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A CADAVERIC STUDY ON VARIATIONS OF BRACHAIL ARTERY

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ABSTRACT

Background: The brachial artery is the extension of the axillary artery starting at the lower margin of the teres major muscle and is the major artery of the upper extremity. The brachial artery reaches the cubital fossa and bifurcates into the radial and ulnar artery. **Aim:** To study the variations in brachial artery in cadavers. **Material and Methods:** Dissection of the upper limb in dissection hall of anatomy department. **Result:** Among the 30 cadavers, variations were found in 5 cadavers which includes 4 males and 1female cadaver of age 56 years Male, and 61 years Female, 68 years Male, 64 years Male and 51 years Male. It is noted that Accessory brachial artery was arising from the axillary artery at the lower border of teres major along with main brachial artery in these 5 cadavers accounting for 16.66% variation. Accessory brachial artery was placed superficially and medially, compared to main brachial artery, which was placed deeply and laterally. **Conclusion:** When undergoing vascular and reconstructive procedures on the arms and forearms, precise understanding of the anatomical variations of the brachial artery's course, branching, bifurcation/termination, the path of its terminal branches, and connection with the surrounding structures is crucial. The brachial artery anatomical changes found in this study are uncommon and have significant clinical implications. The superficial auxiliary ulnar arteries and accessory brachial arteries identified in this study could be misdiagnosed as veins, which could make intravenous medication delivery, venipuncture procedures more difficult, and percutaneous brachial catheterization more difficult. Anatomists, radiologists, orthopaedist vascular surgeons, and plastic surgeons all need to have a thorough understanding of these vascular variances.

Key Words: Variations, Brachial Artery, Cadavers and Accessory Brachial Artery.

INTRODUCTION: The Brachial artery is the axillary artery's continuation past the teres major muscle's lower border. It splits into the radial and ulnar arteries in the anterior cubital region, opposite the radius neck. differences in the arteries of the upper limb have been reported on a regular basis [1–2]. The bulk of these differences are found in the radial artery, followed by the ulnar artery. Brachial artery variants are less prevalent. For the purpose of avoiding diagnostic errors, it is imperative that radiologists and surgeons have accurate knowledge of changes related to the muscles and nervous system [3]. McCormack coined the term "accessory brachial artery"

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to describe the superficial brachial artery in embryology. This term refers to the persistence of multiple intersegmental cervical arteries that do not deteriorate but instead persist and can even enlarge in diameter [4,5]. A case of two brachial arteries was described by Tohno Y et al. [6]. In this instance, the deep brachial artery followed its typical course and descended behind the median nerve, while the superficial brachial artery descended in the arm superficial to the median nerve. Accuracy in vascular diagnosis, reconstructive surgery, and angiographic picture evaluation all depend on a thorough understanding of the variances in artery branching patterns. The present study is undertaken to study the variations in brachial artery in relation to its morphology.

MATERIALS AND METHODS

This present study was conducted at Shri Balaji Institute of Medical Sciences, Raipur from April 2021 to November 2022. During routine dissection of the upper limb in the department of Anatomy Dissection Hall in total of 30 cadavers of both sexes, were included in the present study. Out of 30 cadavers 18 were males and 12 were females and the age of death of these cadavers ranged from 55 to 70 years. The flexor (anterior) compartment of arm, cubital fossa and forearm were dissected according to the instructions given in the standard dissection manual. The skin, superficial fascia, deep fascia and muscles were separated using a scalpel and forceps and the anatomical variations of the brachial artery and its terminal branches with their relation to the surrounding structures were examined and representative anatomy was photographed for the proper documentation. Length of the accessory brachial artery is measured by 2 points (a) the midpoint of the width of the artery where it begins (b) point of termination.

RESULTS

Among the 30 cadavers, variations were found in 5 cadavers which includes 4 males and 1female cadaver of age 56 years Male, and 61 years Female, 68 years Male, 64 years Male and 51 years Male. It is noted that Accessory brachial artery was arising from the axillary artery at the lower border of teres major along with main brachial artery in these 5 cadavers accounting for 16.66% variation. Accessory brachial artery was placed superficially and medially, compared to main brachial artery, which was placed deeply and laterally. Out of the cadavers it is significantly noted that in three cadavers unilateral accessory brachial artery in the upper part the flexor compartment of the arm is related medial to the medial nerve, whereas in the lower part of the arm it crossed the median nerve ventrally from medial to lateral. At base of the cubital fossa the accessory brachial artery united with the main brachial artery where it is more tortuous across the median nerve. In one of the cadavers accessory brachial artery descends downwards parallel to the main brachial artery separated by median nerve. At base of the cubital fossa the accessory brachial artery united with the main brachial artery where it is crossed ventrally by the median nerve and after a short course the united trunk of accessory and main brachial artery divided into radial and ulnar arteries.

