

## VARIATIONS IN THE BRANCHING PATTERN OF AXILARY ARTERY

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### ABSTRACT

**Introduction:** Axillary artery, a continuation of the subclavian-artery, begins at the outer border of the first rib, and ends nominally at the inferior border of teres major where it becomes the brachial artery. Its direction varies with the position of the limb; it is almost straight when the arm is raised at right angles, concave upwards when the arm is elevated above this and convex upwards and laterally when the arm is by the side. Variations in the course and branching pattern of the axillary arteries are not uncommon, hence we observed for the course and branching patterns of Axillary artery.

**Materials and Methods:** present study is the detailed analysis of the source, site and level of origin of the axillary artery branches and their variations after dissecting 20 upper limbs in 10 cadavers out of which 8 are male and 2 are female with age varying from 35-60 years.

**Results:** In the present study anomalous position of Axillary artery branches were noted in 35% dissections. Superior thoracic artery arose common with the thoraco acromial artery in 10% dissections. Lateral thoracic artery arose common with superior thoracic artery in 5% dissections; common with thoraco-acromial artery in 20% dissections, from the second part of axillary artery, and common with thoraco-acromial artery in 10% dissections, from the first part of Axillary artery. Branches of thoraco-acromial artery arose individually from the 2<sup>nd</sup> part of Axillary artery in 10% dissections. Anterior circumflex humeral artery arose common with the posterior circumflex humeral artery in 20% dissections. Posterior circumflex humeral artery and sub-scapular artery arose from the common trunk in 5% dissections, and common with the anterior circumflex humeral artery in 20% dissections. Sub-scapular artery arose from the second part of Axillary artery in 5% dissections.

**Conclusion:** Knowledge about axillary artery variations is important for the clinicians during surgical or other interventions over shoulder region.

**KEY WORDS:** Axillary Artery, Superior Thoracic Artery, Thoraco Acromial Artery, Circumflex Humeral Arteries, Variations.

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### INTRODUCTION

Axillary artery is the direct continuation of the subclavian artery from the outer border of the

first rib. The course of the axillary artery is anatomically divided into three parts by the pectoralis minor muscle. The first part begins

at the lateral border of the first rib and extends to the medial border of the pectoralis minor muscle. The first part is enclosed within the axillary sheath along with the axillary vein and brachial plexus. The second part of the axillary artery lies deep to the pectoralis minor muscle. The third part lies between the lateral border of the pectoralis minor muscle and the inferior border of the teres major muscle [1]. Axillary artery usually described as giving off six branches. The first part of the axillary artery gives superior thoracic artery. The second part of the axillary artery gives lateral thoracic and thoraco-acromial branches. The third part of artery gives subscapular artery, anterior circumflex humeral and posterior circumflex humeral arteries [1].

It is not uncommon to find variations in the branching pattern of axillary artery. Many of its branches may arise by common trunk or a branch of named artery may arise separately [2]. On the basis of the origin of branches it is described twenty three different types of axillary artery. According to them, there is a greater tendency in the Negros ethnics, then in white persons towards clumping of the branches and arising is common [3,4].

There is an extensive collateral circulation associated with the subclavian and axillary arteries particularly around the scapula. This clearly becomes of clinical significance during injury to the axillary artery [3].

A detailed knowledge of variants of branching pattern of vessels are essential for providing accurate diagnosis and repair of blood vessels in surgical emergencies.

Presence of such variation, a large common trunk as a branch of the axillary artery is worth considering.

1. During ante grade cerebral perfusion in aortic surgery.
2. While creating the bypass between axillary and subclavian artery in case of subclavian artery occlusion.
3. While treating the aneurysm of axillary artery.
4. While re-construction of axillary artery after trauma.

Upper limb artery branches are used for nary bypass and flaps in reconstruction surgery. Accurate knowledge of the normal and variant arterial pattern of the human upper extremities is important both for reparative surgery and for angiography [1].

## MATERIALS AND METHODS

The Present study was carried out in 10 adult cadavers (8 Males and 2 females) total of 20 limbs, which are allotted for First M.B.B.S. students of S.V.S. Medical College.

