

CASE REPORT

Chondrohumeralis and axillary arch of Langer: a rare combination of variant muscles with unique insertion

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Abstract

During routine dissection, we found a rare case of an aberrant muscular slip originating from the pectoralis major called as the "chondroepitrochlearis / thoracoepicondylaris / costohumeralis" and an anomalous slip from the latissimus dorsi called as "axillary arch of Langer / musculus dorsoepitrochlearis" in the same axilla. Interestingly, these two slips found to have a common insertion after arching superficial to the axillary neurovascular bundle, into the fascia covering the biceps brachii and to the lateral lip of the intertubercular sulcus of the humerus. Presence of combination of these two rare variant muscles and their unique insertion pattern has not been reported earlier. The knowledge of these muscle variations is important for the clinicians and physiotherapist for better diagnosis and treatment. Here in this report, in addition to the case presentation, we also discuss their clinical significance and the review of literature in detail.

Keywords: chondroepitrochlearis, axillary arch, dorsoepitrochlearis, latissimus dorsi, pectoralis major.

Introduction

Normally, pectoralis major and latissimus dorsi muscles are attached individually as a single bundle of fibers into humerus. However, very rarely, an anomalous slip, the axillary arch, also called as musculus dorsoepitrochlearis, a tendinous slip arising from the anteroinferior border of latissimus dorsi is shown to join either the tendon of the pectoralis major, coracobrachialis, fascia over the biceps brachii muscle or to the intermuscular septum. This arch is thought to be a vestige of panniculus carnosus muscle of lower mammals [1]. It was shown to present in about 7% of the cases and may also present in multiple pinna [2]. On the other hand, the chondroepitrochlearis is also a very rare muscular anomaly, which arises as an accessory slip from the pectoralis major muscle, then crosses the axilla, and inserts onto the medial epicondyle of the humerus and/or medial brachial intermuscular septum. Recently, it was renamed as the thoracoepicondylaris, which more accurately reflects the origin and insertion of this variant muscle slip [3].

Many such variant muscle slips such as, axillary arch, chondroepitrochlearis, dorsoepitrochlearis, costoepitrochlearis and costohumeralis have been reported in the past. However, in the present observation, we report a rare combination of presence of both variant slips in the same axilla and having common and unique insertion pattern.

Material, Methods and Results

During the routine dissection for teaching the medical

students in the Medical College of Sikkim Manipal University, Gangtok, Sikkim, India, in the left side of a 38-year-old male cadaver (donated body) this rare variation was found.

The skin, superficial fascia and deep fascia were removed to expose the pectoral region and the flexor compartment of the arm. The pectoralis major muscle and its variant muscular slip was noted. The variant muscular slip arose as separate fibers from the inferior aspect of the bulky pectoralis major muscle close to the fifth rib.

This muscular slip was identified as thoracoepicondylaris/chondrohumeralis, and measured approximately about 18 cm in length and 1.5 cm in width.

This variant slip was found to deviating away from the main bulk of the pectoralis major muscle immediately after its origin. After carefully removing the axillary group of lymph nodes and the axillary fascia another variant muscular slip, the axillary arch was found to arising from the anteroinferior border of the latissimus dorsi muscle.

This axillary arch measured approximately 7 cm in length and 2.5 cm in width. Unlike other reports, these two variant muscle slips were uniquely joined together and crossed superficial to the neurovascular bundle of the axilla distal to the pectoralis major and finally inserted as common aponeurosis into the fascia covering the biceps brachii muscle and also to the lateral lip of the intertubercular sulcus of the humerus (Figure 1).

However, in the right axilla the origin and insertion of the pectoralis major and latissimus dorsi muscles were normal.

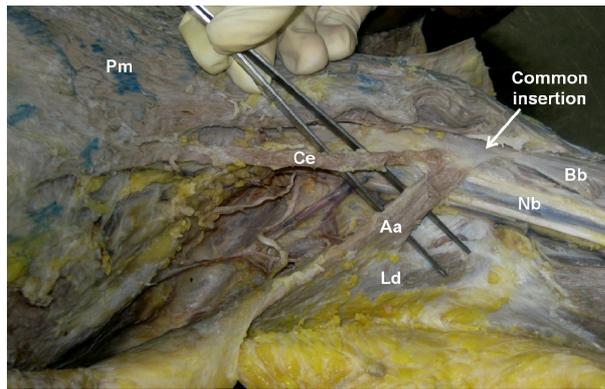


Figure 1 – A muscular slip from the inferior border of the pectoralis major muscle (Pm) called as chondroepitrochlearis (Ce) was separated from the main course of the pectoralis major muscle and crossed the neurovascular bundle of the axilla (Nb) before its insertion. In the same axilla, another variant muscular slip from the anteroinferior border of the latissimus dorsi muscle (Ld), called axillary arch (Aa) was arising and it also runs superficial to the neurovascular bundle of the axilla. These two rare variant muscle slips, after crossing the Nb, were joined to form a single aponeurotic sheath and inserted in to the fascia covering the biceps brachii muscle (Bb) and also on to the lateral lip of the intertubercular sulcus of the humerus.

Discussion

There are many muscular variation of the upper limb in relation to the pectoralis major and the latissimus dorsi muscles have been reported before but it remains yet important to continue describing these rare variations as they appear because of their clinical implications. Such rare muscular slips may produce neurovascular complication as it arches over the axillary neurovascular bundle [4]. Due to large frequency of the surgical intervention in this area, the knowledge of the anatomical variations in the axilla is shown to be important [5].

