MULTIPLE SUPERNUMERARY HEADS OF MUSCLES OF UPPER EXTREMITY

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ABSTRACT

During routine cadaveric dissection, we encountered multiple muscular anomalies in a 58-year-old embalmed male cadaver. The variations were observed in the flexor compartment of upper limb. The anomalies include bilateral origin of pectoralis minor from 2nd rib, a tri-headed coracobrachialis and a third head of biceps brachii in the left arm. The morphological and clinical significance of the anomalous muscles are discussed.

KEYWORDS

Anomalous Muscles, Supernumerary Muscles, Tri-Headed Coracobrachialis, Third Head of Biceps Brachii, Pectoralis Minor.


INTRODUCTION

Anomalous muscles usually do not cause symptoms but are of academic interest. They become a surgical problem when they produce symptoms or are difficult to differentiate from soft-tissue tumours. In the present study there are multiple muscular anomalies found in upper extremity. These variations are worthy of note for clinicians since they should be kept in mind in surgical and diagnostic procedures. The presence of this co-existence was discussed from embryological and clinical points of view.

MATERIAL & METHODS

During routine cadaveric dissection in the department of Anatomy, in one of the upper limb belonging to a 58-year-old male cadaver, found to have three different muscular anomalies involving all the flexor compartments of right upper limb.

CASE REPORT

Variation 1
Pectoralis minor of both sides originating from 2nd, 3rd, 4th and 5th ribs and inserted on coracoid process of scapula. The lateral and medial pectoral nerves were supplying the muscle as usual. (Figure-1)

Variation-2
Coracobrachialis on left side was originating from tip of coracoid process of left scapula as three separate heads i.e. medial, middle and lateral head. Musculocutaneous nerve passed between the middle and lateral head. All the three heads were fused together before attaching on medial border of humerus. (Figure-2)

Variation-3
Biceps brachii muscle in left arm had three heads. The supernumerary head originate along with long head, lie medially and fused with the tendon of biceps brachii. A branch from musculocutaneous nerve supplied the accessory head. (Figure-3)
DISCUSSION

Pectoralis minor is a thin, triangular muscle lying posterior (deep) to pectoralis major. It arises from the upper margins and outer surfaces of the third to fifth ribs (frequently second to fourth), near their cartilages, and from the fascia over the adjoining external intercostal muscles. Its fibres ascend laterally under cover of pectoralis major, converging in a flat tendon which is attached to the medial border and upper surface of the coracoid process of the scapula. Slips of the muscle are sometimes separated and vary in number and level. The costal attachments can be 2nd to 5th ribs; 3rd to 5th; 2nd to 4th; 3rd to 4th. [1]

The supernumerary heads of the biceps brachii muscle have been described as part of a three-, four-, five-headed or even seven-headed biceps brachii muscle. The prevalence of a supernumerary head of the biceps brachii muscle varies among populations, such as Chinese (8%), European white (10%), African black (12%), Japanese (18%), South African blacks (21%), South African whites (8%), and Colombians (38%). The four-headed biceps brachii variation is less frequent with a reported prevalence of 0.18–2.75%.

Supernumerary heads of the biceps brachii muscle may arise from the articular capsule of the glenohumeral joint, lesser tubercle, coracoid process, pectoralis minor tendon, humeral shaft, tendon of the pectoralis major muscle, or the crest of the greater tubercle. [2] Explanation according to the evolutionary point of view: The third head of biceps brachii in humans is probably derived from muscles of anterior compartment of arm as implied by its innervation. In human, where long head of coracobrachialis is absent, the third head of biceps brachii which arises in continuity with the insertion of coracobrachialis may represent a remnant of long head of coracobrachialis the ancestral hominoid condition. [3] It is yet to be proven, whether the accessory head is a specific functional adaptation of population who show continuous, moderate physical activity. Several authors found that males had the variation predominantly and that the incidence was higher in the right arm.

Anomalies of the coracobrachialis muscle are common. [2,4] Numerous studies have documented variations of the form and origins of the coracobrachialis muscle. The reported morphological variations of the coracobrachialis muscle are accessory slips inserting to the medial epicondyle of the humerus, medial supracondylar ridge, medial intermuscular septum, the lesser tubercede and a supernumerary head passing over the shoulder joint. [5] The morphological variations of the coracobrachialis muscle may be due to failure of muscle primordia disappearing during embryological development. [6] The origin of morphologic variations of the coracobrachialis muscle may be explained on the basis of the embryogenesis of the muscles of the arm. The intrinsic muscles of the upper limb differentiate in situ from the limb bud mesenchyme of the lateral plate mesoderm.

At a certain stage of development, the muscle primordia within the different layers of the arm fuse to form a single muscle mass; thereafter, some muscle primordia disappear through cell death. [7] Failure of muscle primordia to disappear during embryologic development may account for the presence of the supernumerary heads of coracobrachialis muscle as reported in this case. In most species, the coracobrachialis muscle has three portions: the longus, mediaus and brevis.

In humans, the mediaus and longus fuse to form the coracobrachialis muscle. [2] The original third head of the muscle, termed coracobrachialis brevis, occurs rather rarely. [2,5] Kyoujouffroy et al. [8] described three portions in coracobrachialis muscle that originated from the coracoid process and inserted into the medial epicondyle of the humerus (Coracobrachialis longus or superficialis), humeral diaphysis (Coracobrachialis mediaus) and humeral neck (Coracobrachialis profundus or brevis).

CONCLUSION

Although it is not usually reported, the presence of the multiple variations is a common case that encountered during educational and diagnostic procedures. We think that the presence of the multiple variations is worth of note not only for anatomist but also for clinicians. Because the upper extremity is a frequent site of injury, various surgical and invasive procedures are performed in this region; consequently, it is of utmost importance to be aware of such variations. The anatomical variations and abnormalities of the muscles of the upper limb have become significant because of physicians may encounter such abnormalities during imaging with computed tomography and magnetic resonance.

Also, these variations are important in order to define the anatomical features of each in relation to the clinical diagnosis and for surgical procedures.

REFERENCES
