

## A Case Report Study of Axillary Artery Variation in Iranian Female Cadaver

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### Abstract

During routine dissection of an approximately 50-year-old female cadaver for training the Master students of the Anatomical Sciences at school medicine of Tehran University of Medical Sciences, we came across a variation in branching pattern of right axillary artery. One branch is separated from the Axillary artery for Pectoralis minor muscle. Lateral thoracic artery has been separated from the Axillary artery along with the subscapular artery through a common trunk and continues as a thoracodorsal artery in parallel to long thoracic nerve.

### Introduction

The subclavian and axillary arteries have been successfully used as cannulation sites for cardiopulmonary bypass in thoracic aortic procedures and cardiac surgery operations. They have also been taken for insertion of intra-aortic balloon, also under discussion for use as an inflow vessel in coronary artery surgery [1]. Usually, the axillary artery begins at the lateral border of the first rib as a continuation of the subclavian artery and ends at the lower border of the teres major muscle, where it continues as the brachial artery. The pectoralis minor muscle crosses anteriorly axillary artery and, for purposes of description, is said to divide it into three parts anatomically: the first part of axillary artery is before the upper border, the second part is the behind and the third part of axillary artery is after the lower border of pectoralis minor muscle. Generally, six arterial branches are separated from this artery: Superior thoracic artery from the first part, Thoraco-acromial and lateral thoracic arteries from second portion and the subscapular artery, Anterior Humeral Circumflex and Posterior Humeral Circumflex from the third section of this artery [2,3] (Figure 1).

The variations of the axillary artery can cause problems for plastic and orthopedic surgeons and radiologists in orientation to the region. Therefore, for an precise diagnosis the variations of the region should be well known [4]. We report a case of division of the axillary artery. One branch is separated from the Axillary artery for Pectoralis minor muscle and Lateral thoracic artery, instead of separation from the second section of the Axillary artery, has been separated from the Axillary artery along with the subscapular artery in a common trunk. This pattern of Axillary artery which has rarely been.

### Case Presentation

This report is based on the observation of right axillary artery variations in the pattern of branches separated from this artery in an Iranian female cadaver, in routine upper limb dissection for training of Master students of the Anatomical Sciences at school of Medicine of the Tehran University of Medical Sciences. In this cadaver, Superior thoracic artery has a normal pattern and separated from the first section of the Axillary artery. Then, Thoracoacromial artery is separated from the second section of the Axillary artery, also another branch is separated from the Axillary artery for Pectoralis minor muscle. Lateral thoracic artery, instead of separation from the second section of the Axillary artery, has been separated from the Axillary artery along with the subscapular artery through in common trunk. Then, after separating the Posterior Humeral Circumflex artery and Subscapular Circumflex artery, subscapular artery continues as a thoracodorsal artery in parallel to long thoracic nerve (Figure 2), just the Anterior Humeral Circumflex is separated from the third section of the Axillary artery that after rounding the humerus surgical neck with Posterior Humeral Circumflex artery provides an anastomosis (Figure 3).

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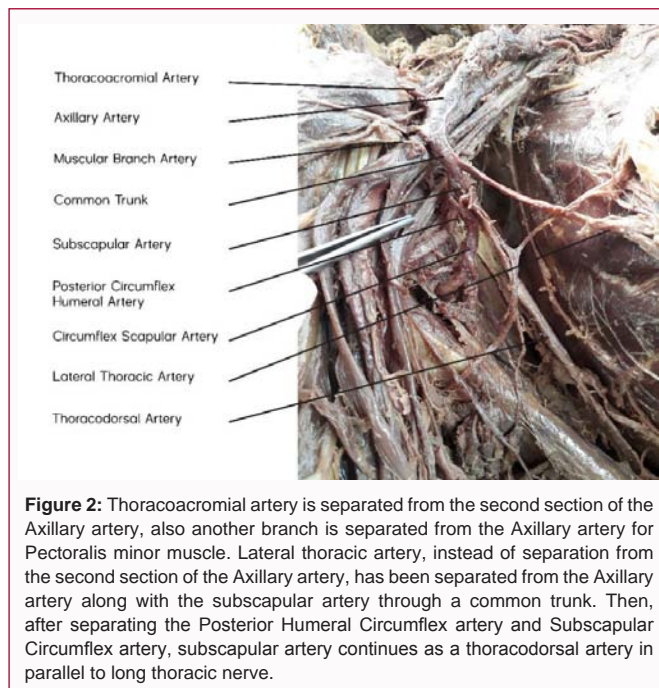
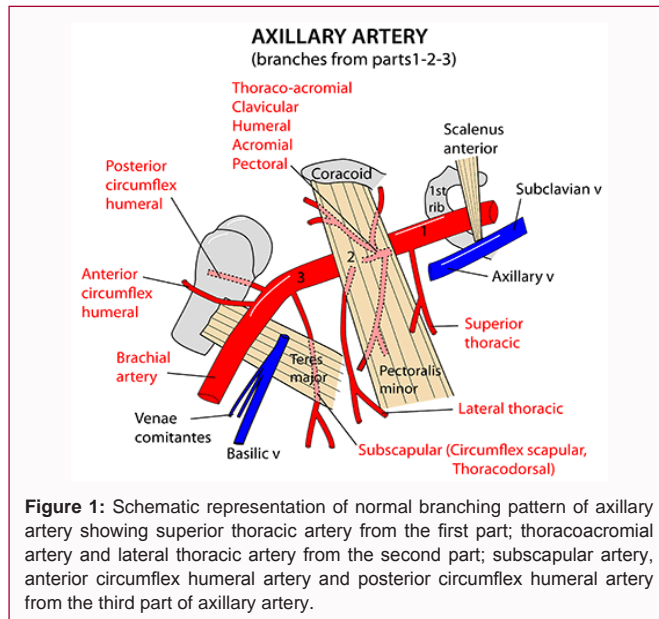
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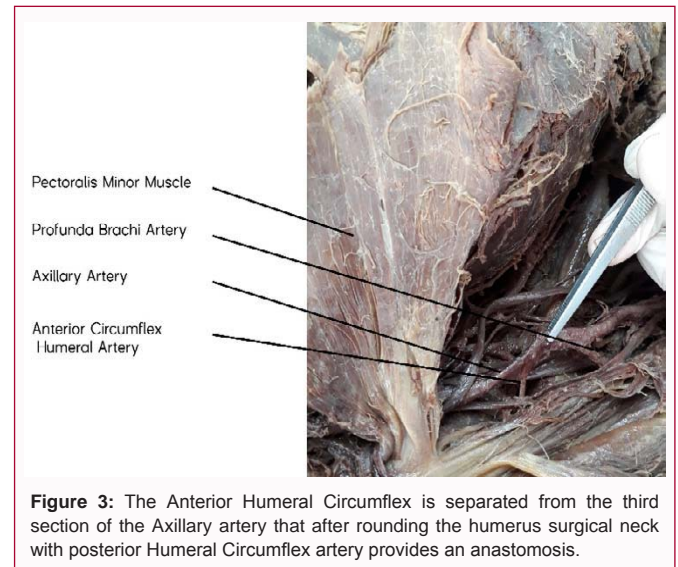
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## Discussion

