

High bifurcation of the unilateral brachial artery: an unusual variation

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Background: It is common to observe a high bifurcation of the brachial artery, with some variations being quite rare.

Materials and methods: During routine dissection for medical teaching purposes, a unilateral high bifurcation of the brachial artery was noted on the left side of a female cadaver.

Results: On the left arm, 2 branches of different sizes originated from the axillary artery, one on the radial side and the other on the ulnar side. These branches ran down the arm, crossing each other, eventually becoming the forearm's radial and ulnar arteries. We also observed branches such as the posterior circumflex humeral artery, anterior circumflex humeral artery, and deep brachial artery.

Conclusions: This case report adds to the existing body of knowledge about the variation of the brachial artery, which is of anatomical and clinical value. We report this case to highlight the unique variation in the arterial anatomy of the upper limb. (Folia Morphol 2024; 83, 3: 734–736)

Keywords: brachial artery, anatomy, variations

INTRODUCTION

The brachial artery, a continuation of the axillary artery, begins at the lower border of the teres major tendon, extends down the medial side of the biceps, terminates in the inferior part of the cubital fossa, and divides into the radial and ulnar arteries at the level of the radius neck. Feeling its pulsation is possible. However, the brachial artery appears to be a common variation, and some of these forms might be rather rare [2, 3, 6]. In this study, we present an uncommon case of unilateral high bifurcation of the brachial artery during the dissection of a female corpse, which serves as a reference for clinical treatment.

CASE REPORT

During the examination of a female cadaver's left upper limb, we discovered a rare variation of the brachial artery. Specifically, we observed that the axillary artery began to bifurcate at the third segment, located on the lateral edge of the pectoralis minor. This resulted in the formation of 2 branches — a larger branch on the radial side and a smaller branch on the ulnar side. These branches intersected with the 2 roots of the median nerve before continuing down on either side of it. Notably, we also observed the presence of other branches such as the posterior circumflex humeral artery, anterior circumflex humeral artery, and deep brachial artery from the larger branch (Fig. 1).

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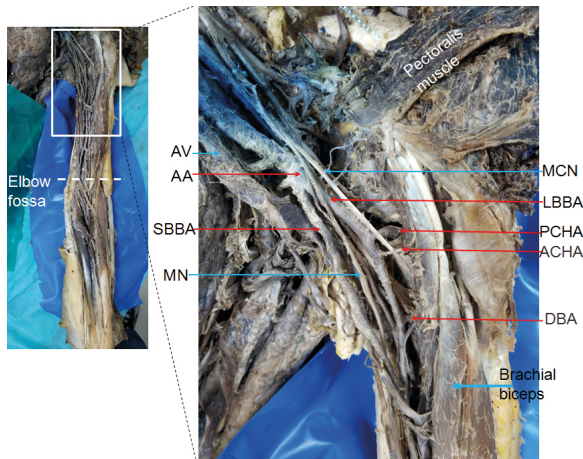


Figure 1. Relationship of arteries and nerves of arm to brachial biceps (anterior view). PM — pectoralis minor; AA — axillary artery; AV — axillary vein; LBBA — large branches of brachial artery; SBBA — small branches of brachial artery; MN — median nerve; MCN — musculocutaneous nerve; BB — brachial biceps; PCHA — posterior circumflex humeral artery; ACHA — anterior circumflex humeral artery; DBA — deep brachial artery.

