

Absence of Subscapular Artery as Anatomical Variation in Branching Pattern of Auxillary Artery

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Abstract

During routine dissection for gross anatomy practical teaching by unknown age of adult male cadaver for the undergraduate medical students at department of human anatomy, college of medicine and health sciences, university of Gondar, Ethiopia we had encountered anatomical variation in branching pattern of right axillary artery. The third part of right axillary artery gave rise to a common trunk that divides into anterior and posterior circumflex humeral arteries. This anatomical variation in the branching pattern of axillary artery is very crucial for surgical procedures that surgeons perform an intervention or a diagnostic procedure in cardiovascular diseases.

Keywords: Axillary artery • Anatomical variation • Branching pattern • Subscapular artery

Description

As regional anatomy textbooks describe that axillary artery is a prolongation of subclavian artery, extending from the lower border of first rib to the lower border of teres major muscle where it named as brachial artery.

The pectoralis minor muscle is a land mark muscle that related anteriorly to the axillary artery and it divides axillary artery into three parts, first part (proximal part) extending from outer border of first rib to the upper border of pectoralis minor muscle, second part (posterior) lies posterior the pectoralis minor muscle and third part (distal part) extending from lower border of pectoralis minor muscle to lower border of teres major muscle [1].

Axillary artery normally give off superior thoracic artery from the first part, lateral thoracic artery and thoracoacromial artery from the second part and subscapular, anterior circumflex humeral and posterior circumflex humeral arteries from the third part (Figure 1) and continuation to brachial artery [2]. Anatomical variation was observed during routine dissection for gross anatomy practical teaching by unknown age of adult male cadaver for second year of undergraduate medical students of academic calendar of 2018/19 Gc at department of human anatomy, college of medicine and health sciences, university of Gondar, Ethiopia [3-6].

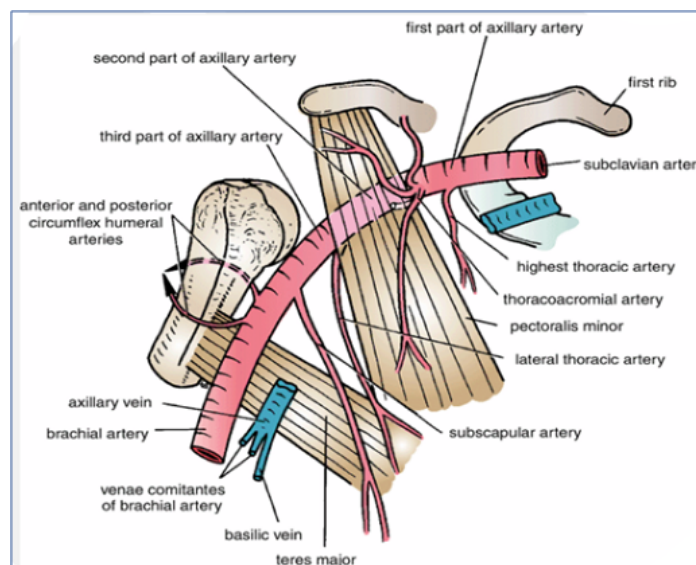


Figure 1. Schematic representation of normal branching pattern of axillary artery showing superior thoracic artery from the first part; thoraco acromial artery and lateral thoracic artery from the second part; subscapular artery, anterior circumflex humeral artery and posterior circumflex humeral artery from the third part of axillary artery.

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We had been encountered vascular anatomical variation in branching pattern of upper limb at right axillary artery. An arterial branching variation was encountered in right upper limb of unknown age adult male cadaver in which the axillary artery offered a variant branching pattern and distribution of arteries from its second and third parts [7-9]. The acromiothoracic trunk arose from the second part as a common trunk and instead of usual giving direct branches from axillary artery as cervical, pectoral, acromial and deltoid branches, the trunk immediately bifurcated into two branches which then divided into usual branches. The lateral thoracic artery was usually large which was arising from the inferior surface of the second part of axillary artery and descended obliquely downwards [10]. Similarly, the third part of axillary artery gives a common trunk from the lateral aspect and divided into anterior circumflex humeral artery and posterior circumflex humeral artery rather than giving direct branch of anterior circumflex humeral artery and posterior circumflex humeral artery from axillary artery [11]. The posterior circumflex humeral artery descended superficial to the axillary nerve and passed through the quadrangular space and the anterior circumflex humeral artery turn in the anterior aspect of humerus and the other a novel observation was absent of subscapular artery from the third part of axillary artery (Figure 2).

