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THIRD HEAD OF BICEPS BRACHII MUSCLE AND ITS CLINICAL IMPORTANCE: A CASE STUDY

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ABSTRACT

The Biceps brachii muscle belongs to the flexor group of muscles in the arm. As Biceps brachii is double headed muscle. It is one of the known variable muscles of the human body in terms of number and morphology. The third head of the biceps brachii muscle was identified bilaterally in an 84-year-old male cadaver during routine human cadaveric dissection for the purpose of education and learning of medical undergraduates in Department of Rachana Sharir, National Institute of Ayurveda, deemed to be university, Jaipur.

Normally the Biceps brachii muscle has two heads i.e. Long and short head. In present cadaveric study third head of bicep brachii muscle has been identified while doing routine dissection for undergraduate scholars. The fleshy proximal attachment on lower 1/3 of anterior surface of shaft of humerus has been identified. It has been origin ate along with the superior part of the Brachialis and inserted into the bicipital aponeurosis, and deep to the long and short heads of the Biceps. This third head is supplied by a branch of the musculocutaneous nerve. The third head of biceps brachii may be an incidental finding at autopsy or during routine anatomical dissections. Unless symptomatic, the third head of biceps brachii may not be detected in clinical studies. Variant of biceps brachii may confuse a surgeon who performs procedures on the arm and may lead to iatrogenic injuries. The surgeons

and traumatologists have to keep such muscular variations in mind. So, the knowledge of the existence of its variation is important for anesthetists and surgeons.

Keywords: Supernumerary Head, Biceps brachii, flexor compartment of arm, Variation.

INTRODUCTION

The biceps brachii is one of the muscles of the anterior compartment of the upper arm. It is characteristically described as a two-headed muscle that originates proximally by a long head and a short head. The long head emerges from the supraglenoid tubercle and the continuous portion of the glenoid labrum of the scapula, travels through the synovial cavity of the shoulder joint, emerges below the transverse humeral ligament, and travels through the bicipital groove of the humerus covered by the synovial sheath. The coracoid process of the scapula, which is lateral to the coracobrachialis, is where the tendon for the short head originates. This widens into a fleshy belly that runs parallel to the fleshy belly of the long head, merging into one another slightly before the elbow joint. The posterior margin of the radial tuberosity receives the combined tendon. It also creates bicipital aponeurosis at the level of the elbow joint, which is across the forearm's deep fascia and into the subcutaneous border of the upper end of the ulna. The musculocutaneous nerve, which has a branch to each belly, innervates the biceps brachii (root values: anterior division of ventral primary rami of C5, C6). The Brachial and anterior circumflex humeral arteries give blood to the area.

It is one of the most varied muscles in humans, with the third head being a common variant even if there have been reports of extra heads in the past. Up to 8 extra heads have been documented in earlier literature[1]. The supernumerary head of biceps is mentioned in the majority of literature as occurring unilaterally and seldom bilaterally. We present a case of an adult with bilateral three-headed biceps brachii muscle.

Material and method

A rare case of bilateral three-headed biceps brachii Muscle in right upper limb was observed during routine dissection class for undergraduate scholars of BAMS. This dissection was done on the cadaver of 84 years -old male cadaver of North Indian origin at the department of Rachana Sharir, national institute of Ayurveda, Deemed University, Jaipur.

A Case Report

An 84-year-old male cadaver was dissected during routinely practical class at our departmental dissection hall. While dissecting the flexor compartment of arm we found a three-headed biceps brachii muscle. This third head of the muscle with fleshy proximal attachment on humerus and bilateral symmetry was identified. It originates from the superior part of the brachialis, region of origin of brachial plexus and the coracobrachialis muscle. This extra head of the biceps was inserted into the bicipital aponeurosis, and also inside deep to the long and short heads of the biceps [Fig. (01)]. We measured the muscle belly of third head, was 17.5cm and width 2.5 cm long. Its extra head received a separate branch from the musculocutaneous nerve. There were no additional concomitant changes discovered or observed in the upper limb. The human cadaver used in the dissection was obtained in accordance with all ethical standards through our department's body donation initiative.