As per the previous studies the axillary artery and its branching pattern was traced by the dissection method, all the cadavers were labelled; and Limbs are numbered.

**Dissection Method adopted for the study:** The Pectoralis major muscle was cut across the clavicular head, below the clavicle and reflected, towards its sternal origin. Thoraco-acromial artery pierce the clavipectoral fascia to enter it. In the upper part of the clavipectoral fascia Thoraco-acromial artery was identified.

The loose connective tissue, fat, lymph nodes were removed from the axilla to expose its contents along with axillary artery.

The lateral thoracic artery was found along with the long thoracic nerve descending on the lateral surface of the serratus anterior muscle.

Axillary nerve passes backwards along with the posterior circumflex humeral artery. Also found the subscapular artery, close to the axillary nerve.

## OBSERVATIONS AND RESULTS

**Superior Thoracic Artery:** In the two specimens it arises from the 2<sup>nd</sup> part of axillary artery and variation noted here was Artery arises from common trunk with Lateral Thoracic Artery and Thoraco Acromial Artery.

**Lateral Thoracic Artery:** In one specimen it arises from the 2<sup>nd</sup> part of axillary artery and variation noted here was Common trunk with 3<sup>rd</sup> part of Axillary Artery, in another specimen it arose from Thoraco-Acromial artery, in two specimens it arises from common trunk with superior thoracic artery and thoraco acromial artery.

**Thoraco-Acromial Artery:** In two specimens they arise as an individual origin form the 2<sup>nd</sup> part of Axillary Artery.

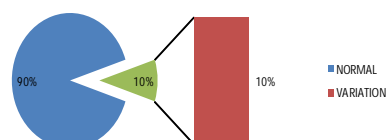
**Anterior Circumflex Humeral Artery:** In two specimens it arises from common trunk with posterior circumflex humeral artery and subscapular artery from the 3<sup>rd</sup> part of Axillary Artery. In one specimen arises from common trunk with posterior circumflex humeral artery from 3<sup>rd</sup> part of axillary artery.

**Posterior Circumflex Humeral Artery:** In four specimens it arises from common trunk with anterior circumflex humeral artery and subscapular artery from 3<sup>rd</sup> part of Axillary Artery.

**Sub Scapular Artery:** In two specimens it arises from common trunk with anterior circumflex humeral artery and posterior circumflex artery and in one specimen it arises from common trunk with posterior circumflex humeral artery from the 3<sup>rd</sup> part of the axillary artery.

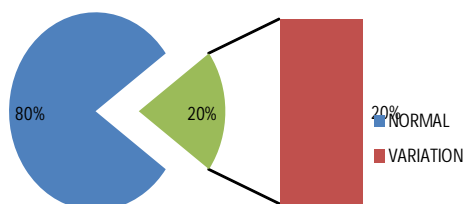
**Graph 1:** Percentage of Normal and Variations of Superior Thoracic Artery.

Percentage Of Normal & Variations Of S.T.A:



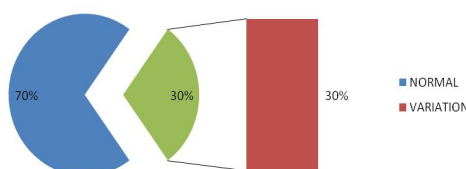
**Graph 2:** Percentage of Normal and Variations of Lateral Thoracic Artery.

Percentage Of Normal & Variations Of L.T.A:



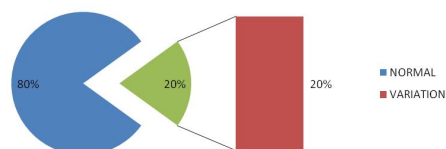
**Graph 3:** Percentage Of Normal and Variations Of Thoraco-Acromial Artery.

