

Case Report on Variations in the Branching Pattern of the Brachial Artery: Clinical Significance and Surgical Implications

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ABSTRACT

The brachial artery is a major vessel of the upper limb, supplying oxygenated blood to the muscles and tissues. Variations in its branching pattern are relatively common and have important clinical implications for surgical procedures, interventional radiology, and diagnostic imaging. In this case

report, we present a unique anatomical variation in the branching pattern of the brachial artery observed during a routine cadaveric dissection. The arterial variation involved an additional branch arising from the brachial artery, which can potentially impact the accuracy of clinical procedures and treatment decisions. Understanding such variations is crucial for healthcare professionals to ensure patient safety and optimize clinical outcomes.

Key Words: *Brachial artery; Anatomical variation; Branching pattern; Clinical anatomy; Surgical implications*

INTRODUCTION

The brachial artery is a continuation of the axillary artery, extending from the lower border of the teres major muscle to the cubital fossa in the anterior aspect of the elbow. It is a critical vascular structure supplying the upper limb, and its branching pattern has been well-described in anatomical literature. However, variations in the branching pattern are not uncommon and can have significant clinical implications [1].

Variations in the branching pattern of the brachial artery have been attributed to embryological development, genetic factors, and evolutionary changes. These variations may involve the absence, duplication, or aberrant course of branches, leading to variations in the blood supply to the forearm, hand, and associated muscles [2]. Awareness of these variations is of paramount importance to surgeons, radiologists, and clinicians involved in various interventions and procedures of the upper limb.

In this case report, we present a unique anatomical variation in the branching pattern of the brachial artery identified during a routine cadaveric dissection. The case demonstrates the importance of understanding and recognizing such variations to ensure safe and effective clinical management [3-4].

CASE REPORT

During a routine cadaveric dissection of the upper limb, a previously unreported variation in the branching pattern of the brachial artery was observed. In the present case, the brachial artery followed its normal course from the axilla to the cubital fossa, but at the level of the mid-arm, an additional branch originated from its lateral aspect. This branch, which was named the "accessory brachial artery" (ABA), coursed parallel to the main brachial artery for a short distance before dividing into two branches in the forearm. The radial and ulnar arteries arose from their respective branches in a usual manner.

The presence of the ABA could have significant clinical implications in various medical and surgical scenarios. For instance, during arterial cannulation for invasive blood pressure monitoring or intravenous drug administration, the presence of the ABA may increase the risk of inadvertent puncture, leading to potential complications such as hematoma formation or distal ischemia. Similarly, in arterial reconstruction procedures or trauma management, surgeons should be aware of such anatomical variations to avoid inadvertent injury to the accessory vessel or compromise the blood supply to the forearm and hand (Figure 1).

DISCUSSION

The variation observed in this case, involving an accessory branch arising

from the brachial artery has not been previously reported in the literature. Variations in the branching pattern of the brachial artery are relatively common, with reported prevalence rates ranging from 13% to 30% in various anatomical studies. However, most commonly reported variations involve the absence or duplication of branches rather than the presence of an accessory vessel [5].

Understanding the anatomical variations of the brachial artery is crucial for several clinical specialties. Surgeons performing vascular reconstruction procedures, such as arterial bypass grafting or angioplasty, need to be aware of the potential presence of accessory vessels to prevent inadvertent damage during surgery. Interventional radiologists performing procedures like transradial catheterization or angiography should also be cautious to avoid complications associated with these variations [6-8].

In addition to surgical implications, knowledge of the anatomical variations in the branching pattern of the brachial artery is essential for accurate diagnostic imaging and interpretation. Radiologists and clinicians interpreting computed tomography angiography (CTA), magnetic resonance angiography (MRA), or

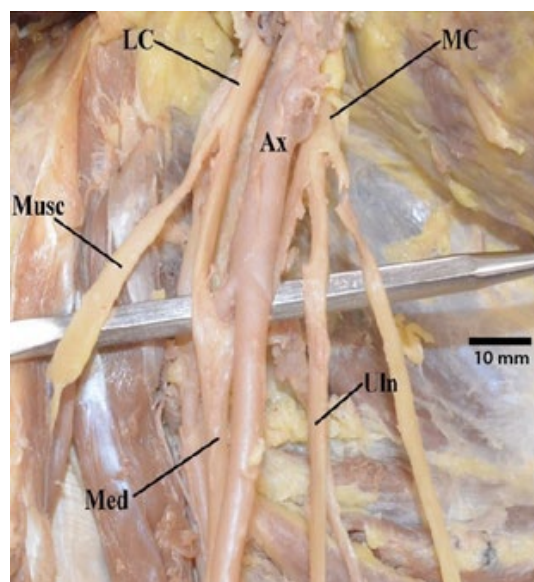


Figure 1) The radial and ulnar arteries arose from their respective branches in a usual manner.

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Doppler ultrasound studies of the upper limb should be familiar with these variations to avoid misinterpretation of images or diagnostic errors.

Moreover, anatomical variations such as the presence of an accessory branch in the brachial artery may affect the interpretation of pulse examination in clinical practice. Pulse assessment in the radial and ulnar arteries is a routine examination technique to evaluate peripheral arterial circulation. The presence of an accessory vessel can result in an unusual or absent pulse, potentially leading to diagnostic confusion or inappropriate clinical management [9-10].

CONCLUSION

This case report highlights a unique anatomical variation in the branching pattern of the brachial artery, involving the presence of an accessory branch. Variations in the brachial artery's branching pattern are not uncommon and can have significant clinical implications for surgical procedures, diagnostic imaging, and clinical decision-making. Healthcare professionals involved in the management of upper limb pathologies should be aware of these variations to ensure safe and effective care. Further research is warranted to investigate the prevalence, clinical significance, and potential complications associated with these variations.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this case report.

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