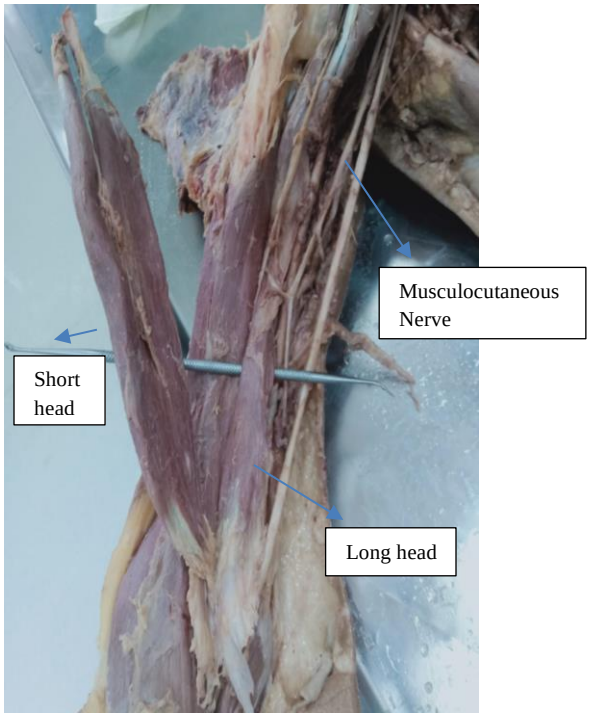

Fig. (01) Showing Right arm with three heads of bicep brachii muscle. Third head emerging roughly from the middle of the shaft of the humerus and inferiorly merging into the bicipital aponeurosis.

DISCUSSION

One of the most variable muscles in the human body is the biceps brachii, which can exhibit differences in 7 to 37% of populations. The Biceps brachii muscle is the only flexor muscle of the arm which crosses the shoulder as well as the elbow joint. It is innervated by the musculocutaneous nerve (root values: anterior division of ventral primary rami of C5, C6) and supplied by brachial and anterior circumflex humeral arteries. This biceps brachii is a particular muscle which means that it helps to control the motion at two different joints, shoulder and elbow. The biceps brachii acts as true prime supination of forearm assisted by supinator muscle and acts as a synergist to the true prime flexor the brachialis muscle at elbow joint. The long head acts as humeral head depressor and Glen humeral joint stability. The short head aids in adduction of humerus, also acts as fixator to stabilize shoulder joint. Long and short heads, as well as proximal and distal attachments and nerve supplies, were all present in both arms.

Males are more likely to have supernumerary heads than females. Extra heads may have a belly like regular heads, or they may seem like a cluster of accessory fascicles originating from any of these: - The shoulder joint capsule or the V-shaped insertion of the deltoid muscle in the humerus, The head and shaft of the humerus ,The pectoralis major and minor tendons. The most typical origin, as in our case, is from the proximal end of the humerus, hence the name "humeral head." It is less frequently occurring bilateral incidence. The frequency of this variation, which is population-specific, has been compared in table-1 with the findings of numerous researchers.

Table 1 - lists the prevalence of extra biceps brachii muscle heads in various populations according to published research.

Third head of the biceps is common,

author and year	Population%	% Occurrence of third head of biceps

Bergman RA[2]1984	Europeans	10
Kosugi K.[3] (1992)	Japanese	18
R. Asvat (1993)[4]	White South Africans	8.3
	Black South Africans made up	20.5
Rai R, 2007[5]	Indian	7.1

Due to its proximity to the brachial artery and median nerve, this extra third or humeral head can occasionally continue inferiorly deep or medial to the main tendon of the biceps brachii and induce compression of neurovascular systems. One study revealed that the incidence of third head of biceps brachii may be approximately 3.33 % but larger studies are needed to confirm this fact. The third head of biceps brachii may be an incidental finding at autopsy or during routine anatomical dissections. Unless symptomatic, the third head of biceps brachii may not be detected in clinical studies.[6] Although the biceps brachii muscle benefits from having an extra head, it may be a phylogenetically degenerating structure and serves no purpose that is particularly noteworthy.[7] In order to use this autonomously innervated and vascularized muscular tissue effectively in various auto grafting techniques, plastic and reconstructive surgeons have this advantage. The Musculocutaneous nerve route and branching pattern may be affected by the presence of such an additional head. However, without knowledge of the variation, such an additional structure can be very readily mistaken for harmful disorders like soft tissue tumors.[8]

It is not unusual to have extra biceps brachii muscle heads. Physical anthropology, which studies human evolution, basic medical sciences, such as human anatomy, which examines the normal structure of the human body, as well as more applied specialties like oncology, general, orthopedic, or reconstructive surgery, all benefit from an understanding of the variations of the biceps brachii muscle. Iatrogenic injuries during surgery and invasive procedures can result from failing to recognize the presence of such a variation[9].

CONCLUSION

The third head of biceps brachii may be an incidental finding at autopsy or during routine anatomical dissections. Unless symptomatic, the third head of biceps brachii may not be detected in clinical studies. The increased biceps brachii heads may play a key role in establishing the forearm's powerful flexion and supination. They might suffocate the median nerve and brachial artery. A surgeon performing surgery on the arm can become confused by a variation of the biceps brachii, which could result in iatrogenic damage. Intermuscular compression may occur if there is a communicating branch between the musculocutaneous and median nerve. This may cause tingling, weakening in the muscles, and other neurological symptoms. These structures may be compressed by the muscle-tendinous slip that was located close to the brachial artery and median nerve. Surgery performed at the arm region may result in damage to the extra head. So, care should be exercised for surgical purposes.

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