Percentage Of Normal & Variations Of T.A.A:



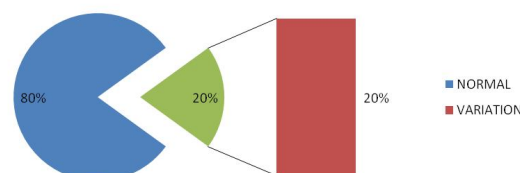
**Graph 4:** Percentage Of Normal and Variations of Anterior Circumflex Humeral Artery.

Percentage Of Normal & Variations Of A.C.H.A:



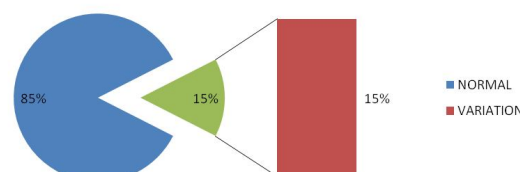
**Graph 5:** Percentage of Normal and Variations of Posterior Circumflex Humeral Artery.

Percentage Of Normal & Variations Of P.C.H.A:



**Graph 6:** Percentage of Normal and Variations of Sub Scapular artery.

Percentage Of Normal & Variations Of S.S.A:



## DISCUSSION

In the present study considering every branch given off directly by axillary artery, whether named, unnamed or common trunk, the number of branches ranged from 3-9. [6 branches in 14 limbs (70%); 5 branches in 2 limbs (10%); 9,7,4 & 3 branches in each limb (5%)].

In 70% dissections number of branches encountered was 6; followed by 5 branches in 10% and 3,4,7 & 9 branches in 5% in each dissections.

This is compared to the works of De Garis & Swartley (1928) [4] who in a study 512 axillary arteries, found 5-11 branches; Huelke (1959) [5] who described the number of branches of axillary artery ranging from 2-7; and Patnaik V.V.G

(2001) [2], who described in 38% of dissections, number of branches encountered was 5, followed by 6 branches in 36% and 4 branches in 10% of dissections.

**Superior Thoracic Artery:** Huelke (1959) [5] was reported 86.6% of superior thoracic artery arose from 1<sup>st</sup> part of axillary artery. De Garis & Swartely (1928) [4] and Patnaik VVG (2001) [2] reported 96.9% and 84% respectively.

Pellegerini (1906) [6] was reported 19.4% of superior thoracic artery arose from 1<sup>st</sup> part of axillary artery.

In the present study 90% of superior thoracic artery arising from 1<sup>st</sup> part of axillary artery, which consonances with Pellegerini (1906) [6] 90.4%.

In the present study 10% of superior thoracic artery arising from thoraco-acromial artery. This consonances with Patnaik V.V.G (2001) [2] 10%.

Pellegerini (1906) [6] was reported 2.9% of cases superior thoracic artery was absent. In the present study it was not established.

**Table 1:** Comparison of sites of origin of superior thoracic artery.

S.No.	ORIGIN	Pellegerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Trotter et al (1930) [7]	Pan (1940) [7]	Huelke (1959) [5]	Patnaik V.G (2001) [2]	Present study
1	From 3 <sup>rd</sup> part of S.S.A.	-	-	-	-	-	5.60%	6%	-
2	1 <sup>st</sup> part of A.A. Directly	90.40%	70%	96.90%	99%	97.90%	86.60%	84%	90%
3	From T.A.A.	-	-	-	-	-	-	10%	10%
4	Not found	2.90%	-	-	-	-	2.20%	10%	-

**Lateral Thoracic Artery:** Huelke (1959) [5] was reported 10.5% of Lateral thoracic artery arose directly from 1<sup>st</sup> part of axillary artery and Patnaik VVG (2001) [2] was reported 6% only. In present study this type of variation is not observed.

Lateral thoracic artery arose along with the thoraco-acromial artery, in 36.5% cases was reported by DeGaris & Swartely (1928) [4]. In the present study, Lateral thoracic artery arose along with the thoraco-acromial artery compared with Huelke (1959) [5], it was only 2.8%; Lateral thoracic artery arose along with the superior thoracic artery was observed by Pellegerini (1906) [6] & Pan (1930) [7] 1.0% and 0.7% respectively. In present study it is 5%.

