Axillary Artery and Subscapular Artery Variation: A Case Report

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Abstract

A. thoracica superior, the first artery to supply thorax, is a thin vein branching from the first part of a. axillaris. There are two arteries branching from the second part of a. axillaris: One of them is a. thoraco-acromialis, being a short and thick branch, and the other one is a branch also known as a. thoracica lateralis or a. mammaria externa. A. thoracodorsalis is another vein and proceeds as a continuation of a. subscapularis and accompanies n. thoracodorsalis. Knowing variations other than normal anatomical structure is significantly important for anatomists, clinicians and especially for surgeons. We want to present an axillary artery and subscapular artery variation we have found, by using dissection method, on bilateral upper extremity of a 40-year old, white, male cadaver used for educational purposes by the Department of Anatomy, Faculty of Medicine, Inonu University.

Key Words: Vascular variations, axillary artery, subscapular artery

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Introduction

The axillary artery proceeds as a subclavian artery from exterior border of the first costa to inferior border of teres major muscle, where it becomes a brachial artery and then continues as brachial artery. Pectoralis minor muscle is on the anterior of axillary artery and divides axillary artery into three parts. The first part runs from the first costa to the upper part of pectoralis minor muscle, the second part is behind pectoralis minor muscle and the third part extends from the inferior border of pectoralis minor to the inferior border of teres major muscle. A. thoracica superior separating from the axillary artery's first part is a thin branch, and supplies blood to m. serratus anterior and to the muscles located in the first two spatium intercostale. Moreover, a. thoracica may sometimes originate from a. thoracoacromialis. The second part is where thoracoacromial artery, a short and thick branch, and lateral thoracic artery branch out. Variations are commonly found in this part. The presence of such arterial variations should be kept in mind in surgical operations especially related to axillary region and breast. Subscapular, anterior circumflex humeral and posterior circumflex humeral arteries separate in the third part. However, subscapular artery divides into circumflex scapular and thoracodorsal arteries. It continues as a. brachialis, a vein responsible for supplying the upper extremity. As classical information, there is no branch from a. brachialis to rib cage [1].

Case

During the routine dissection performed for educational purposes in Inonu University Faculty of Medicine, we have found a bilaterally axillary artery in an adult, male, white cadaver.

Arteria axillaris;

Gave three branches at the same level in the right extremity at 31 mm distal from the first costa. The first branch (arteria thoraco-acromialis) was 4 mm diameter. It continued for 1 cm and was divided into two: one of them run to thorax and the other one run to deltoid muscle. The second branch (arteria thoracica superior) was of 3 mm diameter and extended toward thorax. The third branch (arteria thoracica lateralis) was of 2 mm diameter and ran toward thorax lateral wall (Figure 1).

Figure 1. Arteria axillaris branches.

1: Arteria thoracoacromialis, 2: Arteria thoracica superior, 3: Arteria thoracica lateralis

Arteria axillaris gave arteria subscapularis, of a diameter of 7 mm, at 73 mm distal from the first costa to the medial. Upon separating from arteria axillaris, arteria subscapularis gave three branches at 17 mm distal and then proceeded to spatium axillare medial as arteria circumflexa scapula. First branch of a. subscapularis (detected by us as a variation) was of 3 mm diameter and extended toward lateral wall of thorax. The second branch (arteria thoracodordalis) was of 5 mm diameter and accompanied musculus latissimus dorsi. The third branch (detected by us as a variation) was of 2.5 mm diameter and extended to fossa axillaris. The fourth branch (arteria circumflexa scapula) was of 4 mm diameter and was like a continuation of itself and proceeded to spatium axillare mediale (Figure 2).

