



BILATERAL PRESENCE OF SUPERNUMERARY HEAD OF BICEPS BRACHII WITH UNILATERAL VARIANT MUSCULOCUTANEOUS NERVE COURSE: A CASE STUDY

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ABSTRACT

The incidence of muscular variations is way less frequent than that of vascular variations. Among these, supernumerary heads are quite common alongside their original heads. The Biceps Brachii muscle is one such muscle that exhibits variable morphology concerning its origin, insertion and innervation. The most typical variant, however, is said to be the three-headed Biceps Brachii muscle; these supernumerary heads often originate along the middle 2/3 humeral shaft. During routine dissection of a 10% formalin-fixed upper extremity of a 75-year-old male of North Indian male, a bilateral tricipital biceps brachii muscle is revealed. The origin of the third head of the biceps brachii took place in the area between the insertion of the Coracobrachialis and the origin of the Brachialis. These extraneous heads have many clinical implications as these might be confusing for the surgeons operating in this field, and if these are present on either side, they might be misunderstood for soft tissue malignancies. Hence, comprehension of such differences plays a pivotal role.

Keywords: Supernumerary head, Biceps Brachii, Musculocutaneous nerve, variant

ABBREVIATIONS: Short Head of Biceps Brachii (SHBB), Long Head of Biceps Brachii (LHBB), Third Head of Biceps Brachii (THBB), Musculocutaneous Nerve (MCN), Median Nerve (MN)

INTRODUCTION

Biceps Brachii is the chief muscle of the flexor or the anterior compartment of the arm, with two heads that are generally fusiform in shape. The short head originates from the tip of the coracoid process, and the long head is an intra-articular feature that is a long, thin tendon that originates from the supraglenoid tubercle inside the shoulder capsule. The tendon is enveloped by a double tubular sheath, which is an outgrowth of the shoulder that extends distally over the humeral head before leaving the joint deep in the transverse humeral ligament. Herein the extended muscle bellies are formed by the amalgamation of these two heads which are joined together but easily separates off at around 7cm in front of elbow joint, at which point they combine to form a common tendon. The tendon gives a broad medial expansion, the bicipital aponeurosis, which merges with the antibrachial fascia. The presence of a bursa that separates the tendon from the radial tuberosity facilitates the gliding movement of the fascia while supination and pronation of the arm. Tricipital muscles are the most frequently reported variety, yet there have also been reports of up to six heads. Usually, the middle 2/3 of humerus is where the third head of the biceps originates, between the coracobrachialis and brachialis muscle attachments. As an alternative, it may come from the anteromedial surface of the humerus, the capsule surrounding the shoulder joint, the smaller tuberosity, the intermuscular septum, or a tendon or fascia of a nearby muscle. While having a routine dissection at department of Sharir Rachana, NIA, Jaipur, we have reported an important variation of Biceps Brachii muscle exhibiting bilaterally three heads of origin.

CASE REPORT

A routine dissection was done in the department of Sharir Rachana, National Institute of Ayurveda, Jaipur. These variations were found while dissecting a 76-year-old formalin fixed cadaver of North Indian origin. The body was donated voluntarily, and the

formalin fixed upper limbs were observed for this study. Muscles of the flexor compartment along with supernumerary heads of Biceps Brachii and its nervous innervations were noted in the subject during routine dissection. The third head of Biceps Brachii originated near the insertion of the Coracobrachialis and at the origin of the brachialis. They lay deep to the other two heads of biceps and were inserted into bicipital aponeurosis. The human cadaver used in the dissection was obtained through our department's body donation programme following all ethical guidelines.

MATERIAL AND METHODS

A routine dissection was performed on the formalin fixed cadaver in the department of Rachana Sharir, National Institute of Ayurveda, Jaipur, Rajasthan and bilaterally an extra head of Biceps Brachii muscle was observed by making a longitudinal incision on the anterior aspect of the arm extending from the level of acromion process to a point 2.5 cm below the elbow joint.

Then horizontal incisions were made bilaterally on both proximal and distal ends of the longitudinal incision. The skin, subcutaneous fat and fascia of the arms were dissected carefully to expose the full length of the biceps brachii muscle from its proximal to distal attachment. The presence of accessory heads, their origins and insertions were recorded.

Variations:

In Left arm

Muscular Variations: The muscle Biceps Brachii usually possess supernumerary heads in terms in muscular variations. A total number of six heads has been reported so far globally as its variation. While carrying out routine dissection in NIA, we observed a third head of Biceps Brachii muscle that originated from middle 2/3 of shaft of humerus, from the area between insertion of Coracobrachialis and origin of Brachialis where the third head of Biceps Brachii

merged with the tendon of other two heads and inserted through the tendon of Biceps Brachii and bicipital aponeurosis with length of the belly as 12.1cm and breadth 1.6cm as seen in fig 1.1 and 1.2.



