Case Report

A RARE VARIATION IN THE DISTAL ATTACHMENT OF AN EXTRA HEAD OF BICEPS BRACHI MUSCLE

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ABSTRACT

This paper presents and highlights the anatomical variation in the insertion of supernumerary heads of biceps brachi muscle. The variation was noted in one of the cadaver in the department of Rachana Sharira (Anatomy) at SDM College of Ayurveda, Hassan, Karnataka (India). During routine dissection of a male cadaver (65 years age), in the anterior compartment of arms bilaterally, it was noticed extra heads for biceps brachi muscle with a separate insertion. Extra head origin and insertion was compared to the normal muscle origin and insertion as per Anatomical literature. The findings were compared with different possible variations of the muscle reported in the various literatures. The clinical importance of this variation has been discussed.

KEY WORDS: Anatomical variation, Biceps brachi Muscle, Biceps tendon, Bicipital aponeurosis.

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INTRODUCTION

Biceps brachi (biceps=two heads of origin, brachi=arm) is a muscle with usually two heads, a long head and a short head which lies in the anterior compartment of arm between shoulder and elbow. Although the biceps is located in the anterior compartment of the arm, it has no attachment to the humerus [1].

Origin: The long head originates from the supra glenoid tubercle of scapula and from the glenoid labrum and the tendon is intracapsular. The short head originates from the tip of coracoid process of the scapula along with the origin of coracobrachialis [2].

Insertion: both heads expand into fusiform

which lie side by side and do not join until about 7 cm above the elbow joint, where a flat tendon is formed. The tendon passes through the cubital fossa, undergoes twisting so that the anterior surface becomes lateral and is inserted into the posterior part of the radial tuberosity; a bursa separates the tendon from the anterior part of the tuberosity. Before insertion, the medial border of the tendon presents a fibrous expansion, the bicipital aponeurosis, which extends downward and medially across the brachial artery and is attached to the upper part of the subcutaneous posterior border of the ulna by way of deep fascia of the fore-arm [3].

Nerve supply: Musculocutaneous nerve (C5, C6)

[2] which is a branch of lateral cord of brachial plexus with separate branches passing to each belly.

Blood supply: Brachial artery; anterior circumflex humeral artery [4].

Actions: Muscle crosses three joints ("three joint muscles") viz: shoulder, elbow and superior radio-ulnar joint [5]. It can therefore act on all of them. Biceps is a strong supinator when the fore arm is flexed. All the screwing movements are done with it. It is a flexor of the elbow. The short head is a flexor of the arm and the long head prevents upward displacement of the head of the humerus. In short biceps flexes the fore-arm at elbow joint, supinates fore-arm at radio-ulnar joints, and flexes arm at shoulder joint.

CASE REPORT

During our routine dissection in the department of Rachana Sharira at SDM College of Ayurveda Hassan, an Anatomical variation anatomical variation in the insertion of a supernumerary head of biceps brachi muscle was observed in both hands (bilaterally) of the 65 years old male cadaver. In the dissection of the anterior compartment of the left arm the main muscle Biceps brachi we noticed an extra third head which has origin from the antero lateral surface of the shaft of humerus just below the 'V' shaped deltoid tuberosity into which the deltoid muscle is inserted. Also the short head of biceps originates by two slips from the tip of coracoid process. The extra head is innervated by a separate branch from the musculocutaneous nerve. We also noticed that the the insertion of the extra head is also by an aponeurosis and a separate tendon (fig.1). The extra tendon lies lateral to the original biceps tendon and it is the most lateral content of cubital fossa. The aponeurosis joins with the bicipital aponeurosis and is attached to the upper part of the subcutaneous posterior border of the ulna by way of deep fascia of the fore-arm. The separate tendon goes medially and downwards and expanded to blend with the inter osseous membrane between the radius and ulna (fig.2). In the right hand the extra head takes origin from the antero-medial surface of the shaft of humerus just below the anterior lip of deltoid

tuberosity, which continues as a narrow tendinous slip and is inserted into the radial tuberosity just lateral to the insertion of the biceps tendon. This head is also supplied by a separate branch from musculocutaneous nerve.

Fig. 1: Showing the Insertion of additional head by an aponeurosis and a separate tendon.

Fig. 2: Showing the Course of the tendon in between radius and ulna.

DISCUSSION

Normal variations - additional heads may be present for biceps muscle. Approximately 10% of people have a third head to the biceps. A third head may arise from the upper and medial part of the brachialis, passes behind the brachial artery, and is inserted on the bicipital aponeurosis and the medial side of the bicipital tendon. A fourth head may arise from the lateral side of the humerus; or from inter tubercular sulcus. This case is a rare condition of variation in the insertion of biceps brachi muscle. Bicipital aponeurosis attaches indirectly by means of the fascia (deep fascia covering the flexor muscles in the medial side of the fore-arm) to the subcutaneous border of the ulna [6]. In one of

the articles an extra tendon of insertion of biceps has been mentioned where it is inserted into the radial tuberosity distal to the insertion of common tendon [7].

Surgical and clinical importance: Damage to the musculo cutaneous nerve causes paralysis of the biceps brachi muscle resulting in loss of flexion of the elbow [8]. Bicipital aponeurosis helps lessen the pressure of the biceps tendon on the radial tuberosity during pronation and supination of the fore-arm [6]. Variations in the heads of biceps brachi muscle have been reported to cause compression of surrounding neuro-vascular structures and lead to erroneous interpretation during routine surgeries [9]. Branching pattern of musculocutaneous nerve, while innervating short head and third head is clinically important [10] as the nerve is subjected to compression by the bulky third head. Any variant nerve having the abnormal origin, course and distribution may be prone to accidental injuries and impairments [9].

In literatures variation in the insertion pattern of extra head of biceps muscle is very rare [11]. This knowledge is essential in various surgical interventions done in these areas. Variations of the heads of the biceps brachii muscle have clinical importance. Supernumerary heads may confuse surgeons during shoulder operations or cause compression of neurovascular structures. Knowledge of the accessory tendon of the biceps is crucial while performing tendon reconstruction and repair [7]. Therefore, surgeons should be aware of this anatomical variation in surgical procedures [12]. Such variations become relevant during surgical intervention of the arm especially after humeral fracture with subsequent unusual bone displacements [13].

CONCLUSION

These muscles should not be mistaken for tumors on magnetic resonance imaging of the arm. The biceps brachii are known for its powerful elbow flexion and supination of the

forearm. It can be argued that the presence of supernumerary heads of biceps brachii muscle increase its kinematics. Therefore, from anatomical standpoint of view it can be presumed the power of flexion and supination of the forearm. In addition to allowing the elbow flexion irrespective of the shoulder joint position, the supernumerary head of biceps brachii may enhance the strength of elbow flexion.

Conflicts of Interests: None

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