Circumflex Humeral Arteries which would have arisen from the third part of axillary artery.

In a case study, performed by Suman Tiwari and M Khizer Hussain Afroze, forty upper limbs of 20 adult embalmed human cadavers from south Indian population were studied irrespective of their sex. The specimens were obtained from the Department of Anatomy, MVI Medical College, Bangalore. The gross dissection was done following the guidelines of Cunningham's manual. All the branches of axillary artery were traced. The total number of branches arising from axillary artery, their site of origin along with variations in the origin & presence of any common trunk of origin were noted. The data obtained was analysed and compared with that of previous studies.

In 35 (87.5%) specimens, the axillary artery gave 6 branches. The number of branches were found to be 4 in 1 (2.5%), 5 in 2 (5%) and & 7 in 2(5%) specimens. The frequency distribution of variation in the origin of branches from axillary artery have been summarised as follows:<sup>[18]</sup>

Branches of axillary artery	Origin		
	Normal n (%)	Variation n (%)	Comments
Superior Thoracic Artery	39 (97.5)	O1(2.5)	STA arising from 2 <sup>nd</sup> part
Thoracoacromial Artery	40 (100)	0	-
Lateral Thoracic Artery	37 (92.5)	O3 (7.5)	Arising as common Trunk with SSA from second part (2 cases) & As a branch from SSA from 2 <sup>nd</sup> part (1 case)
Subscapular Artery	34 (85)	6 (15)	Arising from second part as common trunk with LTA (2 cases) giving LTA (1 case) As common trunk with PCHA (1case) Along with the presence of ATA (1 case) CSA arising as separate branch from 3 <sup>rd</sup> part (1 case)
Anterior Circumflex Humeral	37 (92.5)	O3 (7.5)	Arising as common trunk with PCHA
Posterior Circumflex Humeral Artery			Arising as common trunk with ACHA (3 cases) Arising as common trunk with SSA (1 case)

Sr. No.	Author	Year	Findings
1.	Venieratos and Iolis	2001	Common subscapular trunk from third part of axillary artery giving various branches.
2.	Saeed	2002	Aberrant subclavian artery and variant branching pattern of the axillary artery

3.	Samuel	2006	A common trunk from third part of axillary artery dividing into various type branches
4.	Vijaya Bhaskar	2006	Third part of axillary artery divided into superficial and deep brachial arteries, deep divided into various branches.
5.	Ramesh Rao T	2008	A common trunk from the third part which divide into subscapular, anterior and posterior circumflex profunda brachii arteries and ulnar collateral arteries on left side.
6.	Vasudha	2008	Superior thoracic and collateral branch from first and no branches from rest of the axillary artery.
7.	Syed Rehan	2010	Thoraco acromial arise from first and second part and two posterior circumflex humoral arteries from the third part.
8.	Kumar N	2014	Profunda brachii artery from 3rd part of the axillary artery.

## CONCLUSION

Anatomical variation was observed in branching pattern of Axillary Artery in the left limb of middle-aged male cadaver as per follows:

The first part's branch was seen as mentioned in the Anatomical texts but there was an unusual branching variation in the second part of Axillary Artery. From the second part of Axillary artery, thoracoacromial artery arised normally but one branch from it continued as an unnamed artery which in turn gave rise to the LTA and ran parallel to the main Axillary Artery. This unnamed artery further gave rise to SCA and continued as PCHA which would have arised from the third part. From third part of Axillary Artery only one branch ACHA arise instead of 3 branches. After that ACHA formed the anastomosis with the PCHA which is the continuation of unnamed artery around the head of humerus.

## REFERENCES

1. BD Chaurasia, Human Anatomy, Volume 1, 8th Edition, CBS Publishers & Distributors Pvt. Ltd.
2. Rodriguez M. Vazquez T, Parkin IG, Sanudo JR. Arterial patterns of the human U.L.: Update of anatomical Variations & embryological development. *Eur J Anat*, 2003; 7(1): 21-28.
3. Arey LB. Developmental anatomy. Philadelphia: W.B. Saunders Co, 1936; 3: 312.
4. Hamilton WJ, Mossman HW. Cardiovascular system. In: Human embryology. Baltimore: Williams and Wilkins, 1972; 3: 271-90.

5. Anson BJ, McVay CB. Thoracic walls: Breast or mammary region. In: Surgical Anatomy, Anson, BJ, McVay, CB (Eds), Saunders, Philadelphia, 1984; 4, 6: 357.
6. Sargon MF, Tanyeli E. Sürücü HS, Yazar F. Arifoğlu Y. A complicated variation the upper extremity vascularisation. *Kalbogaku Zasshi*, 1996; 71(3): 211-14.
7. Schneider K, Kasparyan NG, Altchek DW, Fantini GA, Weiland AJ. An aneurysm involving the axillary artery and its branch vessels in a major league baseball pitcher: a case report and review of the literature. *Am J Sports Med*, 1999; 27(3): 370-75. Doi:10.1177/03635465990270031801. PMID: 10352776.
8. Duwayri YM, Emery VB, Driskill MR, Earley JA, Wright RW, Paletta GA Jr, et al. Positional compression of the axillary artery causing upper extremity thrombosis and embolism in the elite overhead throwing athlete. *J Vasc Surg*, 2011; 53(5): 1329-40. Doi:10.1016/j.jvs.2010.11.031. PMID: 21276687.
9. Decker GAG, du plessis DJ. Lee Mc Gregor's Synopsis of Surgical Anatomy. Mumbai: K.M. Varghese company, 1986; 12: 451.
10. Cervicobrachial region. In: Samuel L. Turek's orthopaedics: Principles and their Applications: New Delhi: Jaypee brothers, 1989; 2, 4: 913.
11. Karambelkar RR, Shewale AD, Umar BN. Variations in branching pattern of axillary artery and its clinical significance. *Anatomica Karnataka*, 2011; 5(2): 47-51.
12. Saeed M. Rufai AA, Elsayed SE, Sadiq MS. Variations in subclavian- axillary arterial system. *Saudi Med J*, 2002; 23: 206-212.
13. Yang HJ, Gil YC, Jung WS, LeeH Y. Variations of the superficial brachial artery in Korean Cadavers. *J Korean Med Sci*, 2008; 23: 884-887.
14. Patnaik VVG, Kalsey G, Singla RK. Branching pattern of axillary artery- a morphological study. *J Anat Soc. India*, 200; 49: 127-132.
15. Trotter M, Henderson JI, GassH, Brua RS. Eisman S, Agress H, Curtis GH, Westbrook ER. The origins of branches of the axillary artery in whites & in American negroes. *Anat Rec*, 1930; 46: 133-137.
16. Hollinshead WH. *Anatomy for surgeons*. New York, A Heber Harper Book, 1958; 290-300.
17. Pandey SK. Shukla VK. Anatomical Variations in origin & course of the thoraco acromial trunk & it's branches. *Nepal Med coll J*, 2004; 6: 88-91.
18. Tiwari S. Afroze MKH. Anatomical Study of Variations in the Origin of Axillary Artery Branches and Its Clinical Emphasis. *Acad. Anat. Int*, 2020; 6(1): 05-09.