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Aberrant brachial artery: case report of an anatomical variation

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ABSTRACT

INTRODUCTION: The brachial artery and its terminal branches are the major arterial supply to the brachium and antebrachium. Variations in the vascular supply in the upper limbs have been previously documented to occur more in the radial artery, followed by the ulnar artery, but less commonly in the brachial artery

CASE: An embalmed cadaver was used for gross dissection during the gross anatomy dissection for postgraduate students at the department of human anatomy of the University of Rwanda. During the dissection of the right upper arm, an accessory brachial artery was found, branching from the axillary artery above the unification of the lateral and medial cords of the brachial plexus (the lateral and medial root of the median nerve).

CONCLUSION: In our case, the aberrant brachial artery originated from the axillary artery and gave off a muscular branch in the middle third of the arm, which is of clinical importance.

Keywords: Aberrant Brachial Artery, Axillary Artery, Radial Artery, Brachioradial Artery, Anatomy Variation

INTRODUCTION

The brachial artery and its terminal branches are the major arterial supply to the brachium and antebrachium. The brachial artery, which is a direct continuation of the axillary artery, begins at the lower border of the teres major muscle and terminates by dividing into the radial and ulnar arteries just opposite the neck of the radius bone at the cubital fossa [1]. The bifurcation of the brachial artery may occur much earlier in some individuals resulting in the ulnar and radial arteries extending through the upper arm [2]. The radial artery (RA) is the smaller of the two terminal branches of the brachial artery (BA) in the cubital fossa and lies medial to the biceps tendon [3]. The origin of the radial artery is commonly located in the cubital fossa at the level of the neck of the radius [4], and it descends from the BA in the cubital fossa approximately 1.0 cm below the bend of the elbow opposite the neck of the radius as a more direct continuation of the BA [3]. Variations in the vascular supply in the upper limbs have been previously documented to occur more in the radial artery, followed by the ulnar artery, but less commonly in the brachial artery [5]. A study

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by Tohno et al. reported a case of double brachial arteries where the superficial brachial artery descends in the arm, superficial to the median nerve, and the deep brachial artery with its normal course descending behind the median nerve [6]. An unusual bifurcation of the BA high in the arm may produce error readings when targeting the artery for pulsation at the cubital fossa. Therefore, detailed knowledge of the variations of the branching patterns in the vascular system is important for providing accuracy especially during vascular diagnosis, reconstructive surgery and evaluation of angiographic images [7] . This is a reported case of an aberrant brachial artery that was found in a cadaveric dissection at the surgical anatomy course at the department of human anatomy, University of Rwanda.

CASE PRESENTATION

An embalmed cadaver was used for gross dissection during the gross anatomy dissection for postgraduate students at the department of human anatomy, University of Rwanda. The right anterior arm region of a 33-year-old male cadaver was dissected following the steps outlined in the Grant dissector handbook [8].

During the dissection of the right upper arm, an accessory brachial artery was found, branching off the axillary artery above the unification of the lateral and medial cords of the brachial plexus (the lateral and medial root of the median nerve) (Figure 1). The accessory brachial artery runs superficially to the median nerve and gives off a muscular branch in the middle third of the arm to supply the biceps brachii, then continues between the biceps brachii and brachialis muscle to the lateral side of the cubital fossa (Figure 2).

The accessory brachial artery anastomoses with the typical brachial artery, which runs deep to the median nerve through the branch connecting the two arteries (Figure 3).

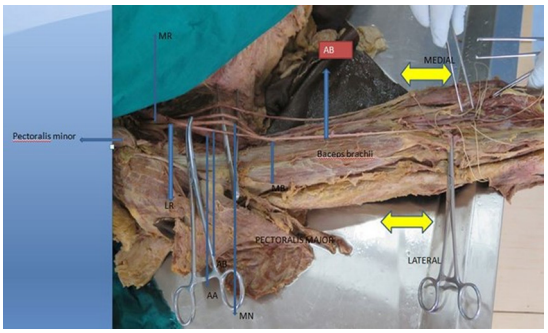

Figure 1: Lateral view of right arm showing aberrant brachial artery from the axillary artery
AB: *aberrant brachial artery****, AA:*** *axillary artery,* ***MR:*** *the medial root of the median nerve, LR: the lateral root of the median nerve,* ***MN:*** *median nerve,* ***MB:*** *muscular branch of the aberrant artery*

