



Bilateral Occurrence of Additional Heads of Biceps Brachii – A Case report

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ABSTRACT

Muscular variations are comparatively less when compared to vascular variations. A few muscles show additional heads of origin apart from their original heads. One such muscle which has additional heads of origin is biceps brachii. Literature reveals common occurrence of a 3rd head to biceps brachii either unilaterally (or) bilaterally. Knowledge of these extra heads is important in treating injuries of the muscle and in tendon reconstruction surgeries.

In the present case 2 supernumerary heads on right side and 1 supernumerary head on left side are observed for biceps brachii muscle in a male cadaver of 60 years age in addition to the normal short and long heads of biceps brachii. Median nerve also presented a slight variation in its course. Because of rarity of bilateral occurrence of these supernumerary heads an attempt is made to report the case.

Key words: *Biceps Brachii, Supernumerary head, Tendon reconstruction*

Introduction

Biceps brachii is a double headed flexor muscle of anterior compartment of upper arm, originates proximally with a long head from supraglenoid tubercle and short head from coracoid process of scapula. Distally these heads join to form a common tendon, which gets inserted to the posterior part of the radial tuberosity. This muscle mainly contributes to the flexion and supination of forearm. Some aponeurotic and tendinous fibers gain insertion into the bicipital aponeurosis. It is innervated by musculocutaneous nerve and supplied by brachial and anterior circumflex humeral arteries [1]. Biceps brachii muscle was described as one with frequent anatomic variations [2]. A frequently encountered variation is 3rd head, but 4th, 5th and up to 7th

head have been reported. In 10% of cases, 3rd head arises from the superomedial part of origin of brachialis and is attached to the bicipital aponeurosis. It usually lies behind the brachial artery. Sometimes it may consist of 2 slips which may descend in front or behind the artery. Less often other slips may spring from lateral aspect of the humerus or intertubercular sulcus[1]. Brachialis may be divided into 2 or more slips in some cases; it sends a tendinous slip to the radius or bicipital aponeurosis [3].

Case Report

During routine dissection in the Department of Anatomy, NRI Medical College, Chinakakani, variations in origin and insertion of additional heads of biceps brachii

were found bilaterally in a male cadaver of 60 years age. Communication between MCN (musculocutaneous nerve) and median nerve is an additional finding in left arm.

Right arm (Fig.1a, b):

Biceps brachii muscle presented additional heads. 3rd head arose from the humerus at the insertion of coracobrachialis, superomedial to brachialis and crossed in front of brachialis. It is attached to bicipital aponeurosis. Fourth head arose from the humerus at the insertion of coracobrachialis and also from the tendinous insertion of deltoid muscle. This slip was seen joining the under surface of main muscle just above the elbow joint. (Fig.2) Both heads were supplied by the twigs from musculocutaneous nerve (fig.1a). Brachialis also contributed a part to the bicipital aponeurosis (fig.1b).

Left arm:

One extra head (3rd head) originated from the humerus at the level of insertion of coracobrachialis, superomedial to the origin of brachialis and attached to bicipital aponeurosis, (Fig.3) and supplied by a twig from MCN. Communication between MCN and median nerve was also noted. (Fig.4)

Discussion

In a study conducted on 85 cadavers, 3 different origins to the 3rd head of biceps brachii were reported [3].

- From medial side of shaft of humerus in common with and distal to the insertion of coracobrachialis – most common. - 20.5% in South African blacks and 8.3% in Whites.
- Brachial origin – adjacent and in common with brachialis.
- Dual origin-From medial side of shaft of humerus, lateral deltoid fascia and deltoid insertion – least common.

Incidence of 3rd head in white Europeans was 10% where in the 3rd head arose from the superomedial part of origin of brachialis and attached to medial side of tendon of insertion and to the bicipital aponeurosis [4]. The 3rd head of biceps arose from anterior limb of V shaped deltoid tuberosity and fused with main muscle and this was observed in 3.33% [5] cases. A unilateral 3 headed biceps in 79 years male, where 3rd head has originated from the humerus between the insertion of coracobrachialis and upper part of origin of brachialis and from medial intermuscular septum was reported [6] and duplication of MCN (musculo cutaneous nerve), whose proximal part terminated by supplying biceps brachii and coracobrachialis, distal part arising from median nerve continued as lateral cutaneous nerve of forearm. The insertion of 3rd head into tendon of biceps brachii was reported [7].

Four headed biceps brachii muscle were reported in the literature by various authors. Bilateral four headed biceps muscle, where 4th head on both sides arose from a thin fibrous origin from inter tubercular sulcus and the insertion of the pectoralis major and insertion into the confluence of biceps brachii was reported [8]. Origin of 4th head from antero medial surface of humerus distal to the insertion of coracobrachialis and from medial intermuscular septum was reported. This head was inserted into the conjoined tendon of corresponding biceps brachii muscle [9]. 4th head arose from anterior surface of humerus distal to the insertion of deltoid muscle and fused with the 3rd head forming common belly at the distal part of distal third of arm lying deep to the usual bulk of main muscle. Common belly then inserted on to the deep surface of the bicipital tendon [10].