Lateral thoracic artery is directly arising from

the 2<sup>nd</sup> part of axillary artery in 45% dissections of present study, consonance from Adachi (1928) [8] 40%. But in present study it is 20% only.

Lateral thoracic artery arose along with the subscapular and posterior circumflex humoral artery observed in 4.0% by Patnaik V.V.G (2001) [2]. In present study it is not observed.

Lateral thoracic artery arose directly from 3<sup>rd</sup> part of axillary artery was reported by Huelke (1959) [5] 1.7% ; in present study it is 5%.

Lateral thoracic artery was absent in 5.8% & 2% cases, were reported by Pellegerini (1906) [6] & Patnaik VVG (2001) [2] respectively. In present study it is not correlated.]

**Table 2:** Comparison of sites and modes of origin, of lateral thoracic artery:

S.No.	ORIGIN	Pellegerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Trotter et al (1930) [7]	Pan (1940) [7]	Huelke (1959) [5]	Patnaik V.G (2001) [2]	Present study
1	From 1 <sup>st</sup> part of axillary artery directly	-	-	-	-	-	10.70%	6.00%	-
2	With T.A.A	-	-	36.50%	-	-	2.80%	-	10%
3	With S.T.A	1.00%	-	-	-	0.70%	-	-	5%
4	From 2 <sup>nd</sup> part of axillary artery directly	70.20%	40.00%	55.90%	69.60%	71.40%	52.20%	82.05	60.00%
5	With T.A.A	14.40%	60.00%	6.40%	7	1.40%	3.90%	-	20%
6	With S.S.A	7.70%	-	1.20%	-	-	14.00%	6.00%	-
7	With S.S.A & P.C.H.A	-	-	-	-	-	-	4.00%	-
8	3 <sup>rd</sup> part of A.A directly	-	-	-	-	-	1.70%	-	5%
9	With S.S.A	1.00%	-	-	23.40%	26.40%	14.6	-	-
10	Absent	5.80%	-	-	-	-	-	2%	-

**Thoraco-Acromial Artery:** Huelke (1959) [5] was reported 68.5% dissections directly arose from the 2<sup>nd</sup> part of axillary artery, Patnaik VVG (2001) [2] was reported thoraco-acromial artery was directly arose from the 2<sup>nd</sup> part of axillary artery in 88% dissections. In present study it is 90%.

Huelke (1959) [5] was reported thoraco-acromial artery arose from 1<sup>st</sup> part of axillary artery in 29.8% cases and Patnaik VVG (2001) [2] was reported in 10% cases thoraco-acromial artery was arose from 1<sup>st</sup> part of axillary artery. In present study it is not established.

Hollinshead, W.H. (1958) [9], described thoraco-acromial trunk absent and arises individually from 2<sup>nd</sup> part of axillary artery. In present study 10% of dissections thoraco-acromial artery is arose individually from 2<sup>nd</sup> part of axillary artery. Karamursel S et al. (2005) [10] described

thoraco-acromial artery was absent and branches arises individually from the 2<sup>nd</sup> part of Axillary artery.

**Table 3:** Comparison of sites of origin of thoraco-acromial artery:

S.No.	ORIGIN	Pellegerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Trotter et al (1930) [7]	Pan (1940) [7]	Huelke (1959) [5]	Patnaik V.G (2001) [2]	Present study
1	From 2 <sup>nd</sup> part of axillary artery directly	-	-	-	-	-	68.50%	88%	90%
2	From 1 <sup>st</sup> part of axillary artery	-	-	-	-	-	29.80%	10%	-
3	Individual origins of thoraco-acromian artery branches	-	-	-	-	-	-	-	10%

**Anterior Circumflex Humoral Artery:** Pan et al. (1930) [7] was reported 33% of dissections, anterior circumflex humoral artery arose common trunk with the posterior circumflex humoral artery.; Pellegerini (1906) [6], Pan et al. (1930) [7] were reported, anterior circumflex humoral artery arose common trunk with the posterior circumflex humoral artery 2.1% and 23.4% respectively. In present study anterior circumflex humoral artery arises in 20% dissections common trunk with the posterior circumflex humoral artery.

