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Case Report

# Unilateral unusual origin of the profunda brachii artery branching from the axillary artery

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## Abstract

During a routine anatomical dissection of a 70-year-old male cadaver, we found that this specimen had an unusual branching pattern of the third part of the axillary artery. On the right side, the third part of the axillary artery had a common trunk originating from it. The common trunk gave rise to four arteries: the subscapular artery medially and the anterior and posterior circumflex humeral arteries laterally. In contrast, the common trunk continued as the profunda brachii artery (deep brachial artery). It is terminated by dividing into two arteries, the middle collateral and the radial collateral arteries.

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## 1. Introduction

The axillary artery (AA) is an important artery in the upper limb. The subclavian artery continues as axillary artery which in turn at the lower border of the subscapularis muscle becomes brachial artery[1] Pectoralis minor muscle uniquely divides axillary artery into three parts. The portion between the origin and medial border of the pectoralis minor is the first part and gives rise to only one artery, called the superior thoracic artery. The second part, located beneath the pectoralis minor, typically gives rise to two arteries, namely the thoracoacromial artery (TAA) and the lateral thoracic artery (LTA). The part of axillary artery distal or lateral to the pectoralis minor is called third part of the axillary. The artery runs upto the lower border of the teres major muscle. The third part gives rise to three branches. They are the anterior and posterior circumflex humeral artery (ACHA), and the subscapular artery (SA). It is now quite common to find variations reported in how the axillary artery branches.[2] The brachial artery in the arm gives rise to profunda brachii or deep brachial artery. This artery supplies muscles of the arm. It terminates by diving into two branches, middle (medial) collateral artery and radial collateral artery.

## 2. Case Report

During dissection for undergraduate studies in the right upper limb of a 70-year-old male cadaver, we found the following. Instead of the typical three branches, a single common trunk (CT) arose from the third part of the axillary artery as seen in (**Figure 1**). Approximately 5 centimeters from its origin, both the anterior (ACHA) and posterior (PCHA) circumflex humeral arteries branched off laterally from the common trunk, while the subscapular artery (SA) originated medially. The common trunk then continued as the profunda brachii artery. Before reaching the radial groove, the deep brachial artery (PBA) then divided into the 2 main trunks, which were the medial/middle (MCA) and radial (RCA) collateral arteries as seen in (**Figure 2**). Other than this anomaly, no variations were identified in the cadaver.

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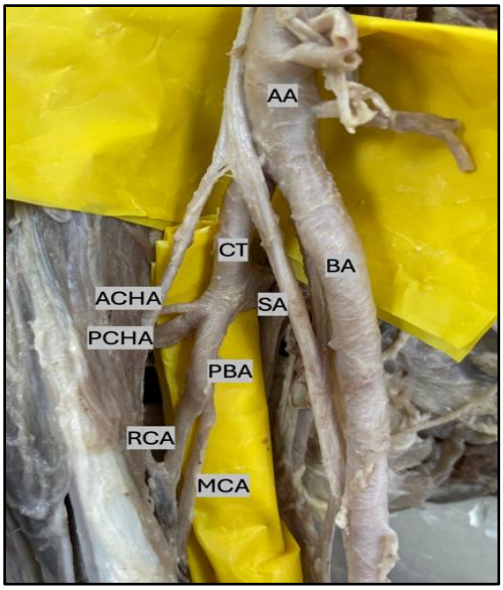


**Figure 1:** Unusual branching of the Axillary artery

CT: Common Trunk, AA: Axillary artery, SA: Subscapular artery, ACHA: Anterior circumflex humeral artery, PCHA: Posterior circumflex humeral artery, PBA: Profunda brachii artery, MCA: Middle Collateral Artery RCA: Radial Collateral Artery, BA: Brachial artery


**Figure 2:** Unusual branching of the Axillary artery

TAA: Thoracoacromial artery, LTA: Lateral thoracic artery, CT: Common Trunk, AA: Axillary artery, SA: Subscapular artery, PBA: Profunda brachii artery, ACHA: Anterior circumflex humeral artery, PCHA: Posterior circumflex humeral artery, MCA: Middle Collateral Artery RCA: Radial Collateral Artery, BA: Brachial artery, BB: Biceps brachii

## 3. Discussion

Sometimes we find a common trunk in arterial variations. It is rare to find a common in axillary artery branching but has been reported earlier. The common trunk, whenever present, is the Circumflex Humeral Artery[80] of the axillary artery. However, the profunda brachii artery taking origin from the 3rd part of the axillary artery or as the continuation of the common trunk is quite rare and has been reported by very few articles before, like that of Samuel et al. and Rao T et al.[4-5]

In 2001 a study shows similar branching. It was proposed that the common trunk be named as subscapular common trunk.[6] A single trunk giving rise to multiple branches, including the thoracoacromial artery, lateral thoracic artery, posterior circumflex humeral artery, and subscapular artery, while the anterior circumflex humeral artery was discovered to originate from the third section of the axillary artery has been shown in other studies also.[7]

In a study by Ramos Alicea et al, they found that on the left side, the second part of the axillary gave rise to subscapular artery. Usually, the artery takes origin from the third part. The subscapular artery in this case took origin along with the thoracoacromial artery and the lateral thoracic artery. The remaining branches of the third part of the axillary artery, were normal in their origin. In the same cadaver on the right side there was another common trunk from the third part of the axillary artery. The subscapular and the thoracodorsal arteries took origin from the common trunk.[8]

### *3.1. Clinical implications*

Surgeons operating in the axillary region must be cognizant of anatomical variations to prevent complications. Understanding these differences is crucial for accurately interpreting radiological studies, such as angiography and computed tomography angiography (CTA). Precise identification and labelling of the arteries branching from the third part of the axillary artery are crucial for diagnostic and treatment planning. Vascular specialists and radiologists should be mindful of these vascular anomalies when examining upper limb angiographic images. A comprehensive knowledge of axillary artery branch variations and their relationship with the brachial plexus is beneficial for clinical practice.

Recognising these anatomical variations is crucial for the successful execution of surgical procedures and interventional catheterisation techniques. A thorough understanding of these anomalies can also significantly enhance the accuracy of imaging modalities such as CT angiography and MR angiography.

## 4. Conclusion

In this case, though the third part of the axillary was bifurcating unusually, there are no embryological reasons available to explain this reasonably. Although axillary artery variation is frequently documented, the combination with variation in the profunda brachii makes this case report unique, and surgeons operating in the axilla and arm need to be aware of this.

## 5. Source of Funding

None.

## 6. Conflict of Interest

None.

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