해부 · 생물인류학 제 36 권 제 2 호
Anat Biol Anthropol Vol. 36, No. 2 (2023) pp. 77~79
https://doi.org/10.11637/aba.2023.36.2.77

Check for updates

Case Report

# Medial Accessory Belly of the Brachialis Muscle in the Korean Population: A Case Report

Yu-Ran Heo[1], Jae-ho Lee[1], Han-Gyu Jeong[1], Kwang Rak Park[2]

[1]*Department of Anatomy, Keimyung University School of Medicine*
[2]*Department of Anatomy, School of Medicine, Kyungpook National University*

**Abstract** : The brachialis muscle (BR) is a powerful flexor located in the anterior part of the brachial region. It is supplied with blood from the brachial artery and is innervated by the musculocutaneous nerve. BR variation is rare, but tends to divide the muscle into two or more, or to attach the accessory belly to other muscles around it. Here, we reported an accessory belly of BR (AcBr) in Korean cadaver. Under the bicep brachii muscle, AcBr was originated from the medial side of the BR. It continued 151.8 mm more and inserted between the tendon of the biceps brachii muscle and the biceps aponeurosis. The length from the origin of the BR to the origin of AcBr was 30.1 mm. It crossed superficially the brachial artery and median nerve. This rare variation of BR cannot rule out the possibility of neuropathy, and may help improve our understanding of neuralgia. Here, we introduced rare variation of BR and discussed its clinical and embryological significance.

**Keywords** : Brachialis muscle, Accessory head, Anatomical variation

## INTRODUCTION

The brachialis muscle (BR) is located in the anterior part of the brachial region and is deeper than the biceps brachii muscle. The BR function as the primary flexor of the elbow joint regardless of whether the forearm is supine or prone [1,2].

The variation of the BR is rare, but a commonly reported variation is splitting the muscle into two or more parts. It tends to be subdivided into lateral and medial parts or into superficial and deep parts [1,3]. In addition to the BR being subdivided, there are variations in attaching to other muscles around it. An accessory brachialis muscle (AcBr) derived from BR may be present. Tonse et al. [4] suggested 5 types according to the insertion pattern of AcBr. Type 1: AcBr attached to the tendon of BR, type 2: AcBr attached to the tendon of biceps brachii, type3a: past the radial recurrent vessels deep and attached to the supinator, type3b: after superficial passage of the radial recurrent vessels attachment to the supinator, type 4: AcBr slips past the radial nerve and is inserted into the brachioradialis muscle. Clinically, the cubital fossa includes the biceps brachii tendon, BR tendon, and median nerve, and muscle variation in the cubital fossa can cause entrapment of the median nerve [5]. We found brachialis variation which is AcBr in the cubital fossa. The AcBr we found may be important in median nerve entrapment at the level of the elbow. According to Loukas et al. [1], when

The author(s) agree to abide by the good publication practice guideline for medical journals.
The author(s) declare that there are no conflicts of interest.
**Received:** June 5, 2022; **Revised:** June 13, 2023;
**Accepted:** June 21, 2023
**Correspondence to:** Kwang Rak Park (Department of Anatomy, School of Medicine, Kyungpook National University, 680, Gukchaebosang-ro, Jung-gu, Daegu 41944, Republic of Korea)
**E-mail:** airboba@naver.com


ISSN 2671-566X (Online)

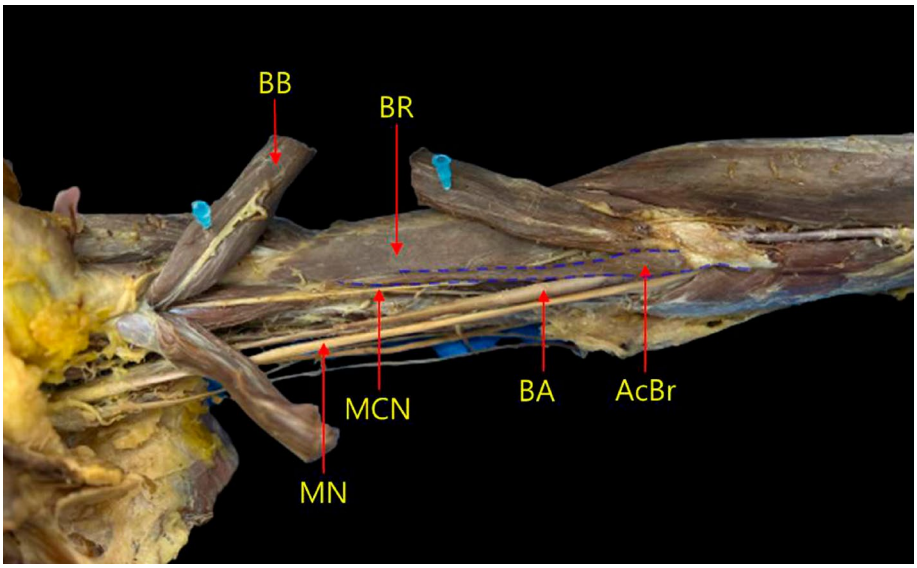


**Fig. 1.** Anterior view of the upper arm, which demonstrates the origin, course, and insertion of the AcBr. BB, biceps brachii; BR, brachialis; AcBr, accessory muscle of the BR (blue dotted lines); BA, brachial artery; MCN, musculocutaneous nerve; MN, median nerve.

the AcBr surrounds the median nerve near the cubital fossa reported that median nerve entrapment may occur such as pronator teres syndrome. Also, Flory and Berger [6] reported when the accessory tendon of the BR entraps the median nerve reported to may cause pronator teres syndrome. In previous study, Townsend et al. [5] reported the symptoms of median nerve entrapment by AcBr at the level of the elbow are similar to those of carpal tunnel syndrome.