Figure.1.1: Anterior view of Left Arm: figure depicting Short Head of Biceps Brachii (SHBB), Long Head of Biceps Brachii (LHBB), Median Nerve (MN), Third head of Biceps Brachii (THBB)

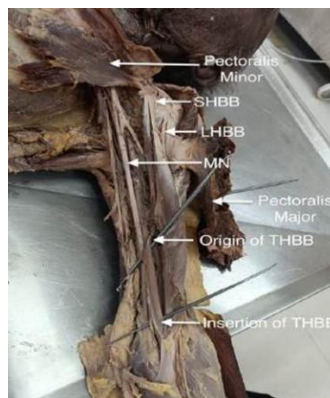


Figure 1.2: Anterior View of Arm: figure depicting Short Head of Biceps Brachii

(SHBB), Long Head of Biceps Brachii (LHBB), Origin and Insertion of Third Head of Biceps Brachii (THBB), Medial Nerve (MN), Pectoralis Major and Minor.

Nervous Variation : The third head of innervated by a twig from Musculocutaneous arm. The short filaments of musculocutaneous nerve entered the muscle from its superior and anterior aspect which emerged out of Lateral Cord of Brachial Plexus and after piercing the Coracobrachialis, it gives off two branches to long head and short head of Biceps Brachii and then giving off a branch to Brachialis muscle as seen in Fig 1.3 and 1.4. The branch of MCN that supplied brachialis muscles gives off a twig that in turn supplies the third head of Biceps Brachii muscle. Later on, the entire MCN continues as the lateral cutaneous nerve to forearm. The vascularization of the accessory head was from the brachial artery and vein.



Figure 1.3:Anterior view of Arm: figure depicting Axillary Artery along with Median Nerve and the branching pattern of Musculocutaneous nerve (MCN),its branches to Short Head of Biceps Brachii (SHBB), Long Head of Biceps Brachii (LHBB), Third Head of Biceps Brachii (THBB), branch to Brachialis

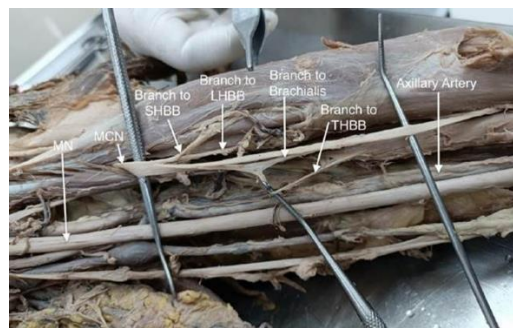


Figure 1.4 : Medial View of Arm: figure depicting course of MCN, branches to SHBB (Short Head of Biceps Brachii), LHBB (Long Head of Biceps Brachii), THBB (Third Head of Biceps Brachii, branch to Brachialis and course of Axillary Artery and Median Nerve

In Right arm:

Bilateral presence of Third head of Biceps Brachii muscle is quite uncommon. The cadaveric study of the muscles of upper limb revealed a comparatively shorter belly of third head of Biceps Brachii muscle to that of one present in left arm. The belly of Third

Head of Biceps Brachii muscle in Right arm measured around 9.8cm in length whilst 1.4cm in breadth as shown in fig 1.5. No such significant branching pattern of Musculocutaneous Nerve was observed.

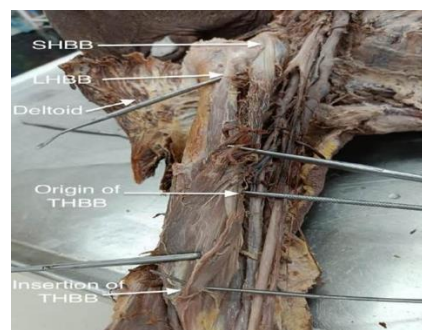


Figure 1 5 : Anterior view of Right Arm : depicting Short Head of Biceps Brachii (SHBB), Long Head of Biceps Brachii (LHBB), Deltoid and origin and insertion of Third Head of Biceps Brachii (THBB)

DISCUSSION

The prevalence percentage of the Biceps Brachii muscle varies from 7 to 37% of the overall population, making it one of the most varied muscles in the body. Different populations have different prevalence rates of SNB: 8% in Chinese, 10% in Europeans, 12% in Africans, and 18% in Japanese. Supernumerary heads are the most common variety of this muscle, and they are more common in males than in girls. The gender difference in prevalence of the third head of the Biceps Brachii is explained by Asvat et al., who state that men are more likely than women to have it. Extra heads can appear as a group of auxiliary fascicles growing from either of these, or they can appear as a belly resembling regular heads:- The humeral head, shaft, coracoid process, pectoralis major and minor tendon, shoulder joint capsule, or the V-shaped insertion of the deltoid muscle in the humerus. As in our case, the most common origin is from the proximal region of the humerus, so it is also known as the humeral head. Bilateral occurrence is less prevalent. In a very unique instance, we document a 75-year-old male of North Indian origin with three-headed Biceps Brachii on both sides with variant course of Musculocutaneous Nerve on the left side.

CLINICAL SIGNIFICANCE

All of these variations are of much clinical importance in the field of orthopaedics as during treatment of the fracture of these bones in this region might lead to unusual displacement of the bones because of third head of Biceps Brachii muscle. The diligent of such variations of the muscle plays a pivotal role as they might lead to compression of neuro-

vascular structures present in vicinity to it and hence might confuse the surgeons during upper limb operations. Herein a third head of Biceps Brachii muscle bilaterally was observed along with variant course of musculocutaneous nerve (MCN) unilaterally in left arm

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