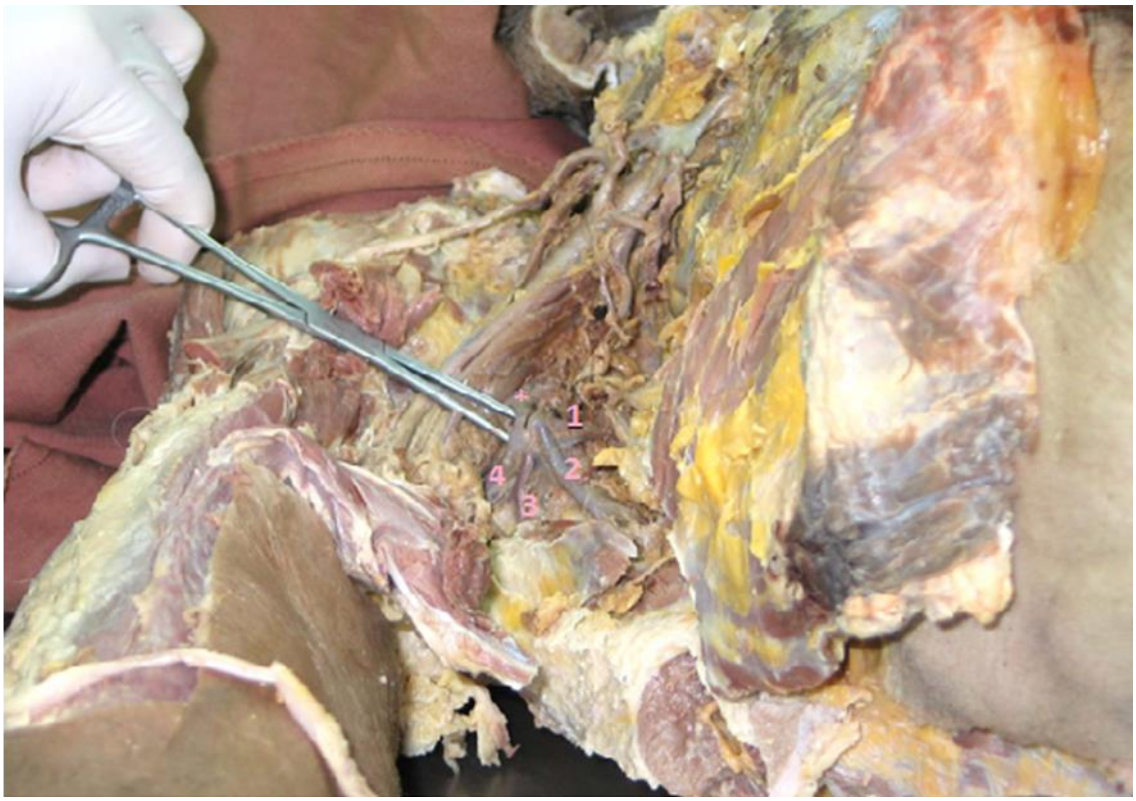

Figure 2. The output of arterial subscapularis and its branches seen in the right extremity.

*: A. subscapularis; 1: variations (moving towards the lateral wall of the thorax), 2: Arteria thoracodorsalis, 3: variations (moving toward the fossa axillaris), 4: Arteria circumflexa scapula.

No arteria thoracica superior was detected in left extremity. Arteria axillaris gave a 3 mm diameter thoracoacromialis at 25 mm distal from the first costa and, at the same point, gave a 2-mm diameter arteria thoracica lateralis toward the medial. It gave another 1.7 mm diameter branch (detected by us as a variation) extending to arm from the center of which arteria thoracoacromialis and arteria thoracica lateralis arose. Arteria axillaris gave a 2 mm diameter branch (detected by us as a variation) extending to spina scapula at 15 mm distal from where arteria thoraco-acromialis originated (Figure 3). Arteria axillaris gave two braches toward the lateral at 70 mm distal from the first costa. One of them, arteria circumflexa humeri anterior, was of 1.5 mm diameter and running forward. The other one, arteria circumflexa humeri posterior, was of 3 mm diameter and running backward.