Due to clinical importance of axillary artery and its branches, a more decisive study seemed advisable and necessary to provide additional data to coeval anatomical literature [5]. Anatomic variations of major arteries of the upper limb have been reported. It is not uncommon to find variation in the branching pattern of axillary artery. The present study revealed a variation in the branching pattern of axillary artery as also documented by many other authors. 28% of cases studied have variation in branching pattern of axillary artery. Subscapular artery has been found to be arising from 2<sup>nd</sup> part of axillary artery in 4% cases and in up to 30% of it arises from a common trunk with posterior circumflex humeral artery [5]. The 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. Lateral thoracic artery arises from the first part of axillary



artery in 10.7% cases, from the second part in 52.2% cases, and from the third part in 1.7% cases. The posterior circumflex humeral artery arises from the third part of axillary artery in 67.5% cases and from the subscapular artery in 15.2% cases [6].

Change in the pattern of the branches separated from the Axillary artery is very common. In a study on the 40 cadavers, Rajish Steak et al reported that 57% variation in the pattern of the branches separated from the Axillary artery. Lateral thoracic artery separated from the subscapular artery was observed in 22.5% of cadavers. Also, the common origin of Suprascapular, Anterior Humeral Circumflex, and deep Brachial artery from a common trunk was observed in 12.5% [7], while in this report, the deep Brachial artery was directly separated from the Brachial artery, in the lower border of Teres major muscle. Ravinda Shanktumar et al. reported that in the cadaver of a 50 years old man, the Lateral thoracic artery and Subcapular artery were separated from the Axillary artery as a common trunk and the Anterior and Posterior Humeral Circumflex were separated from the third section of the Axillary artery [5], while in this study the Posterior Humeral Circumflex is separated from the Subscapular artery as a unusual branch. Koumar Bat et al. indicated in their case study that the Superior thoracic artery was separated from the first section of the Axillary artery, a common trunk was separated from the second section, and Anterior Humeral Circumflex was separated from the third section. Finally, the common trunk was divided into Thoracoacromial, Muscle branches, and Lateral Thoracic Artery. Then, the Subscapular artery was divided into Posterior Humeral Circumflex, scapular Circumflex artery, and Thoracodorsal artery [8], while in the present case; Thoracoacromial Artery is directly separated from the second section of the Axillary artery. Eritre Banerjee et al found an artery trunk with the origin of the second section of the Axillary artery. This artery trunk is finally divided into Lateral thoracic artery and Posterior Humeral Circumflex, but the subscapular artery is individually separated from the third section of the Axillary artery [9]. In the present report, Lateral thoracic artery and subscapular artery are separated from the main artery as a common trunk. Also, other variations such as the lack of major section of the Brachial artery [10], dividing the Axillary artery into surface and deep Brachial artery and then the subscapular artery and Posterior and Anterior Humeral Circumflex originate from deep Brachial artery of the Axillary artery, and that all three branches of the third section are separated from

the third section of the Axillary artery in continuation of this trunk has been observed as a deep Brachial artery [11] in different studies. The division of the axillary artery into Posterior and deep branches was found to be more frequent in black persons (13.4%) than in white (4.6%) [12].

Variations in the branches of the Axillary artery may be due to the failure in the embryonic vascular system that may occur in each stage of the embryonic development. Also, the failure in growing the tissues around the arteries should not be ignored to create the variation of the branches separated from the Axillary artery [13].

Study the body variations and its accession in the different societies is very important in order to prevent the possible damages in the medical interventions such as surgery. Blood vessels of Axillary area are used for bone marrow transplant, plastic surgery, or in heart bypass surgery. By performance these types of studies, one can avoid the unwanted vascular injuries in a surgery which requires intervention in the Axillary region, such as Mastectomy. Even, the existence of such changes may be helpful in explaining the pathogenic causes of various vascular diseases in the upper limb and their treatment [14]. Therefore, both the normal and abnormal anatomy of the region should be well known for accurate diagnostic interpretation in different countries and genders.

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