Patnaik VVG (2001) [2] reported, anterior circumflex humoral artery arose directly from the 3<sup>rd</sup> part of axillary artery in 96% dissections. In present study 80% dissections, anterior circumflex humoral artery arises from the 3<sup>rd</sup> part of axillary artery.

**Table 4:** Comparison of sites of origin of anterior circumflex humoral artery.

S.No.	ORIGIN	Pellegerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Trotter et al (1930) [7]	Pan (1940) [7]	Huelke (1959) [5]	Patnaik V.G (2001) [2]	Present study
1	Directly from the 3 <sup>rd</sup> part of A.A	-	-	-	-	-	-	96%	80%
2	Common with P.C.H.A	2.10%	-	15.80%	23.40%	33.60%	12.30%	16.00%	20%

**Posterior Circumflex Humoral Artery:** Adachi, Das B (1928) [8] was reported 33% cases posterior circumflex humoral artery was directly arose from 3<sup>rd</sup> part of axillary artery; De Garis & Swartely (1928) [4] was reported 73.4% cases posterior circumflex humoral artery was directly arose from 3<sup>rd</sup> part of axillary artery, in present study 75% of posterior circumflex humoral artery arises directly from the 3<sup>rd</sup> part of axillary artery.

Pellegerini (1906) [6] & Pan et al. (1930) [7] were report posterior circumflex humoral artery common with anterior circumflex humoral artery in 2.1% and 33.6% cases respectively, in present study 20% cases posterior circumflex humoral artery arises from common trunk along with anterior circumflex humoral artery.

Pan et al. (1930) [7] and De Garis & swartely (1928) [4] were report posterior circumflex humoral artery arose common with subscapular artery in 28.6% and 1.4% respectively. In present study 5% dissections posterior circumflex humoral artery arises common with subscapular artery.

Adachi, Das B (1928) [8] and Patnaik VVG et al. (2001) [2] reported posterior circumflex humoral artery arose a branch from profunda brachii in 27.2% and 2.0% respectively. In present study it is not established.

**Table 5:** Comparison of sites of origin of posterior circumflex humoral artery.

S.No.	ORIGIN	Pellegerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Trotter et al (1930) [7]	Pan (1940) [7]	Huelke (1959) [5]	Patnaik V.G (2001) [2]	Present study
1	Directly from the 3 <sup>rd</sup> part of A.A	37.50%	33.00%	73.40%	63.30%	35.70%	67.50%	58%	75%
2	Common with A.C.H.A	2.10%	-	15.80%	23.40%	33.60%	12.30%	16.00%	20%
3	Common with S.S.A	22.10%	39.80%	1.40%	13.80%	28.60%	15.20%	22.00%	5.00%
4	A branch from profunda brachii	11.50%	27.20%	4.70%	-	2.10%	2.80%	2.00%	-
5	Others	4.80%	-	4.70%	-	-	2.20%	2.00%	-

**Subscapular Artery:** Huelke (1959) [5] reported 0.6% of subscapular artery arising from 1<sup>st</sup> part of axillary artery. In the present study it is not established.

Patnaik VVG et al. (2001) [2] was reported 16.0% of subscapular artery arising from 2<sup>nd</sup> part of axillary artery. And De Garis & Swartely (1928) [4] reported 5.1% of subscapular artery arising from 2<sup>nd</sup> part of axillary artery. In present study 5% of subscapular artery arising from 2<sup>nd</sup> part of axillary artery.

Pellegerini (1906) [6] & Huelke (1959) [5] were report subscapular artery arising from 3<sup>rd</sup> of axillary artery respectively 95.2% & 79.2%. in present study 95% of subscapular artery arising from 3<sup>rd</sup> part of axillary artery.

Huelke (1959) [5] reported 2.8% of subscapular artery arose from deep brachial artery. In

present study it is not established.