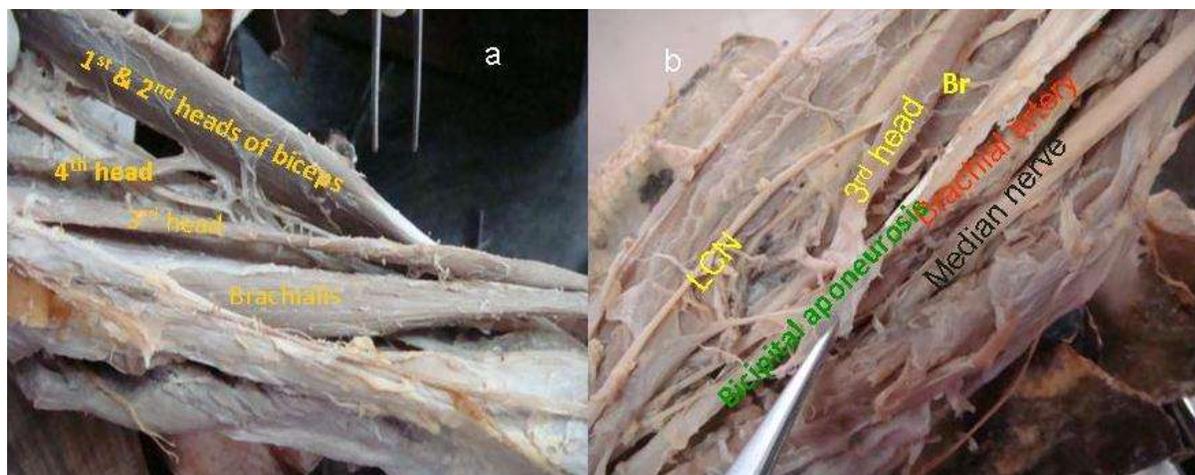


Fig.1a - 3rd and 4th heads of biceps brachii 1b. Brachialis contribution to bicipital aponeurosis

LCN-lateral cutaneous nerve of forearm, Br - Brachialis



Fig. 2- Attachments of 4th head of biceps brachii of right arm



Figure.3- Origin of 3rd head of biceps brachii and its aponeurosis of left arm (BT- Biceps tendon)

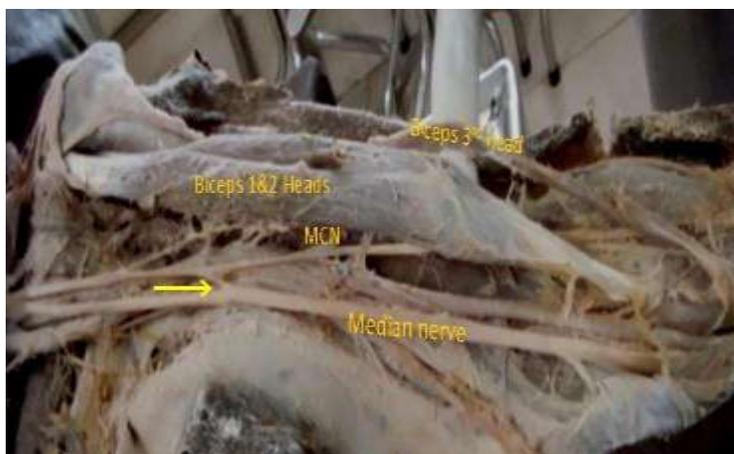


Figure.4 -Communication between MCN & median nerve of left arm (MCN – Musculocutaneous nerve)

Origin of 4th head from the short head of biceps brachii and insertion into the anteromedial surface of shaft of humerus above the insertion of coracobrachialis was observed [11]. Communicating branch between left side musculocutaneous nerve and median nerve was also reported [12]. A similar observation was made in the present case. In present case the origin and insertion of 3rd head was as described by Asvat et.al. [3] who reported it as most common variation. The 4th head origin was as described by Mamatha and Suhani [9] and Poudel and Bhattarai [10], but its insertion differed from above study, by fusion with the undersurface of the main muscle.

Embryological explanation of translocation of a portion of brachialis muscle from ulna to radius was proposed in literature [2]. This supports the hypothesis of functional adaptation. Supernumerary medial heads were thought to be due to the musculocutaneous nerve piercing brachialis muscle and producing a supernumerary separate head [12].

Conclusion

The additional heads of biceps brachii muscle have clinical importance as they may confuse surgeons who perform procedures on the arm and may lead to iatrogenic injuries or they may cause compression of important neurovascular structures in the upper limb. Association of 3rd head with unusual bone displacement subsequent to fracture has relevance in surgical procedure. In addition to allowing elbow flexion independent of shoulder joint position the 3rd head of biceps brachii may enhance the strength of the elbow flexion.

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