

Case Report

Undocumented variant branching pattern of axillary artery

Suman*, Sunita Kalra, Sarika Rachel Tigga

Department of Anatomy, University College of Medical Sciences, Delhi, India

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***Correspondence:**

Dr. Suman,

E-mail: suman1984yadav.sy@gmail.com

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ABSTRACT

During routine dissection for teaching under graduate medical students, an atypical case of variant branching pattern in second and third part of the axillary artery was discovered. The posterior circumflex humeral artery and subscapular artery arose as a common trunk from third part of axillary artery. Also, subscapular artery was a small branch whereas lateral thoracic artery was the largest branch of axillary artery which was totally unusual. The lateral thoracic artery supplied second and third intercostal spaces, axillary fat, subscapularis, serratus anterior, teres major and latissimus dorsi muscles. Also there was an aberrant branch arising from the second part of axillary artery which was observed to be coursing towards the shoulder joint. The co-existence of variant branches along with the extra aberrant artery found in this case is exceptional. The knowledge about this kind of variation is important for vascular surgeons and radiologists for repair of vessels; diagnostic and therapeutic angiography in addition to various skin flaps and muscle transfers for upper extremity and breast reconstruction.

Keywords: Aberrant artery, Axillary artery, Lateral thoracic artery, Thoracodorsal artery, Variation

INTRODUCTION

The standard textbooks describe axillary artery as the continuation of subclavian artery, extending from outer border of the first rib to the inferior border of teres major muscle and subsequently continuing as brachial artery.¹ The axillary artery is naturally divided into three regions by the pectoralis minor muscle as the first part (proximal), second part (posterior) and third part (distal) to the muscle. The typical branches of axillary artery include the superior thoracic artery from its first part.

Second part gives rise to the acromio thoracic trunk as well as lateral thoracic artery and finally subscapular artery, anterior circumflex humeral and posterior circumflex humeral artery from the third part. Few authors have described anatomical variations in the branching pattern of axillary artery that typically involve the subscapular artery, lateral thoracic artery and the posterior circumflex humeral artery.² The variable branching pattern of axillary artery is of paramount

importance for anatomists, plastic, cardiovascular and orthopedic surgeons, radiologists and interventional cardiologists.

In the present report, the unusually large area of distribution of lateral thoracic artery was discovered while the subscapular artery was a small branch which arose as a common trunk with the posterior circumflex humeral artery. Also, there was an aberrant branch supplying shoulder joint. This kind of variations is very important for shoulder joint and vascular surgeries including muscle flap transplants.

CASE REPORT

The variation was noticed during routine dissection conducted for 1st year MBBS students in the Department of Anatomy, University College of Medical Sciences, Delhi, India. An undocumented vascular deviation was encountered in right upper limb of a 55 year old male cadaver in which the axillary artery gave a variant

branching pattern and distribution of arteries from its second and third parts.

The acromio thoracic trunk arose from the superior surface of second part as a common trunk and instead of usual quadri-furcation, it immediately bifurcated into two branches which then divided into classical branches (Figure 1A). The lateral thoracic artery was unusually large which was arising from the inferior surface of the second part of axillary artery and descended obliquely downwards along inferior border of pectoralis minor muscle.