Adachi, Das B. (1928) [8], Huelke (1959) [5] & patnaik VVG et al (2001) [2] were reported subscapular artery was not found in 8.3% ; 1.7% and 4.0% cases respectively. In present study it is not established.

**Table 6:** Comparison of sites of origin of sub scapular artery.

S.No.	ORIGIN	Pelleggerini A (1906) [6]	Adachi (1928) [8]	DeGaris & Swartley (1928) [4]	Huelke (1959) [5]	Patnaik. V.G (2001) [2]	Present study
1	From 1 <sup>st</sup> part of A.A	—	—	—	0.60%	—	—
2	From 2 <sup>nd</sup> part of A.A	—	5.10%	15.70%	16.00%	5%	5%
3	From 3 <sup>rd</sup> part of A.A	95.20%	91.70%	94.10%	79.20%	80.00%	95%
4	From Deep brachial artery	—	—	—	2.80%	—	—
5	Absent	—	8.30%	—	1.70%	4.00%	—
6	Not specified	4.80%	—	0.80%	—	—	—

Axillary artery bifurcation in 3<sup>rd</sup> part of Axillary artery observed by the Treves. F.B, rogers. I (1947) [11]; Mc Cormac I.J (1953) [12]; Keena, J.A (1961) [13]; Decker Gag et. al. (1986) [14]; Kogan, I and Lewinson, D (1998) [15]; Jurjus AR, et. Al (1999) [16]; Samuel V. (2005) [17]; Johnson, D. et. et. (2005) [18]. In present study these variations were not observed.

Jurjus A, Sfeir R, Bezirdjian R. (1986) [19] described superficial ulnar artery arises from third part of axillary artery. Arey, L.B (1957) [20]; described radial artery arises from second part of axillary artery in 55 year male cadaver. In present study these variations were not observed.

Bregman R.A. Thomson, S.A, at.al (1988) [21] described subscapular artery arises from the first part of axillary artery, reported as 10% in his findings. In present study these variations were not observed.

Williams et al (1989) [22] described 'ALAR THORACIC ARTERY' from the third part axillary artery. Sometimes Axillary artery divides into the radial and ulnar arteries, and occasionally it gives origin to the 'VOLAR INTEROSSIOUS ARTERY'. In present study these variations were not observed.

Campta, X.G (1991) [23] described origin of radial artery from the axillary artery and associated hand vascular anomalies. In present study this variation was not observed.

C.B.C.Tan (1994) [24] described second part of

axillary artery having common trunk, and gives origin to 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> branches of axillary artery. An unusual course and relations of the human axillary artery. In present study this variations was not observed.

Icten N; Tuncar I (1996) [25] described a variant in high origin of radial artery. In present study this variations was not observed.

Venieratos, D. & Lolis, e.d (2001) [26] described abnormal ramification of the axillary artery ; Subscapular common trunk, gave origin to circumflex scapular, thoraco dorsal, A.C.H.A, P.C.H.A, Profonda brachi and ulnar col-lateral arteries. In present study this variations was not observed.

Saeed M et al., (2002) [27] described bilateral common subscapular circumflex humoral trunk emerging from the third part of axillary artery in 3.8% dissections. And this trunk branching into circumflex humoral and thoraco dorsal arteries. In present study this variations was not observed.

Soubhagya R.N. et al. (2006) [28] described axillary arch muscle (Latissimocondyloideus muscle) which an unusual branching. In present study this variations was not observed.

Yoshinaga K et al. (2006) [29] described 'ALAR' artery of the axillary artery. In present study this variations was not observed.

Samuel, V, Standatring S (2007) [17] described, From the third part of Axillary artery, common trunk arose for the lateral-thoracic, post. Circumflex humeral; thoraco-dorsal; subscapular. And from third part, anterior circumflex, acromial, deltoid. In present study this variations was not observed.

Geogeb. M et al. (2007) [30] described unilateral bifurcation into two equal trunks. Superficial among the two continued as a brachial artery and deep trunk bifurcated into a common circumflex humoral-subscapular trunk further divided to give A.C.H.A, P.C.H.A and S.S.A. Clinically significant neurovascular variations in the axilla and the arm. In present study this variations was not observed.