The pectoralis major muscle may show different types of anomalies such as chondro-epitrochlearis, costohumeralis, costoepitrochlearis [6, 7]. Previously many studies have shown that the anomalous slips coursing along the inferior border of the pectoralis major muscle and to have origin from the ribs or the costal cartilages [8, 6]. Samuel VP and Vollala VR reported an accessory muscular slip originating from the pectoralis major muscle and inserting on to the medial epicondyle of the humerus and medial intermuscular septum [9]. Further, the chondroepitrochlearis is a rare unilateral or bilateral muscular variation that may arise from either the pectoralis major muscle, the costal cartilages, or the aponeurosis of the external oblique muscle. However, the insertion of these rare slips was varied. It has been shown that this slip may insert into the medial epicondyle of the humerus and to the brachial fascia [10], medial intermuscular septum or medial aspect of the humerus. Some reports show that, the occurrence of this muscle with a coincidental loss of the normal twisting of the tendinous insertion of the pectoralis major muscle [3]. In another study, two heads of anomalous muscle, the ventral head arising from the

abdominal part of the pectoralis major muscle, and the dorsal head arising from the lateral surface of the latissimus dorsi muscle was reported. These two heads were shown to unite at the medial surface of the upper third of the arm to form a common tendon, which further descended on the medial surface of the upper arm, parallel with a long tendon of the coracobrachialis muscle before it attached to the medial epicondyle of the humerus [11].

The latissimus dorsi muscle also presents an aberrant muscular slip, which was named as axillary arch [12]. After its origin from the anteroinferior border of the latissimus dorsi, it may insert either on to the coracoid process or along with the tendon of pectoralis major [13, 14]. The presence of the “axillary arch of Langer” from the latissimus dorsi muscle has been reported many times before [15]. Muscular slip arising from the latissimus dorsi or pectoralis major muscle inserting into many structure including the fascia and the flexor muscles of the arm [16], coracobrachialis, biceps brachii and long head of the triceps brachii [17], the teres major [15], the coracoid process of the scapula [13, 18], the medial condyle of the humerus as chondroepitrochlearis muscle [19] and pectoralis minor [20] have been reported earlier. Chiba S *et al.* suggested that chondroepitrochlearis is always associated with axillary arch muscle and is present in 7 to 13 % of the population [7]. However, Voto SJ and Weiner DS in 1887 reported a clinical case of an infant with a contracture of the chondroepitrochlearis without an axillary arch muscle [21].

Even though there are many reports to show the chondroepitrochlearis and axillary arch, the present variation, a combination of presence of two variant muscle and their common insertion on to the fascia covering the biceps brachii muscle and also to the lateral lip of the inter-tubercular sulcus, seems to be unique and not been reported earlier. The popular name “chondroepitrochlearis”, here may be referred as “chondrohumeralis or chondrobrachialis” owing to its proximal and distal attachments.

Cadaveric, neurosurgical and medico-diagnostic evidences of the presence of the axillary arch of Langer is assumed to produce symptoms similar to those of entrapment or obstruction type syndromes and may also influence the motor control of the shoulder girdle. It has been shown that presence of axillary arch significantly increases the strength, endurance and motor control of the shoulder along with an increase of paraesthetics in women but not in men. A possible shoulder stabilization and an improved proprioception were also found both in men and most of the women with axillary arch [22]. It has also been shown that the presence of axillary arch may show positive sings during neurodynamic test from brachial plexus and median nerve by transiently provoking the axillary neurovascular bundle [4]. Preoperative diagnosis of axillary arch via multidetector row computed tomography is shown to be very useful during sentinel lymph node biopsy [23].

To conclude, this muscular anomalies of the pectoralis major and the latissimus dorsi holds a great deal of importance as it is rare and is important to know in many clinical applications. Aberrant slips may also cause axillary vessels entrapment syndromes [24, 22],

branches of brachial plexus entrapment symptoms [8, 25] and has been suggested to have a role in development of lymphedema of the upper limb. Spinner RJ *et al.* group has explained for the first time, the symptomatic infraclavicular ulnar nerve entrapment due to the chondroepitrochlearis muscle [10]. The knowledge of the presence of these variation in the axilla may help during lymph node staging and lymphadectomy [26, 27], radical mastectomy, cannulation/cauterization of axillary vessels, transposing and anastomosing the cephalic vein to the upper basilic/axillary vein in cephalic vein stenosis treatment [28], while using the latissimus dorsi muscle flap to treat the traumatic wounds of the antecubital fossa [29], treating the shoulder displacement, fracture of the humerus, the nerve block and to treat the functional limitations in the range of the shoulder movement. Compression of the neurovascular bundle by the axillary arch should be considered in the differential diagnosis of the thoracic outlet and the hyperabduction syndromes [5]. Idiopathic contracture resulting from the anomalous slips of the pectoralis major and the latissimus dorsi muscles may require the surgical interventions. Further, knowledge of these muscular variations is important for the diagnosis of unexpected and uncommon clinical conditions.

☒ Conclusions

These anomalies therefore attract clinical attention because of its potential to cause significant functional defects and surgical importance and may be of particular interests to orthopedic surgeons, neurologist and cosmetic surgeons.

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