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A METICULOUS APPROACH ON CUBITAL FOSSA AND ITS CONTENTS DUE TO HIGHER BIFURCATION OF BRACHIAL ARTERY

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ABSTRACT

An important blood vessel in the upper arm, the brachial artery, continues in the axillary artery. It is essential for providing the arm and forearm with oxygen-rich blood. The brachial artery starts at the teres major muscle's lower border. It proceeds distally down the humerus' medial aspect until splitting into the radial and ulnar arteries at the cubital fossa. Because of its anatomical location, the artery is essential for several clinical operations, including venipuncture and blood pressure monitoring. Its significance encompasses knowledge of vascular disorders, traumatic injuries, and upper limb surgical procedures. To guarantee precise diagnosis and successful treatment plans, medical practitioners must be aware of the anatomical landmarks and variations of the brachial artery.

Understanding its physiological function and pathological conditions can enhance clinical outcomes in cardiology, surgery, and emergency medicine.

Keywords: brachial artery, higher bifurcation, radial artery, ulnar artery, venipuncture, cubital fossa, blood pressure, pulse, median nerve, axillary artery, teres major muscle.

INTRODUCTION

The brachial artery is one of the main blood vessels supplying blood to the hand and arm. Starting at the bottom edge of the teres major muscle and extending down the upper arm, it is an extension of the axillary artery. The bicipital groove, which is deeper than the biceps brachii muscle, is where the artery descends along the medial part of the arm. Blood is supplied to the hand and forearm by the radial and ulnar arteries, which split off at the elbow at the level of the radius's neck.

During its journey, the brachial artery releases the humeral nutritional artery and muscular branches. Along the radial nerve, the deep brachial artery emerges from the rear of the brachial artery, travels downward, and passes through the radial humeral groove. It provides blood to the triceps before splitting into the middle and radial collateral arteries, which help form the anastomosis around the elbow joint. The ulnar nerve, which also anastomoses in the elbow's vascular network, and the superior ulnar collateral artery go to the posterior portion of the medial epicondyle from the middle of the arm.

The arterial anastomosis of the elbow joint includes the inferior ulnar collateral branch, which starts above the elbow and travels medially to the medial epicondyle.

Numerous medical operations heavily utilise the brachial artery, including peripheral vascular procedures, endovascular procedures, vascular shunts for haemodialysis, and coronary artery approaches. Skin and superficial and deep fasciae cover the brachial artery, making it easily accessible. The bicipital aponeurosis, which crosses it near the elbow, separates it from the median antecubital vein anteriorly.

At the distal connection of the coracobrachialis, close to the middle of the arm, the median nerve crosses the artery from the lateral to the medial side. Because the brachial artery pulse is easily perceptible in the middle third of the arm, blood pressure can be measured there before the radical and ulnar arteries split.

Case report:

During the routine dissection of a 65-year-old male cadaver, the brachial artery was observed to bifurcate at an unusually high level, approximately 19 cm above the cubital fossa.

The brachial artery bifurcates into a superficial brachial artery (brachioradial artery) and brachial artery, approximately 19 cm above the cubital fossa and 5cm below the lower border of trees major, as shown in figure 1 and 2.

In the middle of the arm, the brachioradial artery runs superficial & medial to the median nerve, and the main brachial artery runs deep and medial to the median nerve. As the superficial brachioradial artery transcends further, it runs above the median nerve in the lower one-third of the arm and, ultimately, laterally in the cubital fossa. The brachial artery runs deep & below the median nerve in the lower arm and then lateral to the median nerve in the cubital fossa.

The radial artery took a superficial course along the anterior aspect of the forearm, lying beneath the skin but above the muscle fascia, as shown in Figures 3 and 4. This variation was confirmed through careful tracing and measurement of the arterial pathway.

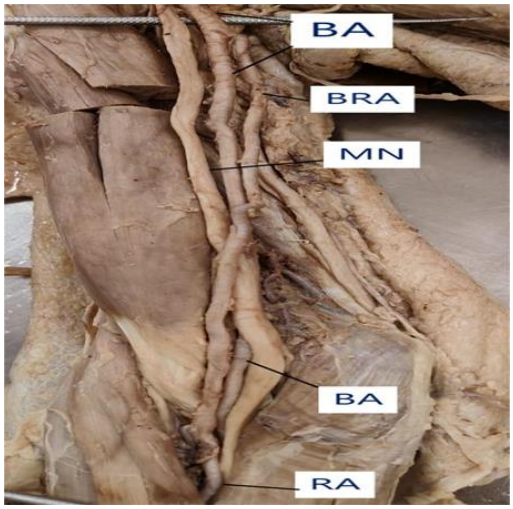

Figure 1: Anterior view of Axilla- figure demonstrates the course of the Brachial Artery (BA), Brachioradial Artery (BRA), Medial Nerve (MN), and Radial Artery (RA).

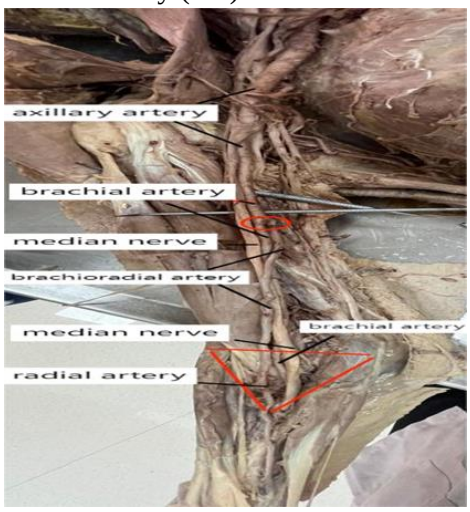

Figure 2: Anterior view of Axilla- figure demonstrates cubital fossa and its contents in a marked triangle along with higher bifurcation of BA in the encircled area.

