



VARIATION IN THE ATTACHMENT OF COSTOHUMERALIS MUSCLE

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ABSTRACT

New imaging techniques, such as computed tomography and magnetic resonance imaging, made easier the detection of the muscle variations of the upper limb. These variations are important in defining the anatomical features in relation to clinical diagnosis and surgical procedures. The knowledge of the anatomical variations in the axilla is important in surgical interventions, considering the frequency of procedures done in this region. We present a rare case of costohumeralis muscle, an accessory slip originating from the sixth rib near the costochondral junction and running along the lower border of the pectoralis major muscle and inserting onto the lateral lip of the intertubercular sulcus and medial epicondyle of the humerus on the right side. Clinical consideration of such a variation include ulnar nerve entrapment and functionally limited abduction of the humerus.

KEYWORDS: costohumeralis muscle, pectoralis, costochondral.

INTRODUCTION

Variant muscles usually do not cause symptoms but are of academic interest. Variations are quite common in different regions of anatomy. Even though, muscular variations are less common, reports on extra origin or deficient origin of muscle and variable positions of insertion are being reported. The muscular variations, most of time, are asymptomatic, whenever if it is symptomatic it may be associated with soft tissue tumours, which are difficult to differentiate accurately. The chondroepitrochlearis, costoepectrochlearis or costohumeralis are rare muscular variations that may arise from the pectoralis major muscle, the costal cartilage, or the aponeurosis of the external oblique muscle, crossing the axilla, and inserting into the medial intermuscular septum or medial epicondyle of the humerus. In the present case, we found a variable muscular slip originating from the sixth rib near costochondral junction and running along the lower border of the pectoralis major muscle, inserting onto the lateral lip of the intertubercular sulcus and medial epicondyle of the humerus on the right side. The muscle is variable in its attachment; such variants are of considerable morphological significance. It is analogous to extensions of the pectoralis major which occur normally in certain lower mammals.^[1]

CASE REPORT

Using conventional dissection techniques, the right upper limb of a 66-year-old, well-built, embalmed male

cadaver is dissected with a purpose of preparation of the teaching and museum anatomical specimens. The medical history of this cadaver was not available. The skin, superficial fascia and the deep fascia were removed systematically on both sides of the pectoral region and flexor compartment of the arm. Special attention was given to the origin and insertion of the costohumeralis muscle. During routine dissection we found a rare case of costohumeralis muscle, an accessory slip originating from the sixth rib near the costochondral junction and running along the lower border of the pectoralis major muscle and inserting onto the lateral lip of the intertubercular sulcus and medial epicondyle of the humerus on the right side. After running along the lower border of the pectoralis major; from the costohumeralis an aponeurotic slip was given off which got attached to the lateral lip of the intertubercular sulcus; beyond this aponeurotic slip, the rest of the costohumeralis became tendinous and ran all the way down to get inserted to the medial epicondyle of the humerus (Figure 1). The occurrence of this costohumeralis muscle also showed a coincidental loss of the normal twisting of the tendinous insertion of the pectoralis major muscle, which proves that this muscle was variable in its development and attachment. However such anomaly was not found on the opposite side. Following the fine dissection, the costohumeralis muscle was photographed.

Figure 1

PM – Pectoralis major muscle CH – costohumeralis muscle
 ME – medial epicondyle humerus - Arrow showing the additional insertion of CH



Figure 1



DISCUSSION

The pectoral muscles show extremely rare muscular variations such as chondroepitrochlearis, costoepitrochlearis or costohumeralis that extends from costal cartilage or from the ribs. The appropriate insertion of these muscles was reported to be variable. In the present case, we observed a muscular slip that originated from 6th rib near the costochondral junction, ran along the inferior margin of the pectoralis major, continued as anterior fold of axilla and got further joined with abdominal fibers and finally inserted to the lateral lip of intertubercular sulcus. Earlier studies named the extra slip of pectoralis major as costohumeralis, where

the origin was from the 6th rib and the costal cartilage. However, the insertion of the extra slip was found to be varying. Variations in the muscular fibers may not be symptomatic but are of academic interest. If symptomatic may be associated with altered kinetics of the joints which influences the movements of the joint or nerve entrapment.^[2]

