

# A Rare Case: Variation in the Third Part of the Axillary Artery

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## Abstract

Axillary artery branching pattern variations are commonly observed during routine dissections. These variations have great importance due to the wide range of therapeutic and diagnostic procedures carried out in the axillary region. Therefore, neurovascular abnormalities should be well-known before surgeries involving the axillary region in order to prevent complications. This case report presents a common trunk at the third part of the axillary artery which gives rise to the deep brachial artery.

**Keywords:** Axillary artery, common trunk, deep brachial artery, variation

## INTRODUCTION

Anatomy knowledge of the axillary region is of great importance to neurosurgeons, orthopedic, plastic, and cardiovascular surgeons as well to radiologists. Although variations in the axillary region are observed commonly, they are not well defined. The axillary artery is one of the structures located in this region and it requires to be studied well before any procedures are planned.

Classically, the subclavian artery in the neck continues as the axillary artery at the outer border of the first rib and passes through the axilla. It consists of three parts and has six branches. The first part lies between the superior border of the pectoralis minor muscle and the first rib. It gives rise to a single branch, the superior thoracic artery, which supplies the pectoral muscles. The second part gives rise to two arteries; the thoraco-acromial and lateral thoracic arteries, and it is located posterior to the pectoralis minor muscle. These two arteries provide blood supply to the pectoral muscles, the skin around that region, and the axillary lymph nodes. Finally, the third part lies inferior to the pectoralis minor muscle and it has three branches. The first and the largest artery which arises from the third part is the subscapular artery, supplying the skin and the muscles of the shoulder and the thoracic wall. The other two

arteries arising from the third part are the posterior and the anterior humeral circumflex arteries. The surgical neck of the humerus is wrapped with these two arteries which supply the shoulder joint. The axillary artery continues its course and becomes the brachial artery right after exiting the axilla, at the inferior border of the teres major muscle. The deep brachial artery is the largest branch of the brachial artery, and it arises below the inferior border of the teres major muscle.<sup>1,2</sup>

## CASE PRESENTATION

During a routine dissection for educational purposes, a variation was noticed in the branching pattern of the third part of the axillary artery. The variation was observed on the left axillary region of a male cadaver aged 63 years. To view the axillary artery clearly, the skin and the fascia were removed, and the pectoralis major muscle was retracted. Median and musculocutaneous nerves were detected and pulled away with clamps in order to view all of the branches of the axillary artery. The branching pattern of the first and the second parts of the axillary artery were observed to be normal. A common trunk was observed just below the subscapular artery at the third part of the axillary artery. This common trunk had branches to the anterior and posterior humeral circumflex arteries, the brachial artery, and the deep brachial artery

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(Figure 1). Further branching patterns and the course of the deep brachial artery were noted as regular, and no additional abnormalities were detected.

## DISCUSSION

Variations located in the axillary region, especially the axillary artery branching pattern, are frequently observed either during cadaveric dissections or clinical cases. A study conducted with 40 cadavers showed that the variant pattern of the axillary artery was 63% in males and 58% in women.<sup>3</sup> Variations similar to our case have been reported; the common trunk at the third part of the axillary artery provided branches to the anterior and posterior circumflex humeral, the ulnar collateral arteries, and the deep brachial artery at the same time.<sup>4</sup> Another interesting case of axillary artery variation was published in which the medial and lateral roots of the median nerve sandwiched the abnormal common trunk.<sup>5</sup> An unusual variation at the third part of the axillary artery was published in 2017, where a common trunk gave branches to the lateral thoracic artery and continued as the posterior circumflex humeral artery.<sup>6</sup>

Knowledge of the axillary artery branching pattern is vital for surgeons while treating axillary artery thrombosis, attending to axillary region traumas, or cannulating the axillary artery.<sup>7</sup> The right axillary artery can



**Figure 1.** High bifurcation of brachial artery

BA: brachial artery, DBA: deep brachial artery, PHCA: posterior humeral circumflex artery, AHCA: anterior humeral circumflex artery, LTN: long thoracic nerve, MSCN: musculocutaneous nerve, MN: median nerve

be used for cannulation as another option to femoral artery cannulation, especially in patients suffering from iliofemoral arterial occlusion.<sup>8</sup> Axillary lymph node dissection is commonly performed as a part of the surgical treatment of breast cancer patients, and this procedure is also used to determine the stage and the management of breast cancer. Any variation in the course of the vessels located in the axillary region must be well identified when planning this procedure.<sup>9</sup> Radiological and surgical reviewing of the region can prevent complications which can occur during procedures scheduled in the axillary region. Therefore, anatomical knowledge of any variations of this region are vital for surgeons and radiologists.

## MAIN POINT

- Arterial variations in the axillary region is of great importance when preparing for a surgical procedure towards the region.
- A variation has been observed in the third part of the artery, presented with a common trunk that gave branches to anterior and posterior humeral circumflex arteries, brachial artery, and deep brachial artery.

## ETHICS

**Informed Consent:** This study was conducted on a cadaver that was donated by consent to be used in medical studies and education.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Concept: B.Ç.Ö., Design: S.Ü.Ş., Literature Search: U.V., Writing: B.Ç.Ö., Critical Review: U.V., A.Y.

## DISCLOSURES

**Conflict of Interest:** No conflict of interest was declared by the authors.

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