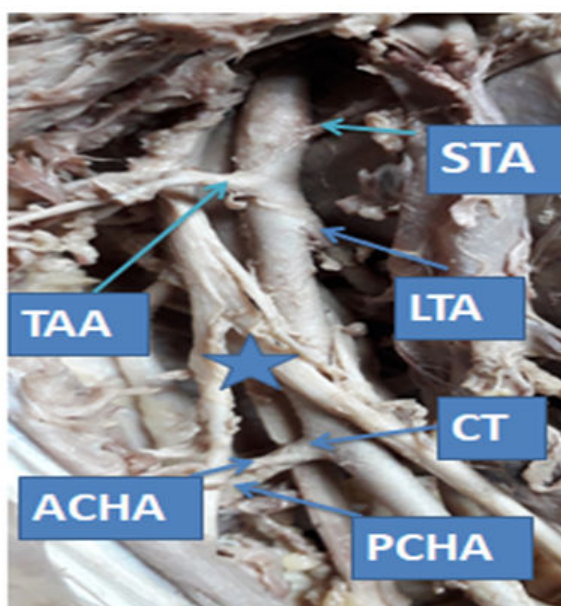


Figure 2. Photograph taken from right axillary artery with branching pattern variation. **Note:** STA: Superior Thoracic Artery; LTA: Lateral Thoracic Artery; TAA: Thoracoacromial Artery; CT: Common Trunk; ACHA: Anterior Circumflex Humeral Artery; PCHA: Posterior Circumflex Humeral; Artery*: Musculocutaneous Nerve and Lateral Root of Median Nerve

Variation of branching pattern of axillary artery is common as reported that 28% of cases studied have variation in branching pattern of axillary artery. Subscapular artery has been found to be arising from second part of axillary artery in 4% cases and in up to 30% of it arises from a common trunk with posterior circumflex humeral artery.

A study reported that subscapular artery arises from the first part of axillary artery in 0.6% cases, from the second part in 15.7% cases and from the third part in 79.2% cases. Variation in branching pattern of axillary artery has been reported that the third part of the left axillary artery gave origin to subscapular, anterior and posterior circumflex humeral, profunda brachii and ulnar collateral arteries from a common trunk. Similar study conducted that a common trunk from the third part of the axillary artery giving rise to anterior circumflex humeral, posterior circumflex humeral and subscapular arteries and which then descended into the arm to give radial collateral, middle collateral and continued as the superior ulnar collateral artery. In another study, a common trunk from the second part of axillary artery gave origin to thoracoacromial, lateral thoracic, subscapular and posterior circumflex humeral arteries. Similar study reported that the axillary artery gave a large abnormal arterial trunk which in turn divided into a common circumflex humeral-subscapular trunk and profunda brachii artery.

Conclusion

In the present study the second part of the axillary artery gave rise to common trunk as thoracoacromial trunk which immediately divided into usual branches, the third part of axillary artery gives a common trunk for anterior circumflex humeral artery and posterior circumflex humeral artery and absence of subscapular artery. Variation in branching pattern of axillary artery might be due to the anomalies in embryonic developmental processes of vascular system occurred at any stage by the arrest of development and developmental defects of surrounding tissue. Anatomical variations in branching pattern of axillary artery should be kept in mind while performing bypass between the axillary and subclavian artery in surgical treatment of subclavian artery occlusion. Injury to axillary artery may require reconstructive operation and variations as in the present case may present difficulties in such procedures. Any pathological conditions lead to dilation of the axillary artery and its major branches may give the impression in physical activities. Repetitive positional compression of the axillary artery in athletes can cause focal intimal hyperplasia, aneurysm formation, segmental dissection and branch vessel aneurysms. These conditions lead thrombosis and distal embolism and may need positional arteriography for diagnosis. Anatomical variant branches of axillary artery as in the present case is also prone for such conditions. The axillary arteries have been successfully used as an ideal site of ways like cardiopulmonary bypass, thoracic and aortic procedures, for insertion of intra-aortic balloon pumps and it is under consideration for use as an inflow vessel in coronary artery surgery. These variations in branching pattern of axillary artery might be considered as significant impact in any clinical application.

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