Magden O et al. (2007) [31] described unilateral common trunk in third part of axillary artery, reported a lateral thoracic-thoracodorsal

arteries. This common trunk from third part of Axillary artery. Which was divided into L.T.A and thoraco-dorsal artery. S.T.A was out of passion. Circumflex artery originated directly from the third part of Axillary artery. S.S.A was not present in up to 30% cases. The S.S.A arises from a common trunk with the P.C.H.A. In present study this variations was not observed.

Bhat KM et al (2008) [32] described superior thoracic and anterior circumflex arose from common trunk of second part of axillary artery in a south Indian male cadaver. Which gave thoraco-acromial, pectoral branch, lateral thoracic, P.C.H.A, circumflex scapular and thoraco-dorsal arteries. A.C.H.A arose from circumflex scapular artery. In present study this variations was not observed.

Yang HJ Gil YC et al. (2008) [33] studied 304 Korean cadavers and described high origin of radial artery from the A.A. in 2.3% of dissections. This was the most frequent variation found in the western population as quoted by them. Also described lateral thoracic artery from first part and two trunks of thoraco-acromial absent. In present study this variations was not observed.

## CONCLUSION

As the present study is the detailed analysis of the source, site and level of origin of the axillary artery branches and their variations, the detailed knowledge about this axillary artery anomalous branching pattern is essential for the clinicians to perform the various surgical interventions in shoulder region.

## ABBREVIATIONS

S.T.A - Superior thoracic artery  
LTA - Lateral thoracic artery  
TAT - Thoraco-acromial trunk  
Cbr - Clavicular branch  
Dbr - Deltoid branch  
Abr - Acromial branch  
Pbr - Pectoral branch  
Mbr --- Muscular branch  
AV - Axillary Vein  
ACHA - Anterior circumflex humeral artery  
PCHA - Posterior circumflex humeral artery  
SSA - Sub scapular artery  
CT - Common trunk  
AA - Axillary artery  
SCA - Sub clavian artery

**Conflicts of Interests: None**

## REFERENCES

- [1]. Susan Stanring. Gray's anatomy. 40<sup>th</sup> ed, London, ChurchillLivingstone. 2008;815-817.
- [2]. Patnaik VVG, Kalse G, Singala RK. Bifurcation of axillary artery in its third part. J. anat. soc india 2001;50;166-69.
- [3]. Saralaya V. Joy T, Madyastha S, Vadgaonkar R, Saralaya S. Abnormal branching of the axillary artery subscapular common trunk. Int.j morphol 2008;26;963-966.
- [4]. Charles F. De Garis and William B. Swartley. The axillary artery in white and negro stocks. American Journal of Anatomy. 1928;4(2):353-397.
- [5]. Huelke DF. Variations in the origins of the branches of axillary artery. Anat. rec 1959;35;33-41.
- [6]. Pellegrini A. Le arteriae subclavia e. axillaris nell'uomo studiate col. metodo statisco. Arch Ital Anat Embryol. 1906;5:205-466.
- [7]. Trotter M, Henderson JL, Gass H, Brua RS, Weisman S, Agress H, Curtis GH, Westbrook ER. The origins of branches of the axillary artery in whites and in American negroes. Anat Rec. 1930;46:133-137. doi: 10.1002/ar.1090460205.
- [8]. Adachi, Das B. Arterien system Des Japaner, Kayoto 1928;1:205-205.
- [9]. Hollinshead W.H. & Rosse, C. In text book of anatomy 4<sup>th</sup> ed. Harper and Row, Philadelphia, 1985 pp 187-89.
- [10]. Karamursel S, Badatli D, Demir Z, Tuccar E, Celebilu S. Plast reconstr. Surg 2005;115(7):2025-2031.
- [11]. Treves. F.B, Rogers. I. Upper extremity, surgical applied anatomy. 11<sup>th</sup> edn. Cassel & co-ltd. London 1947;pp230-231.
- [12]. Mc cormack IJ, Cauldwell EW, Anson BJ. Brachial and antibrachial Arterial patterns. Surg, gynecol, obstet, 1953 ;96;43-54.
- [13]. Keena, J.A. American journal of anatomy. 1961;108 pp 245-261.
- [14]. Decker Gag, Duplessis DJ, Lee Mc Gregor. In shoulder joint, synopsis of surgical anatomy, K.M..Varghese company, Mumbai 1986;pp 451.
- [15]. Kogan I and Lewinson D. Variation in the branching of the axillary artery, Acta two parts. Anat. (Basel), 1998;162(4);238-240.
- [16]. Jurjus AR, Correa-DE-Aruaujo R, Bohn RC. Embryological basis and clinical implications. Clinical Anatomy 1999; 135-140.
- [17]. Samuel V, Standatring S. Gray's Anatomy 39<sup>th</sup> edn. Churchill Livingstone;Edinburg 2005;pp.844-855.
- [18]. Johnson, D.& Ellis, H. Pectoral. In standring ,s.ed. Gray's Anatomy 37<sup>th</sup> ed. Edinburgh Elsevier, 2005.p.845.
- [19]. Jurjus A, Sfeir R, Bezirdjian R. Unusual variation of the arterial pattern of the human upper limb anat. Rec. 1986;215;82-83.
- [20]. Arey L.B. In development of the arteries, developmental anatomy, 6<sup>th</sup> edn. w.b.saunders' co. Philadelphia 1957;pp.375-375.