In this report, we report AcBr located on the medial side of the forearm. We also discuss its anatomical and clinical significances.

## CASE REPORT

In 2022, a muscle variation of the BR was discovered during a routine dissection at Keimyung University School of Medicine. Dissection was performed in 83-year-old male cadaver, and macroscopic abnormalities were not found. First the skin of the upper arm was cut and remove the subcutaneous tissue, and then the biceps brachii muscle was identified. The biceps brachii muscle was cut at roughly 4 cm above of the cubital fossa, and the long head and short head parts were tilted upward and the rest of the muscles downward, and then the BR located under the biceps brachii muscle was identified. Accessory muscle of the BR located on medial side of BR was confirmed and then it was named as AcBr. Near the insertion point of the coracocbrachialis muscle, AcBr originates from the medial side of the BR and was inserted between the tendon of the biceps brachii muscle and the biceps aponeurosis. The AcBr continued downward and ran superficially parallel to the brachial artery and median nerve. The thickness and width were measured at the origin, middle, and insertion portions of AcBr using calipers, and the length from the origin of the BR to the origin of AcBr and the total length from the origin to insertion of AcBr were measured. The thickness and the width at the origin portion of AcBr were 2.8 mm and 9.8 mm, respectively. At the middle portion, thickness and width were 3.1 mm and 4.5 mm, respectively. At the insertion portion, the thickness and the width were 1.1 mm and 10 mm, respectively. The length from the origin of the BR to the origin of AcBr was 30.1 mm. The total length from the origin of AcBr to the insertion was 151.8 mm. The distance from the origin of AcBr to the insertion of the musculocutaneous nerve is 60.8 mm. Blood supply and innervation were identical to normal structures.

## DISCUSSION

In this report, we found that rare variations of the BR. Our case is in which accessory muscles formed as part of BR variation were found, and this pattern has not yet been re-

ported in Korea.

Embryologically, the upper limb musculature develops from the proximal muscle, a muscle of common origin that develops into a specific muscle head, which is stimulated to be transferred to the developing limb bud by growth factors produced by cells in the proximal limb bud [2,3]. BR is a skeletal muscle that ultimately develops in the mesodermal layer [3]. Therefore anatomical variations may occur due to differences in these embryological processes between the muscle head arising from the proximal muscle and the muscle developed from the mesodermal layer. The presence of AcBr can predict changes in the distribution of cell adhesion molecules present in promyocytes in the formation of somites and myosegments. Thus, further understanding of the developmental process is needed.

Due to the structure of AcBr formed in the cubital fossa, clinically we considered that AcBr could come into proximity with the median nerve during forearm motion. In previous studies [1], it is known that near the AcBr point of insertion, the tendinous fibers of the AcBr split to form a fork around the median nerve within the cubital fossa. In this case, it was reported that the AcBr may compress the median nerve and may be similar to pronator teres syndrome or carpal tunnel syndrome. Similarly, we found that AcBr is indirect contact with the median nerve, so muscle contraction of AcBr could lead to exacerbation of compression syndrome. In a surgical approach, the structure of AcBr can be confusing when proceeding by dividing the muscle between the BR and the brachioradialis muscle. Another possible clinical consequence is that blood pressure measurements may become irregular due to compression of the brachial artery when AcBr travels medially toward the cubital fossa. Also, because it is a variation, AcBr may be mistaken for a tumor on images such as CT.

This case reported that AcBr originates from and runs in the medial side of BR. Tonse et al. [4] reported that AcBr was classified into 5 types, but in all types, AcBr originated from the lateral side of the BR and was divided. Similar to this study, it was not applied to the type classification despite the existence of previous cases in which AcBr was present in the medial [1,7,8]. The length of AcBr in our case was measured and it was 15.1 cm. In a similar type report in which AcBr was present in the medial side of the BR, the length was 12 cm in a previous American case. In the Malaysian case, the length was 9 cm, and in the Indian case, it was 13.8 cm. Therefore, our case in Koreans was the longest, however, accessory muscles of various lengths existed by race. And additional research will be needed for comparison according to race [1,7,8].

In this paper, we discovered is a very rare variation in BR, and knowledge of BR variation is of clinical value as it helps to improve our understanding of neuralgia. Therefore, clinicians need to be clinically aware of BR variations and have a comprehensive understanding of diagnosis and treatment.

## REFERENCES

1. Loukas M, Louis RG Jr, South G, Alsheik E, Christopherson C. A case of an accessory brachialis muscle. Clin Anat. 2006; 19:550-3.
2. Drake R, Drake RL, Vogl W, Mitchell AW. Gray's basic anatomy. Third ed: Elsevier Health Sciences; 2012.
3. Pai MM, Nayak SR, Vadgaonkar R, Ranade AV, Prabhu LV, Thomas M, et al. Accessory brachialis muscle: a case report. Morphologie. 2008;92:47-9.
4. Tonse M, Pai MM, Prabhu LV, Murlimanju B, Rao LY. Incidence of Accessory Brachialis Muscle, Variations in its Insertion and Relation with Surrounding Neurovascular Structures. Muscles Ligaments Tendons J. 2021;11:759-65.
5. Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston textbook of surgery. 17th ed: Philadelphia: Elsevier Saunders; 2004.
6. Flory PJ, Berger A. The accessory brachial tendon-a rare cause of pronator teres syndrome. Handchir Mikrochir Plast Chir. 1985;17:270-2.
7. Vadgaonkar R, Rai R, Ranade AV, Nayak SR, Pai MM, Lakshmi R. A case report on accessory brachialis muscle. Rom J Morphol Embryol. 2008;49:581-3.
8. Dharap AS. An anomalous muscle in the distal half of the arm. Surg Radiol Anat. 1994;16:97-9.