A case of a supernumerary third head of the biceps brachii muscle - clinical significance.

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ABSTRACT: A three-headed biceps brachii muscle was found in one male cadaver out of 118 (0.85%) studied, both for educational and research purposes. The supernumerary head of the biceps brachii muscle was located superficially to the normal heads. It was originated from the insertion of the pectoralis major tendon at humerus. At the lower third of the arm, it was merging with the normal biceps brachii muscle and as a conjoint tendon was inserted at the radial tuberosity. The significance of our finding lies on the fact that the location of the supernumerary head was superficial to the other two heads, in contrast to previous reports in the literature. Surgeons and especially orthopaedic surgeons should bear in mind muscular variations like the one reported in the present study.

Key Words: Arm, Muscles, Biceps brachii, Three heads.

INTRODUCTION

Anatomical variations of the biceps brachii muscle are thought to be frequent, and may be revealed during clinical examination, autopsy or surgery. Biceps brachii is one of the most variable muscles of the human body regarding its heads[1]. Studies from different ethnic groups have revealed the existence of supernumerary head of biceps brachii with different ratio between black, white or yellow race and different nationalities[2,3]. However, another study suggests that other factors, in addition to racial ones, might play a part in determining the incidence of the biceps brachii third head in a population[4].

Although the variations of the muscle's insertion are uncommon, abnormalities regarding redundant heads of the muscle are relatively frequent[5]. The existence of a third head is usually accompanied by variations in the musculocutaneous nerve[6], abnormal course of blood vessels, co-existence of other multiple accessory muscles[7] or diversities in adjacent muscles, namely coracobrachialis muscle[8].

The third head may originate from the coracoid process and humeral shaft, the tendon of pectoralis minor or pectoralis major, the insertion of deltoideus or coracobrachialis muscle, the greater tuberosity or the capsule of the shoulder joint[9]. The third head may be unilateral or bilateral[5]. The absence of the entire muscle or one of its heads, as well as the existence of a four-headed biceps brachii muscle, are rare[10]. Sometimes the two heads are completely separated until their insertion.

In the current study a cadaveric finding of a three-headed biceps brachii muscle is presented and its incidence and clinical significance are discussed.

CASE PRESENTATION

A three-headed biceps brachii muscle was found in the right arm of a 70 years old male cadaver out of 118 cadavers dissected for both educational and research

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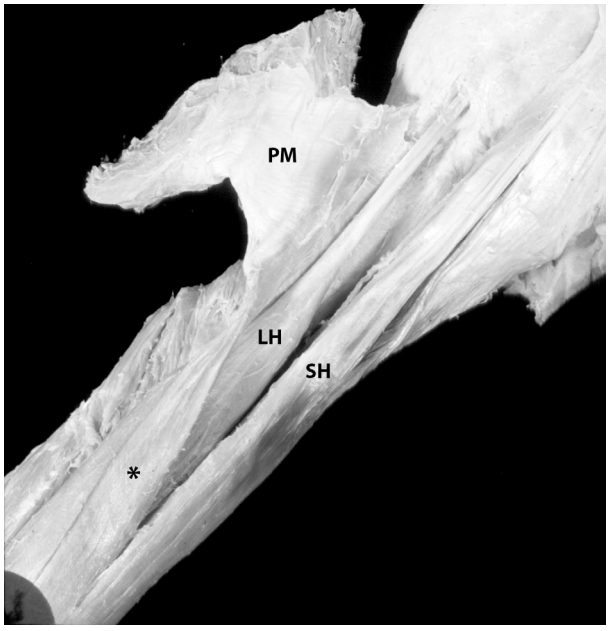

Figure 1. Right arm of the cadaver having a third head (*) of the biceps brachi muscle, located superficially to the short (SH) and long heads (LH) of the muscle. PM: Pectoralis major tendon.

purposes. Thus, the incidence of the three headed biceps brachii muscle in our series was 0.85%.