- [21]. Bregman R.A. Thomson, S.A., Afifi, A.K. and Saadeh, F.A. Compendium Of anatomic variation, in C.V.S. Baltimore, Urban and Schwarzenber, 1988 pp72-73.
- [22]. Williams et al. Subclavian system of arteries in Gray's anatomy 37<sup>th</sup> ed. Edinburgh; Chrchill Livingstone; 1989.p.749-763.
- [23]. Campta, X.G. Journal of hand surgery 1991;16(a):293-296.
- [24]. C.B.C.Tan. An unusual course and relations of the human axillary artery, Singapore Med, J.1994;35;263-264.
- [25]. Icten, N; Tuncar. Variant high origin of radial artery: A bilateral case. Surgery, Radiology, Anatomy, 1996;18(1):63-66.
- [26]. Venieratos, D. and Lolis. Subscapular common trunk.Morphologic. 2001;85(270):23-4,2001
- [27]. Saeed M, Rufai AA, Elsayed SE, Sadiq M.S. Third part of axillary artery variations in the subclavian-axillary arterial system 2002;23(2):206-212.
- [28]. Soubhagya, R. N.; Latha, V. R; Ashwin, K.; Madhan, K. S. J. & Ganesh, C. K. Coexistence of an axillary arch muscle (Latissimocondyloideus muscle) with an unusual axillary artery branching: Case report and review. Int. J. Morphol, 2006;24(2):147-50.
- [29]. Yoshinaga K, Kodama. K, Kameta. K, Karasawa. N, Kanenaka. N, Kohono. S, and Sugunuma T. 'ALAR' artery of the axillary artery. Indian. J. Plast. Surg 2006;39:222-3.
- [30]. George B. M, Nayak S, Kumar P. Clinically significant neurovascular variations in the axilla and the arm - a case report. Neuroanatomy, 2007;6(1):36-S.
- [31]. Magden O, Gocmen-Mas N, Cagar B. Multiple variations in the axillary arterial tree relevant to plastic surgery ; int.j.morphol 2007;25(2):357-61.
- [32]. Bhat KM, Gowada S, Potu BK, Rao MS. Common trunk for thoraco- acromial & muscular branches, a unique branching pattern of the axillary artery in south indian male cadaver. Bratisl Lek Listy. 2008; 109:587-589.
- [33]. Yang HJ Gil YC, Jung WS, Lee HY. Variations of the superficial brachial artery in korean cadevers. J. Korean med sci.2008; 23;884-887.

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