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Accessory Tendon of Biceps Brachii Originated from Pectoralis Major

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During an educational dissection, accessory tendon of the biceps brachii muscle was found on the right side in a Korean cadaver. The short and long heads showed normal morphology and course: however, narrow tendon was originated from the posterior border of the pectoralis major muscle and was inserted into the conjoined tendon of the long head of the biceps brachii muscle. The authors describe this previously novel case report and discusses the clinical implications of such a variant.

Key Words: Biceps brachii muscle, Pectoralis major muscle, Variation

Introduction

The biceps brachii muscle (BBM) is traditionally named by its morphology which is described as a two-headed muscle. A long head is originated from the supraglenoid tubercle and a short head is from the coracoid process of the scapula. In terms of the number and morphology of its heads, BBM is one of the most variable muscles in the human body [1]. The most common variation is a third head of BBM, but four, five, or even seven heads have been reported [2]. The presence of the third head has been reported with varying frequency from 8% to 37.5% according to the population. This supernumerary muscle has clinical importance because they may cause the compression of neurovascular structures or confuse a surgeon who performs procedures on the arm [3].

In this article, we report unique morphology of the accessory tendon of BBM and discuss the clinical significance of this variation.

Case Report

During a routine dissection of the upper limb, variation of BBM was found on the right side of a 63-year-old female cadaver (Fig. 1). After the skin, subcutaneous fat, and fascia were removed to expose BBM, the innervation and blood supply of each head were carefully examined. The findings were photographed, and the length and width of the muscle were measured in millimeters. The long and short heads of BBM were originated from the supraglenoid tubercle and the coracoid process of the scapula, respectively. The tendon of long head passed between the intertubercular groove and it was changed into a muscular part at the level of lower insertion-point of the pectoralis major muscle (PMM). At the middle of the insertion point of the posterior surface of the PMM, thin accessory tendon was originated and continued inferiorly 83 mm more. It was changed into 10 mm length of muscular part, and then merged with the muscular part of the PMM. Its width was 2 mm and muscular part was slightly thicker. This variant did not have own (individual) blood supply and innervations. Further course of neurovascular structures showed normal patterns.