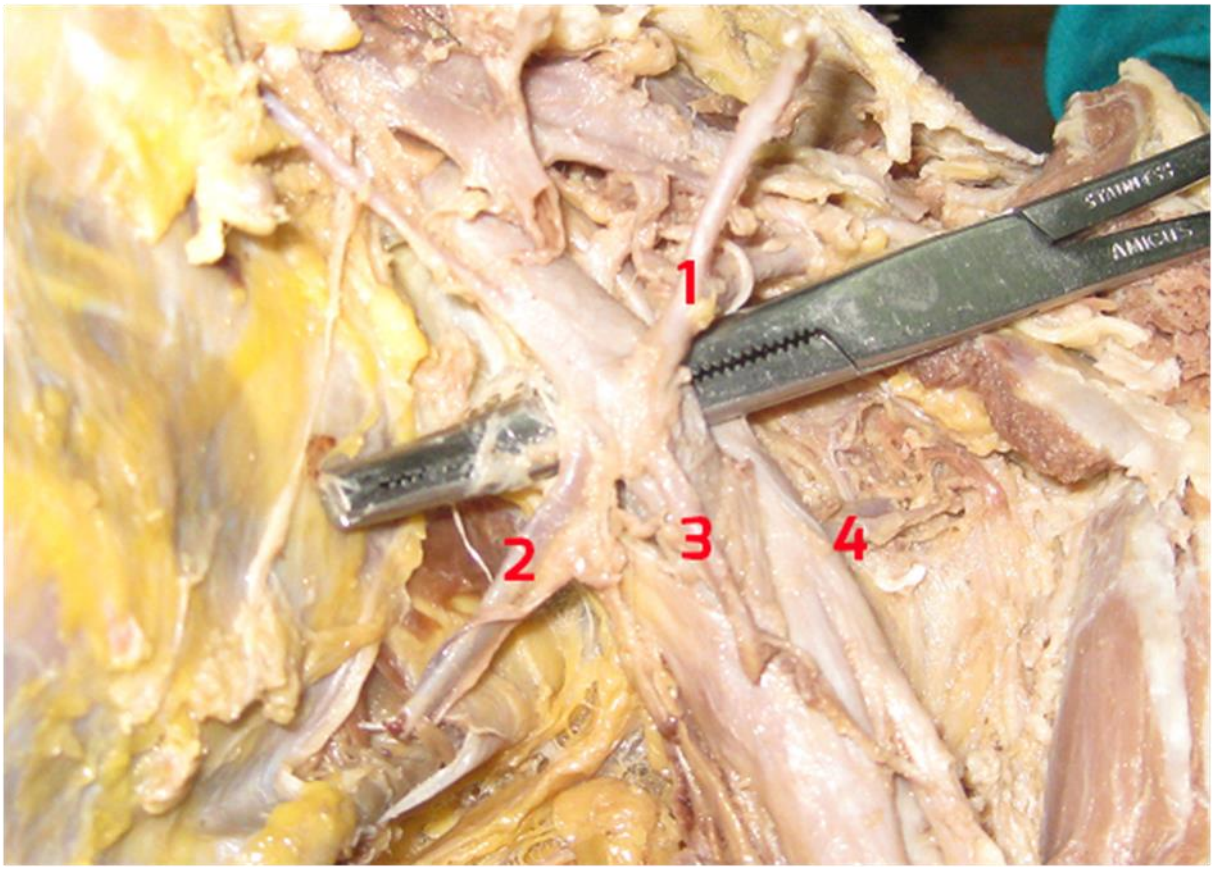

Figure 3. Variations of arteria axillaris seen in the left extremity.

1: Arteria thoracoacromialis, 2: Arteria thoracica lateralis, 3: variations, 4: Branch extending to spina scapula

Arteria axillaris gave a 4-mm diameter arteria subscapularis toward the medial at the point where it gave branches called circumflexa humeri anterior and posterior.