Accessory pectoral muscles have negative and positive implications. Accessory pectoral muscles may be mistaken for masses or tumours during CT or MRI scans. During pectoral flap surgeries, difficulties may be encountered due to presence of these accessory muscles. Absence of the abdominal slip of pectoralis major, variations in the number of costal attachments, decussation of right and left muscles across the sternum and ascension of superficial vertical slips from the lower costal cartilages which are called “sternalis”. The pectoralis muscle is derived from dorsal limb bud masses which arise from myoblasts that migrate out of the last five cervical and first thoracic myotomes into the developing limb buds during the fifth week of development. The pectoralis muscles assume their final forms through a combination of migration, fusion and apoptosis of muscle cell precursors. It is possible that accessory pectoral muscle is a result of a failure of designated myoblasts in undergoing apoptosis. The “*epicostobrachialis*” muscle arose from the lateral edge of the pectoralis major muscle and inserted into the medial epicondyle of the humerus.^[3]

Occurrence of variant muscular slips from pectoralis major muscle is rare. A rare case of aberrant muscular slip associated with the pectoralis major muscle which we call costodorsalis was found originating from the 6th rib near the costochondral junction and ran along the lower border of pectoralis major muscle. It crossed the axilla from medial to lateral side and merged with the latissimus dorsi muscle. This anomalous slip crossed the base of axilla from medial to lateral side. It might surprise the surgeons doing any surgery of the axilla. The anomaly is of specific importance because of its potential to cause cosmetic defects and to restrict abduction of the arm.^[4]

Sometimes the insertion of the pectoralis major muscle on the fascia of the arm extends lower than usual, and a muscular slip called chondro-epitrochlearis has been described as arising from one or other of the ribs and descending to be attached to the medial intermuscular septum or medial epicondyle. It is analogous to extensions of the pectoralis major which occur normally in certain lower mammals.^[5]

Rare occurrence of unilateral anomalous disposition of the muscular slips of pectoralis major was observed in an adult male cadaver. The pectoralis major muscle displayed unusual configuration and comprised of four parts delineated by three intramuscular clefts. Further, the sternocostal part was found to divide into two

fasciculi. The origin and insertion of pectoralis major muscle was as usual and unremarkable. Interestingly, the innervation of the muscle was observed to bear an important variation. The clavicular and sternocostal slips of pectoralis major muscle received a direct branch from the lateral cord of brachial plexus in addition to its usual innervation from the lateral and medial pectoral nerves. The multiplicity of innervation of pectoralis major as encountered in the present study would presumably augment its suitability for its use in reconstructive procedures. An additional anomalous attachment of the pectoralis minor muscle was also observed emanating from the second rib, apart from the usual third, fourth and fifth ribs.^[6]

A rare case of a right sided accessory head of the pectoralis major muscle was found arising from those of the serratus anterior muscle and travelled superolaterally towards the axilla. The accessory muscle terminated by fusing with the tendinous fibres of the pectoralis major muscle as they underwent their normal anatomical rotation before insertion upon the lateral lip of the bicipital groove of the humerus. Accessory head of pectoralis major muscle may also have had positive implications regarding the functionality of the involved arm. It is possible that the increased size and origin of the pectoralis major muscle through the addition of accessory head of pectoralis major may have increased the angle of optimal function for the shoulder. This may have included increased stability through a greater range of motion or increased load carrying capacity.^[7]

CONCLUSION

Familiarity on the anatomic variations of pectoral musculature is of utmost importance and to proceed for a definitive dissection plane during surgery of chest wall and axilla. The variations may be advantageous for cosmetic reconstructive surgeries and radiological anatomy. Such anatomical anomalies may prove to be advantageous for cosmetic augmentations during reconstructive surgery of breast where pectoralis major can be partly preserved because of additional nerve supply. Awareness of possibility of such anomalies is important for radiologists during interpretation of skiagrams.

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