Case Report

Inferolateral supernumerary head of biceps brachii — bilateral variation

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Abstract
Biceps brachii muscle supernumerary head has been widely studied regarding its origin, insertion, size, innervation, and racial difference. It represents the most frequent variation of biceps brachii. During routine dissection in our department, we dissected a Malaysian male cadaver. The variation of unusual third inferolateral supernumerary head were found in both left and right upper arms, apart from medial bicipital aponeurosis, lateral bicipital aponeurosis was also seen in both biceps brachii muscles insertions. This unusual third supernumerary head innervated by the musculocutaneous nerve. Review of the medical literature shows that the occurrence of inferolateral supernumerary third head of biceps brachii muscle is nowhere in Malaysians. Knowledge of occurrence of inferolateral supernumerary third head of biceps brachii muscle may become significant in clinical syndrome and thus it is worthwhile and noteworthy to keep the clinicians for selective motor nerve blocks, to treat the nerve impairments and for the surgeons performing arm surgeries and diagnostic procedures.


Key words: [supernumerary head] [biceps brachii] [medial bicipital aponeurosis] [lateral bicipital aponeurosis]

Introduction
Biceps brachii belongs to the flexor group of muscle in the arm, is in terms of number and morphology one of the most variable muscles in the human body. It is classically described as two-headed muscle, long head originating from the supraglenoid tubercle and a short head from the coracoid process of scapula. It is the only flexor of the arm crossing the shoulder joint, thereby acting on both the joints. This muscle mainly contributes to flexion and supination of the forearm [1]. The two tendon leads in to elongated fleshy bellies uniting just distal to the middle of the arm, end in a flattened tendon, which is attached to the rough posterior area of the radial tuberosity. The tendon has a broad triangular membranous medial expansion, the bicipital aponeurosis, across the cubital fossa and merges with the antebrachial deep fascia over the origin of flexor muscle in the medial side of the forearm [2].

Although the biceps is located in the anterior compartment of the arm, it has no attachment to the humerus. The biceps brachii is a three joint muscle crossing and capable of effecting movement at the glenohumeral, elbow and superior radioulnar joints, even though it primarily act at the latter two [3].

The presence of any supernumerary head of the biceps brachii might alter its kinematics. It is estimated that 9-22% of the people has a supernumarary head [4].

Case Report
Approximately 50-year-old formalin-fixed Malaysian male cadaver was dissected in the Department of Anatomy at AIMST University Malaysia. The upper limbs were dissected carefully as per the Cunningham’s manual of practical anatomy. Variations were photographed and documented. We observed for variations in the origin and insertion of the biceps brachii muscles bilaterally in the anterior compartment of both arms. The biceps brachii muscle showed the supernumerary third head inferolaterally. The supernumerary third head originated from the middle of lateral border of the anterolateral surface of humerus along the line of anterior border of the ‘V’ shaped deltoid tuberosity, its origin medially surrounded by the musculocutaneous nerve.

The third head joining distally with the rest of the muscle and had a common insertion with flattened tendon, which was inserted to the rough posterior area of the radial tuberosity. Apart from the common insertion of the flattened tendon, a broad triangular membranous medial expansion coursed to the bicipital aponeurosis. Through another broad lateral bicipital aponeurosis has been seen over the origin of the common extensor muscle of the forearm to the antebrachial fascia of forearm (Figures 1, 2). No other variations were observed.
This supernumerary third head of biceps brachii was supplied by a branch of musculocutaneous nerve (Figure 3).

**Discussion**

The supernumerary third head of biceps brachii can be explained in the light of embryonic development. During the fifth week of development, the mesoderm invades the upper limb bud to further condense into ventral and dorsal muscle masses. The biceps and triceps are derived from the dorsal and ventral muscle masses of the upper limb buds, respectively. It would be during this period of development that accessory muscle might have been formed [4].

Recently Rodriguez-Niedenfuhr et al. observed 350 arms, classified the supernumerary bicipital heads based on their origin and location. Taking into account all studies and cases reported previously, they defined three different types of supernumerary bicipital heads; i.e. superior, inferomedial and inferolateral humeral heads. They observed the presence of a third head in 27 out of 350 (7.7%) arms. The inferomedial humeral head was observed in 31 out of 350 (9%) arms and was therefore the most common variation. The superior humeral head was observed in five arms (1.5%). The inferolateral humeral head was the least common variation observed in 1 out of 350 arms (0.3%) [5].

In the present case, the supernumerary head is purely inferolateral type, and it is a very rare variation originating from the line of anterior border of the ‘V’ shaped deltoid tuberosity, which is similar to the observation of Rodriguez-Niedenfuhr et al. The third head provided approximately more than 25% of the total mass of the biceps brachii muscle. Till today there was no such reporting regarding the presence of infrolateral bilateral supernumerary third head in Malaysian population. Hence our reporting has important significance.

Previously many authors described about the supernumerary bicipital heads ranging from 3% to 7%, among them the three-headed biceps brachii represents the most common type of variant that has been reported ranging from 7.5% to 18.3% [6–8].

Earlier workers studied differences in races, among them the supernumerary third head of biceps brachii is found in about
20.5% of South African blacks, 8.3% of South African whites, 12% of black Africans, 9% Brazilian blacks, 20% of Brazilian white, 8% of Chinese, 37.5% of Colombians, 10% of white Europeans, 18% of Japanese, 2% of Indian and 15% of Turkish population [9–10].

As far as the side preference for the third head of the biceps brachii is concerned Sweiter and Carmichael emphasized that the incidence of such head is more on the right side, but in our observation was bilateral [11].

Literature review shows the incidence of its occurrence is more in males than females. But Asvat et al. and Kosogi et al. stated that there are no clear gender and racial differences in the occurrence of supernumerary head of biceps [8, 12].

Asvart et al. observed that the third head of biceps brachii originated from the humeral shaft either inferior to or with the insertion area for the corachobrachialis or in common with the brachialis muscles. The relevance of these observations in the clinical scenario is related to some physiopathological consideration. Presence of such muscular variations should be kept in mind by surgeons and traumatologists. Anatomical variations of the head of the biceps brachii muscle have importance in clinical syndromes and thus it is noteworthy to keep this in the mind of surgeon in preoperative diagnosis. Biceps brachii may be useful as a component of flap surgery, in such cases the knowledge of the innervation of accessory head is important for plastic surgery [8].

In the present case the course and branching of musculocutaneous nerve was as usual. There was no variation in the origin and distribution of the musculocutaneous nerve. The knowledge about the supernumerary head and its nerve supply is important for clinicians for selective motor nerve blocks and to treat the nerve impairments, the surgeon should be aware of this anatomical variation during the surgical procedures [13].

Conclusion
The present cadaver study is to highlight the bilateral presence of supernumerary third head of biceps brachii muscle and to discuss its clinical importance which might be helpful for anatomist and surgeons.

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References