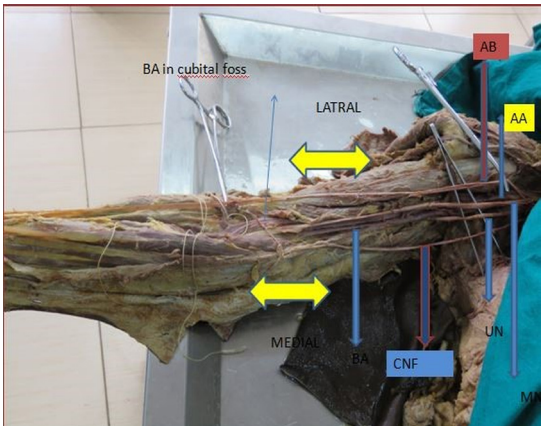

Figure 2: Medial view of right arm showing aberrant brachial artery from the axillary artery
AB: *aberrant brachial artery* ***AA:*** *axillary artery,* ***MN:*** *median nerve,* ***UN:*** *ulnar nerve,* ***CNF:*** *medial cutaneous nerve of forearm,* ***BA:*** *brachial artery*

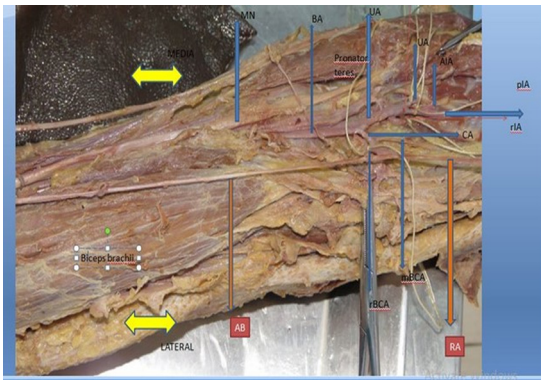

Figure 3: Aberrant brachial artery and connecting branch in cubital fossa view of right arm showing aberrant brachial artery from the axillary artery
AB: *aberrant brachial artery,* ***RA:*** *radial artery,* ***CA:*** *connecting branch (connecting ulnar and radial artery),* ***mBCA:*** *muscular branch of a connecting artery,* ***rBCA:*** *radial recurrent branch of the connecting artery (radial recurrent artery),* ***MN:*** *median nerve,* ***BA:*** *brachial artery,* ***UA:*** *ulnar artery,* ***pIA:*** *posterior interosseous artery,* ***rIA:*** *recurrent interosseous artery*

been documented to commonly occur in the right upper limb regions [6] and, less commonly, in the left upper limb [9]. A study conducted by Keen postulated that the superficial brachial artery was the origin of the radial artery [10]. The prevalence of the superficial brachial artery originating from the axillary artery was reported as 1.67% in the study by Haładaj et al. [4], 7% in the study by Nasr et al. [3], 1.25% in the study by Kachlik et al. [11]. Yoshinaga et al. [12] documented the bifurcation of the brachial artery into large superficial and small deep branches at the lower border of teres major muscle. Baeza et al. [13] reported the duplication of the brachial artery. They documented that the superficial brachial artery ended by anastomosing with the radial artery in the cubital fossa. In a few cases, it continued as the antebrachial artery, which ends by anastomosing with the radial artery in the cubital fossa. In a few exceptions, it continued as the antebrachial artery.

The study by Chakravarthi et al. [7] documented the prevalence of the accessory brachial artery as 11.43%. The superficial course of the accessory brachial artery provides a route for a radial catheterization approach to coronary procedures but also makes it more vulnerable to injuries which could result in bleeding and ischemia [7]. In our case, the aberrant brachial artery originated from the axillary artery and gave off a muscular branch in the middle third of the arm, which is of clinical importance. The knowledge of the vascular system of the upper limb is clinically important and may complicate intravenous drug administration, venipuncture at the cubital fossa, percutaneous brachial catheterization, and vascular surgery. The variation of the original level of the radial artery may mislead in a therapeutic, diagnostic, and surgical procedure.

Haładaj et al. documented the prevalence of artery connecting brachioradial and "normal" brachial arteries in the cubital fossa as (6/11 = 54.55%). This anastomosis, known as "cubital crossover" [4] In our case, this anastomosis gives off a radial recurrent artery which is supposed to be a branch of the radial artery in normal vascularization of the forearm; this variation has clinical importance during radial recurrent flap for elbow coverage.

CONCLUSION

Knowledge of these variations has clinical importance in orthopedic and vascular reconstructive surgeries and is also helpful in the evaluation of angiographic studies.

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