The supernumerary head was actually a flat muscular belly which originated from the insertion of the pectoralis major tendon at humerus. At the lower third of the arm, it was merging with the normal biceps brachii muscle and as a conjoint tendon was inserted into the radial tuberosity. Innervation of the third head was by the musculocutaneous nerve and the blood supply from brachial artery. There wasn't any other anatomical variation concerning the afore-mentioned nerve and artery. The accessory head was not hypertrophic and it was lying superficially to the normal ones. As a result, no sign of compression at nerves or vessels was observed (Figure 1).

DISCUSSION

Biceps brachii is a long fusiform muscle which covers the anterior aspect of the arm. It consists of two heads, the long one which originates from the labrum and the supraglenoid tubercle, and the short one which arises from the coracoid process. The two heads join together to form the muscle belly, which inserts in the radial tuberosity and the superomedial aspect of the bicipital aponeurosis. The main function of biceps is flexion and supination of the forearm. Innervation and vascular supply of the muscle is from the musculocutaneous nerve and the brachial artery, respectively.

The most frequent abnormality that has been reported in the literature regarding biceps brachii concerns the amount of muscle heads with a high prevalence up to 22%[1,10]. However, bilateral occurrence of supernumerary heads of biceps brachii is relatively uncommon[3]. The most usual type of this variation is the three-headed one, although supernumerary bicipital heads have been described as part of the three, four, five or even seven-headed biceps brachii.[11] The incidence of the three-headed biceps brachii mucle was much lower in our series (0.85%) in comparison to the percentages reported in the literature.

The significance of our finding lies on the fact that the location of the supernumerary head was superficial to the other two heads, in contrast to previous reports in the literature[12,13]. Furthermore, it was crossing the anterior aspect of the elbow joint, augmenting the forearm's muscle power at flexion and supination. Additional biomechanical and electromyographic studies might assist in clarifying the precise function of the variant. Moreover, we didn't observe any accompanying anatomical abnormalities, regarding other muscles, nerves or vessels, which are very often in such cases of supernumerary head of biceps, according to the literature[7].

Surgeons and especially orthopaedic surgeons should bear in mind muscular variations like the one reported in the present study, since unusual clinical signs and symptoms at the upper limb could be attributed to compression or entrapment of neurovascular bundles by these anatomical structures. Knowledge of these variations is necessary to avoid complications during surgical exposures[14]. Special attention is needed during the anterior exposure of the arm or shoulder. Recognition and mobilization of the accessory bicipital head is necessary for adequate exposure of the shoulder joint through a deltopectoral incision[15]. Moreover, in humeral fractures, the supernumerary head may cause unusual displacement of the fracture ends due to the alteration of the biomechanical forces applied on the humerus.

Υπεράριθμη τρίτη κεφαλή του δικεφάλου βραχιονίου μυός. Παρουσίαση περίπτωσης και κλινική σημασία.

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ΠΕΡΙΛΗΨΗ: Κατά τη διάρκεια ανατομικών παρασκευών 118 πτωμάτων, για διδακτικούς και ερευνητικούς σκοπούς, βρέθηκε σε ένα πτώμα ανδρός (0.85%) μία τρίτη μυϊκή κεφαλή του δικεφάλου βραχιονίου μυός. Η υπεράριθμη κεφαλή βρισκόταν επιπολής των δύο φυσιολογικών κεφαλών του μυός και εκφυόταν από τον καταφυτικό τένοντα του μείζονος θωρακικού μυός. Στο κάτω τριτημόριο του βραχίονα συγχωνευόταν με τις δύο φυσιολογικές κεφαλές του μυός, μαζί με τις οποίες καταφυόταν στο κερκιδικό όγκωμα, με κοινό τένοντα. Η περίπτωσή μας παρουσιάζει ενδιαφέρον λόγω της επιπολής εντόπισης της υπεράριθμης κεφαλής σε σχέση με τις δύο φυσιολογικές κεφαλές του δικεφάλου βραχιονίου μυός, σε αντίθεση με τη βιβλιογραφία. Η γνώση της περιγραφείσας παραλλαγής είναι χρήσιμη για το χειρουργό και ιδιαίτερα για τον ορθοπαιδικό χειρουργό.

Λέξεις Κλειδιά: Βραχίονας, Μύες, Δικέφαλος Βραχιόνιος, Τρίτη κεφαλή.

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