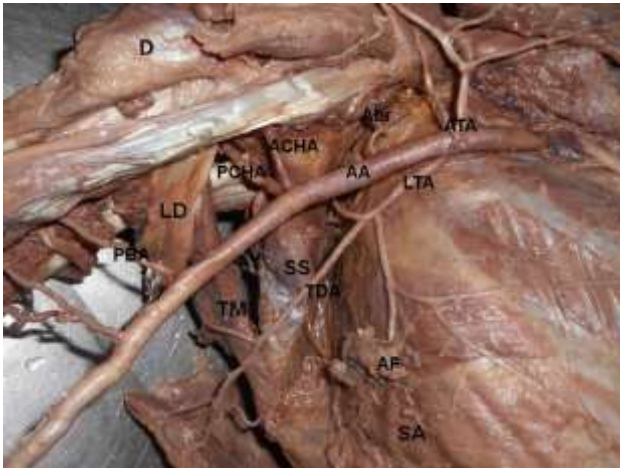


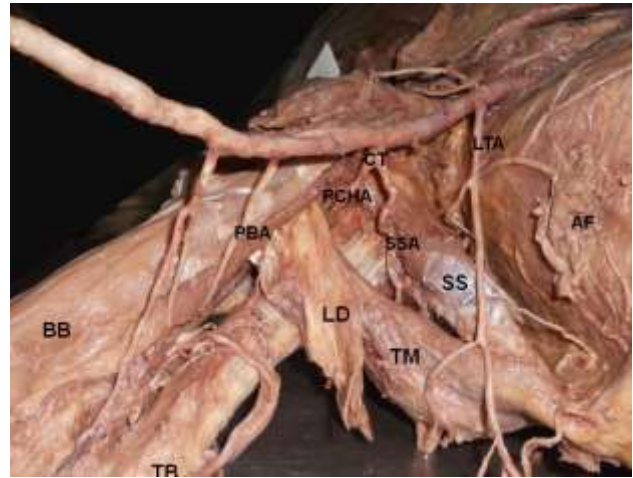
Figure 1A: Dissection of right axillary.

Along its course, it supplied 2nd and 3rd intercostals spaces, axillary fat, pectoralis minor, subscapularis, serratus anterior, teres major and lattisimus dorsi muscles (Figure 1A and B). On the contrary, the subscapular artery was not only unusually smaller branch but also emerged as a common trunk along with posterior circumflex humeral artery from the inferior surface of third part of axillary artery (Figure 1B).

The posterior circumflex humeral artery descended superficial to the axillary nerve and passed through the quadrangular space while the subscapular artery gave a branch to subscapularis and continued as circumflex artery through the upper triangular space without giving the customary thoracodorsal branch. In this extraordinary case, thoracodorsal artery was a branch from the larger lateral thoracic artery (Figure 1A and B).

Also, there was an aberrant artery emerging from the postero-inferior surface of the third part of axillary artery arising between acromio thoracic trunk and anterior circumflex humeral artery (Figure 1A). It coursed

towards the shoulder joint to supply it by passing deep to the coracoid process.



AA (axillary artery), CT (common trunk), PCHA (posterior circumflex humeral artery), SSA (subscapular artery), LTA (lateral thoracic artery), PBA (profunda brachii artery), LD (lattisimus dorsi muscle), TM (teres major muscle), BB (biceps brachii muscle), TB (triceps brachii muscle), SS (subscapularis).

Figure 1B: Dissection of right axillary region.

DISCUSSION

Review of literature revealed many different patterns of branching and course of axillary artery and its branches.² But the aberrant variation noticed in this study has not been reported. In the present case, there was a common trunk for subscapular and posterior circumflex humeral artery (Figure 1B).

The subscapular artery was not the standard largest branch of axillary artery while lateral thoracic artery was the largest branch which also gave origin to thoracodorsal artery (Figure 1A and B). Moreover, an aberrant branch arose from third part of axillary artery and supplied the shoulder joint (Figure 1A). Variant branching pattern of axillary artery which include a common subscapular arterial trunk that arose as a collateral branch of axillary artery and gave all the branches which otherwise arise from second and third part of axillary artery has also been reported in one study.³

In a study conducted regarding the origin and distribution of lateral thoracic artery, the authors found that in 7.25% cases, thoracodorsal artery was a branch from the lateral thoracic artery. They also found that in 12% cases, subscapular artery gave origin to posterior circumflex humeral artery.⁴ However the co-existence of many variant branches along with aberrant branch in the same individual was not found in literature as seen in the present case. The knowledge of variant branching and distribution of axillary artery is of vital importance for anatomists, plastic, cardiovascular and orthopedic surgeons, vascular radiologists and interventional

cardiologists.^{2,3,5} Several myocutaneous flaps used in free muscle transfer for traumatic repair of upper extremity and breast reconstruction are based on the branches of axillary artery.^{4,6} These branches are commonly used as recipient vessels in this kind of autogenous tissue grafting surgeries.

In the commonly used transverse rectus abdominus muscle (TRAM) flap for breast reconstruction surgeries, thoracodorsal artery along with lateral thoracic and circumflex scapular artery are commonly used as recipient vessels.⁴

As lateral thoracic is the main artery supplying nipple areolar complex in majority of females and any compromise in its blood supply leads to nipple-areolar necrosis. The variant origin and distribution of lateral thoracic artery should be kept in mind during procedures like radical mastectomy, mastopexy, breast reconstruction and reduction.^{5,7}

Moreover, the accessory branch to shoulder joint should also be kept in mind during shoulder dislocation and procedures on shoulder joint. Also, the variant branching pattern is of significance while doing traumatic and aneurysm repair of axillary artery and surgical biopsy or excision of axillary lymph nodes for breast cancer.⁴ The documentation of this kind of variation would certainly benefit the plastic and reconstructive surgeons.

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