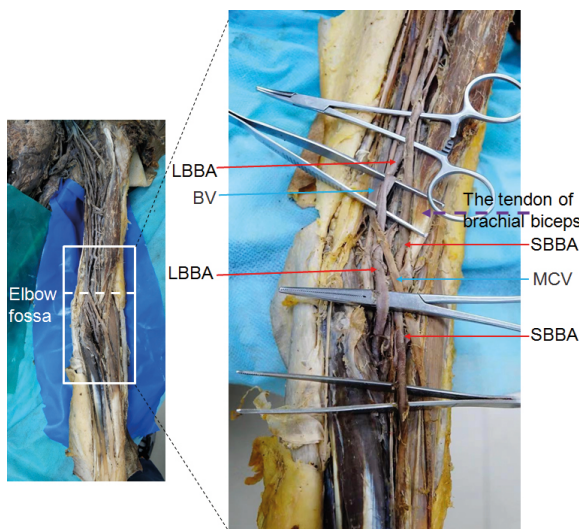


Figure 2. Relationship of arteries and nerves of arm to the tendon of brachial biceps (anterior view). TBB — the tendon of brachial biceps; LBBA — large branches of brachial artery; SBBA — small branches of brachial artery; MCV — median cubital vein; BV — basilic vein.

When traveling along the middle third of the arm, both the large and small branches crossed in front of the median nerve and ended up on the lateral side of it. Upon reaching the cubital fossa, the small branch went behind the biceps tendon and into the radial muscles of the forearm, eventually reaching the radial artery. However, the large branch goes in front of the biceps tendon went into the ulnar muscles of the forearm, ultimately reaching the ulnar artery (Fig. 2).

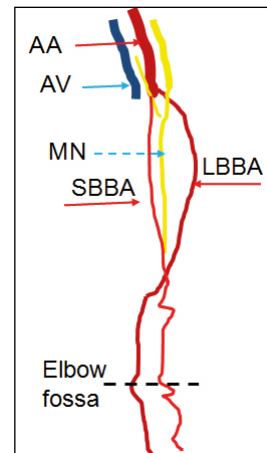


Figure 3. Schematic diagram of unilateral brachial artery height bifurcation variation. AA — axillary artery; AV — axillary vein; LBBA — large branches of brachial artery; SBBA — small branches of brachial artery; MN — median nerve.

DISCUSSION

The present article describes a case of left brachial artery variation characterised by a high bifurcation of the proximal end of the upper arm into 2 arteries, crossing anterior to the median nerve, and then continuing to be the radial artery and the ulnar artery in the inferior part of the cubital fossa (Fig. 3).

This report discusses the varying anatomy of the upper limb artery, specifically in regard to unilateral variants. The left brachial artery has a high bifurcation pattern, while the right brachial artery follows a normal branching pattern and continues into the axillary artery. Due to this variation, the pulsations of the left brachial artery may not be as easily felt as those of the right brachial artery. Additionally, measuring blood pressure in both brachial arteries can yield inconsistent results. The cause of this may be due to the bifurcation variation of the left brachial artery, rather than common clinical reasons like arterial atherosclerosis or pulse thrombosis. If the blood pressure in the radial arteries on both sides is the same, it may be a preliminary indication of unilateral brachial artery variation. Diagnostic confirmation can be made through colour Doppler ultrasound observation [5, 7].

Performing trans-radial coronary catheterisation (TRCC) can be challenging due to difficulties in accessing the area caused by anatomical variations. One such variation is a small branch of the brachial artery that extends to form the radial artery. To mitigate this challenge, it is important to assess for anatomical variations in the arteries through vascular mapping before proceeding with TRCC, as recommended in

previous reports [4, 8]. The morphological variation of the brachial artery is not a rare occurrence, so it should be considered by surgeons when performing procedures in the brachial artery area [1].

CONCLUSIONS

We are sharing a rare case involving high bifurcation of the left brachial artery in a female cadaver. This case report adds to the existing body of knowledge about the variation of the brachial artery, which is of anatomical and clinical value.

ARTICLE INFORMATION AND DECLARATIONS

Ethics statement

The project has been reviewed and accepted by Medical Ethics Committee of Guangzhou Medical University (24 July 2023, L202307010).

Author contributions

X.Y., M.L. and L.C.: Data collection. X.Y.: Drafting of the manuscript. S.L.: Project development, data analysis or interpretation, critical revision of the manuscript.

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Conflict of interest

None declared.

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