After continuing by 10 mm, arteria subscapularis gave three branches: the first branch was of 2 mm diameter and extended to anterior thoracic wall; the second branch (arteria thoracodorsalis) was of 2 mm diameter and extended toward muscle fibers of latissimus dorsi; and the third branch (arteria circumflexa scapula) was of 2.5 mm diameter and running toward fossa axillaris.

Discussion

Developmental disorders on tissue region may lead to vascular variations. As a result of a defect in embryogenic vascular structure resulting from cessation of development, there may be variations in the axillary artery branches [2].

Arteria Axillaris' primary branches, responsible for conveying blood to thorax, are a. thoracodorsalis separating from a. subscapularis, a. thoracica superior, a. thoraco-acromialis and a. thoracica lateralis. Arteria thoracica superior normally separates from the first part of a. axillaris. In this case, we have found that this artery is absent on left extremity. Normally, a. thoracica lateralis and a. thoraco-acromialis originate from the second part of a. axillaris. However, in this case, we have found that there is another branch on the left extremity arising between these two arteries and running to the arm.

We have seen many upper extremity artery variations in literature [3,4]. However, more than one variation in the same extremity is too rare. In the literature search, the rate of variations on the upper extremities' major arteries is within 11%-24.4% [5]. Baral et al. [6] reported that a. axillaris does not give any branch in the first part and gives two branches in the second part. Furthermore, they reported that one of these branches arises as a. thoraco-acromialis and the other one arises as a large trunk, and after giving off a. thoracica lateralis, a. thoracodorsalis, a. subscapularis and a. circumflexa scapula posterior, continues as a. circumflexa humeri posterior. The same researchers reported that a. axillaris gives only a. circumflexa humeri anterior in the third part. Natsis et al. [7] reported a finding of a. thoracodorsalis accessory originating bilaterally from the third part of axillary artery. Kogan and Lewinson [8] identified a variation arising from axillary artery which they called thoracoepigastric artery.

In the dissected cadaver, Arteria subscapularis' branches showed variations on the right. Upon giving off three branches, it proceeded to spatium axillare medial as a. circumflexa scapula. Two of these branches are accordant with information in literature (a. thoracodorsalis and a. circumflexa scapula). However, the names of other two branches could not be identified. One of them ran toward thorax lateral wall and the other one extended to fossa axillaris. After giving two branches, a. subscapularis proceeded as a. circumflexa scapula on the left. The first one ran to anterior thoracic wall. The second was a. thoracodorsalis. Durgun et al. [9] reported that a. subscapularis gives off a. circumflexa humeri posterior, a. thoracodorsalis and a. circumflexa scapula branches. Olinger and Benninger [10] reported that a. thoracica lateralis gives origin to a. thoracodorsalis (7.2%) and to a. subscapularis (5.4%). However,

they reported that a. thoracica lateralis takes its origin from a. subscapularis (4.2%). Vijayabhaskar et al. [11] reported that a. subscapularis, a. circumflexa humeri anterior and a. circumflexa humeri posterior originated from a. brachialis. Panagouli et al. [3] reported that in the cadaver, a. axillaris gave a branch called a. ulnaris superficialis before giving a. subscapularis.

Relevant to the upper extremity artery traumas, axillary artery trauma is moderately rare with a range from 15 to 20%. It is reported that the third segment of axillary artery is traumatized after glenohumeral joint inferior dislocation [12].

Axillary artery traumas and aneurysms may require reconstructive operations. Axillary arteries are successfully used in cardiopulmonary bypass, thoracic and procedures and coroner artery surgery. Variations make these procedures difficult [13].

It is obvious that variations relevant to axillary artery and subscapular artery are common and widely documented in literature. Information about the variation seen in our case is important in terms of avoiding the occurrence of any unwanted iatrogenic errors especially during mammoplastry and axillary lymph node dissection operations.

Conflict of Interests

The authors hereby declare that they have no competing interests.

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