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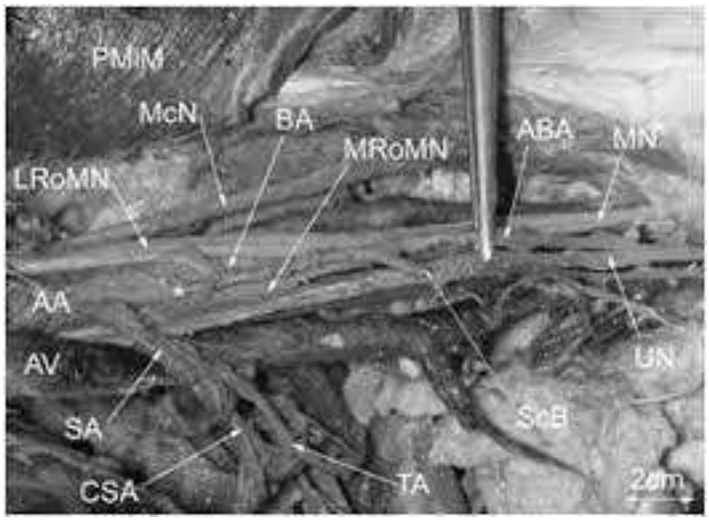

Figure 1: Showing the Accessory Brachial Artery

DISCUSSION

In the present study of 30 cadavers, variations were found in 5 cadavers which includes 4 males and 1female cadaver of age 56 years Male, and 61 years Female, 68 years Male, 64 years Male and 51 years Male. It is noted that Accessory brachial artery was arising from the axillary artery at the lower border of teres major along with main brachial artery in these 5 cadavers accounting for 16.66% variation. It is believed that the superficial brachial artery provided the majority of the blood flow to the forearm. Variations in the arteries supplying the upper limbs have been regularly noted in clinical practice or routine dissections. The right upper limb was the primary site of persistent superficial brachial artery [6,7,8], with a small number of cases also documented in the left upper limb [9]. We also documented the left dominance of the persistent auxiliary brachial artery in this investigation. While Muller [11], Adachi [12], and Kachlik et al. [13] found a prevalence of 3% for the superficial brachial artery coming from the axillary artery, Keen [10] argued that the superficial brachial artery is actually a high origin of the radial artery. On the other hand, in the present study the prevalence was found to be 16.66%. When doing radial approach coronary procedures for catheterization, the superficial course of the auxiliary brachial artery can be used as a catheter route. However, the presence of such a superficial brachial artery makes it more vulnerable to damage that might result in hemorrhage and anemia. A report by Kachlik et al. [14] described the reconnection of the auxiliary brachial artery with the main brachial artery in the cubital fossa, after it emerged from the third segment of the axillary artery. At the lower border of the teres major muscle, Yoshinaga et al. discovered that the brachial artery bifurcated into big superficial and small deep branches [15]. In the cubital fossa, the superficial branch split into the radial and ulnar arteries, whereas the deep branch mostly fed the arm muscles. The superficial brachial artery ended by anastomosing with the radial artery in the cubital fossa, and in a few instances, it continued as the antibrachial artery, according to Baeza et al.'s report on the duplication of the brachial artery [16]. In contrast, five cadavers (11.43%) in this investigation had a preponderance of auxiliary brachial artery reunion with the main brachial artery in the cubital fossa.

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CONCLUSION

When undergoing vascular and reconstructive procedures on the arms and forearms, precise understanding of the anatomical variations of the brachial artery's course, branching, bifurcation/termination, the path of its terminal branches, and connection with the surrounding structures is crucial. The brachial artery anatomical changes found in this study are uncommon and have significant clinical implications. The superficial auxiliary ulnar arteries and accessory brachial arteries identified in this study could be misdiagnosed as veins, which could make intravenous medication delivery, venipuncture procedures more difficult, and percutaneous brachial catheterization more difficult. Anatomists, radiologists, orthopedists, vascular surgeons, and plastic surgeons all need to have a thorough understanding of these vascular variances.

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Conflict of Interest: No conflict.

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