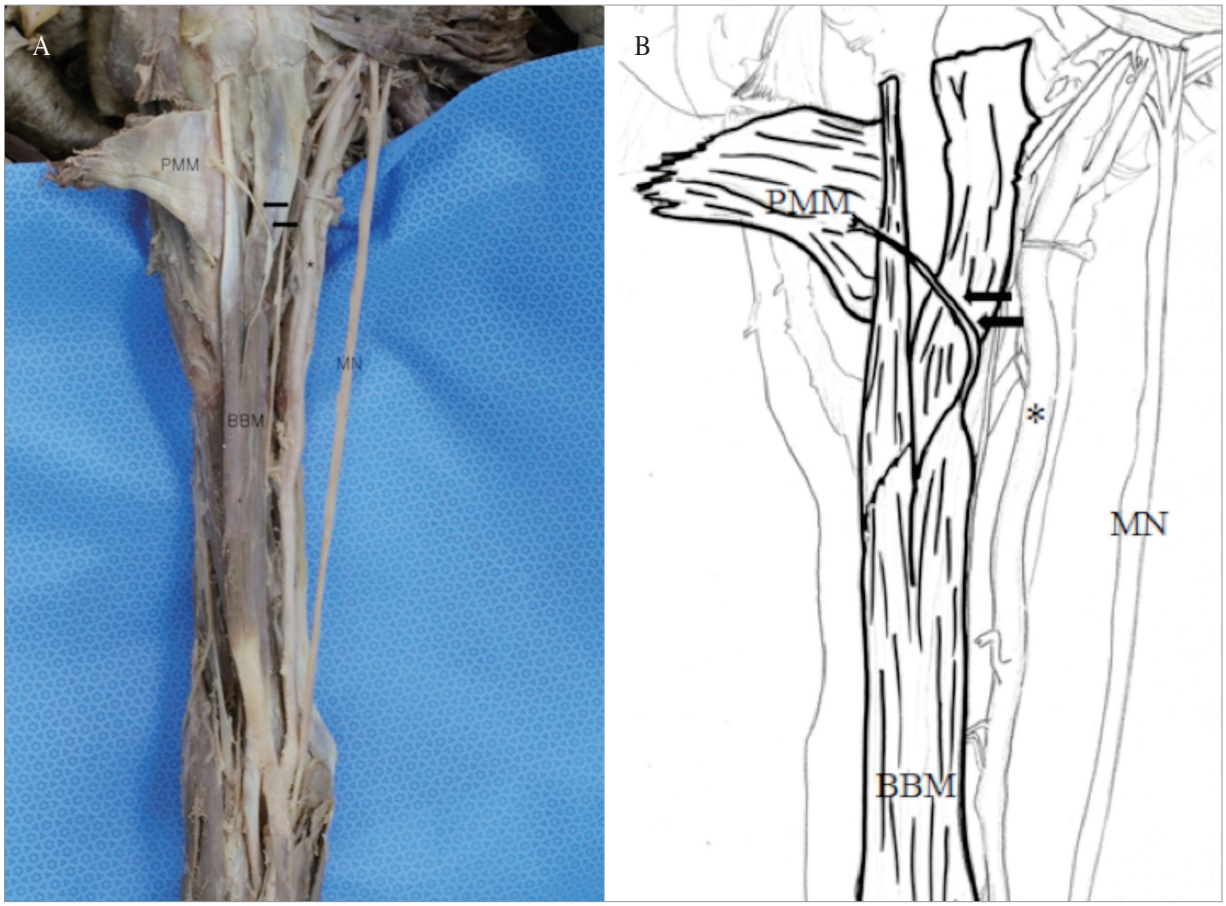

Fig. 1. The photograph (A) and schematic drawing (B) on the dissected right axillar. View of the accessory tendon of the biceps brachii muscle (black arrows) and axillary artery (asterisk) in the right axilla. PMM: pectoralis major muscle, BBM: biceps brachii muscle, MN: median nerve.

Discussion

The most frequent variation of BBM is in the number of muscle bellies [4]. In detail, the prevalence of supernumerary heads of BBM was i.e., Chinese 8%, European white 10%, African black 12%, Japanese 18%, South African blacks 20.5%, South African whites 8.3%, and Colombian 37.5% [2,5,6].

Embryologically, these accessory muscles are formed during the fifth week of development. Mesoderm invades the upper limb bud to further condense into ventral and dorsal muscle masses. The biceps musculature is derived from the ventral muscle masses of the upper limb bud [7]. The variation of BBM, especially in the number of bellies, is thought that occurred by inappropriate cleavage of the ventral muscle masses during development of the upper limb bud. Previous studies demonstrated that the supernumerary heads of BBM were usually originated from the inferio-medial border of the humerus [1]. This head was thought to be due to the musculo-cutaneous nerve piercing brachialis muscle and producing a supernumerary separate head.

Recently, similar cases with the accessory head originated from the anterior surface of the PMM were also reported [8-10] but in this article, the accessory head was originated from the posterior surface of the PMM and this variant has not been previously reported in Korea. Because of the presence of this tendon, the action of the PMM may have an effect on BBM biomechanically [11]. Considering narrow space under the tendon of the PMM, this additional tendon and the tendon of long head may compress the tendon of the PMM and it may cause discomfort to move because of its narrowing space. As most of the third head continued inferiorly deep or medial to the BBM [1], it may cause compression of neurovascular structures because of its close relation to the brachial artery and the median nerve. Because the third head of the BBM described here continued superior to normal BBM, however, clinical problems stated above might not occur frequently in our case. Instead, the third head may increase the potential to cause confusion to clinicians, because of its rare course [10]. In addition, the third head could be valuably used by plastic surgeons in certain procedures [12].

The third head of the BBM originating from the PMM as described above has not been previously reported in Korea. Knowledge of the variations of the BBM is important for surgeons because the presence of the third head increases the incidence of iatrogenic injuries during surgery and invasive procedures.

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