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ISSN: 0015-5659

e-ISSN: 1644-3284

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DOI: 10.5603/fm.96877

Article type: Case report

Submitted: 2023-08-10

Accepted: 2023-08-29

Published online: 2023-09-07

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Articles in "Folia Morphologica" are listed in PubMed.

High bifurcation of the unilateral brachial artery: an unusual variation

Xuqi Yang et al., Bifurcation variation of left brachial artery

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ABSTRACT

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, two branches of different sizes originate from the axillary artery, one on the radial side and the other on the ulnar side. These branches run 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.

Key words: 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 [1-3]. 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 begins to bifurcate at the third segment, which is located on the lateral edge of the pectoralis minor. This results in the formation of two branches - a larger branch on the radial side and a smaller branch on the ulnar side. These branches intersect with the two 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).

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

DISCUSSION

The present article describes that the left brachial artery variation case is characterized by a high bifurcation of the proximal end of the upper arm into two 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 color Doppler ultrasound observation [4, 5].

Performing trans-radial coronary catheterization (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 [6, 7]. The morphological variation of the brachial artery is not a rare occurrence, so that should be considered by surgeons when performing procedures in the brachial artery area [8].

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

Ethics statement: The authors alone are responsible for the content and writing of this article

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.

Acknowledgments: The authors which to acknowlegde the body donor and their family for the selfless donation to medical science

Conflict of interest: None declared

Supplementary material: None

Funding: This work was supported by Key Discipline of Guangzhou Education Bureau (Basic Medicine) (grants number 201851839); Discipline construction project of Guangzhou Medical University (02-410-2206124).

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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.

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.