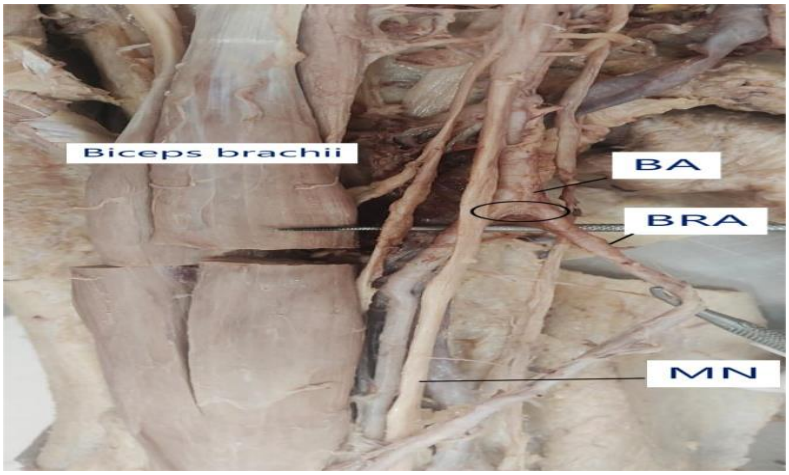

Figure: Anterior view of Axilla- black encircled area shows highly bifurcated Brachial Artery, course of Brachial Artery (BA), Brachioradial Artery (BRA), Medial Nerve (MN), Radial Artery (RA).

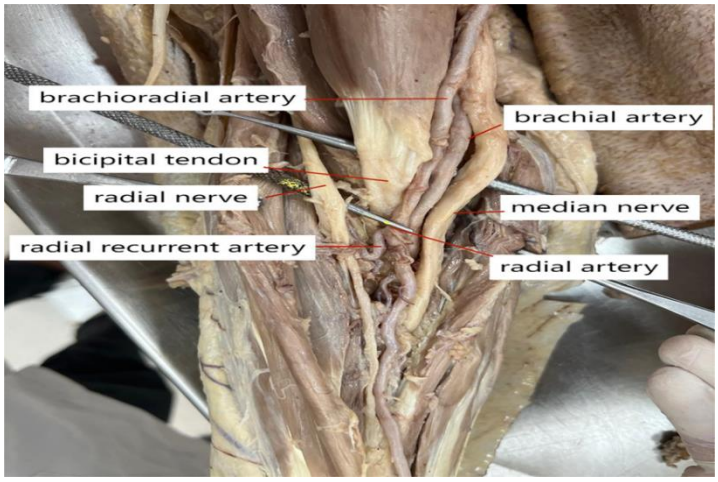

Figure 4: Anterior view of Axilla- figure demonstrates contents of cubital fossaviz Brachial Artery (BA), Brachioradial artery (BRA), Medial Nerve (MN), Radial Artery, tendon of Biceps Brachii, Radial Recurrent Artery, Radial nerve.

RESULT:

The brachial artery usually splits into the radial and ulnar arteries in the elbow area. Higher bifurcation, in which the brachial artery splits at a position closer than typical, might nevertheless have serious clinical ramifications.

Anatomical changes may lead to higher bifurcation, whether inherited or the consequence of developmental processes. Medical practitioners must be aware of these differences, particularly in specialities such as interventional radiology, trauma surgery, and vascular surgery. These differences may impact on imaging study interpretation, catheter placement, and surgical techniques.

In clinical practice, a greater bifurcation may raise the risk of vascular problems during upper limb treatments, including hand or forearm surgeries. Additionally, it might affect collateral circulation and hand and forearm perfusion. Understanding these anatomical variances can help improve the planning and execution of surgical procedures in patients with vascular illnesses or accidents.

Additionally, some demographic characteristics, such as age, sex, and ethnicity, have been connected to differences in brachial artery bifurcation. This variance emphasises the need for customized patient evaluations and thorough anatomical research to enhance patient outcomes.

DISCUSSION & CONCLUSION

The brachial artery's higher bifurcation raises significant anatomical research and clinical practice issues. It is imperative to identify and comprehend these variations to reduce surgical risks, improve intervention techniques, and improve the general management of vascular disorders in the upper extremities. More investigation and thorough anatomical mapping are required to further clarify the ramifications of higher bifurcation and eventually improve surgical methods and patient care. A greater understanding of these anatomical variances by medical practitioners can significantly improve the results of upper limb surgeries and procedures.

CLINICAL SIGNIFICANCE:

Blood Pressure Measurement: This widely used technique provides vital information regarding cardiovascular health by taking an arm blood pressure reading.

Pulse Assessment: The brachial pulse is easily palpable, which aids in determining circulation and identifying any vascular problems.

Vascular Access: In some medical operations, the artery serves as a location for catheterization or is frequently utilised for procedures such as arterial blood gas sampling.
Surgical Considerations: Understanding the architecture of the brachial artery during upper limb procedures is essential to avoid complications like ischemia or bleeding.
Peripheral Vascular Disease: Disorders that affect the brachial artery may be a sign of systemic vascular problems, such as atherosclerosis, which can also affect other parts of the body.
Collateral circulation: Its function in the blood supply of the upper limbs is crucial for comprehending and treating disorders that impact limb perfusion.

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