Case Report

Deep axillary arch muscle; a rare muscular variation

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Abstract

Axillary or Langer's arch muscle is one of the rare anatomical variations in the axillary region. It is a muscular band running from latissimus dorsi to pectoralis major, biceps brachii or coracoid process and it can be deep or superficial. In its course it is closely related to the nerves and vessels of the axillary region. The evolution of this muscle states that it is a remnant of panniculus carnosus, which is an extensive subcutaneous sheet of muscle. In clinical practice it is seen associated with costoclavicular compression syndrome, neurovascular entrapment, thoracic outlet syndrome and it leads to confusion in routine axillary clearance in breast cancer. The anatomical knowledge of this variation is of great use for surgeons, clinicians and radiologists in interpreting axillary mass. We report an anomalous axillary arch muscle, its morphology and clinical significance had been reviewed.

Key words: Deep axillary arch muscle, brachial plexus, posterior cord, axillary vein, radial nerve

Introduction

One of the rare anatomical variations in the axilla is a muscular band extending from latissimus dorsi to pectoralis major muscle called as axillary or Langer's arch, axillopectoral or pectodorsal muscle. Many types of this have been observed like attaching to coracoid process of scapula, long head of triceps, medial epicondyle of humerus, teres major, coracobrachialis, biceps brachii or pectoralis minor. Common in Chinese as compared to Caucasians and more incidence is seen in females as compared to males and is usually bilateral. Axillary arch is commonly a single band, but can be seen as multiple slips which extend along the axilla and it can be superficial or deep. The most reliable theory of its embryological derivation describes that it arises from panniculus-carnosus, an extensive sheet of subcutaneous muscle. A possible genetic basis is pointed out by Aziz in a patient of trisomy 13. On examination it has been misinterpreted as axillary mass or confused with enlarged axillary lymph nodes or soft tissue tumors. It may cause intermittent axillary vein obstruction and compression of nerves and vessels in the axilla. It's presence can block adequate exposure of axillary contents and also may limit the access to lymph nodes during routine axillary clearance for breast cancer. Hence it is important for the surgeons operating in the axilla to be aware of this anatomical variant to achieve complete lymphatic dissection.

Case report:

During regular dissection for first year MBBS students at anatomy department of Sri Siddhartha Medical College, Tumakuru, we found a muscular slip in the right axilla of a middle aged male cadaver arising from the anterior border of latissimus dorsi coursing deep to...
brachial plexus except for a small part of posterior cord and axillary artery attached to the coracoid process of the scapula by tendinous slip as shown in Fig 1. The length was about 10cms and its wide breadth was 1.5cms. It was a single band of fibres traversing across the axilla in close relation to axillary vessels and brachial plexus. We also noticed a variation in the formation of posterior cord of brachial plexus, which has upper part which was the continuation of dorsal division of upper trunk and lower part as a continuation of fusion of dorsal divisions of middle and lower trunks. upper part gave rise to upper and lower subscapular, axillary nerves and a small contribution to radial nerve. Lower part gave rise to thoracodorsal nerve, a twig to axillary arch muscle and continued to form Radial nerve.

The nerve supplying it traversed its anterior surface, wound round the lateral border, entered its deep surface and supplied it, indicating that the fibers were derived only from C7, C8. This variation in its innervation was not reported in the literature previously as per our knowledge.

Axilla of the left side of the same cadaver revealed variation in the branches of axillary artery in its third part which gave rise to radial artery proximal to the origin of subscapular and circumflex humeral arteries.

### Discussion

Primarily the axilla is a small pyramid shaped compartment between the wall of thorax and upper one third of arm & it contains varied elements derived from brachial plexus and axillary vessels (Holinshead 1958). Occasionally an anomalous muscular band called Axillary arch is seen and its relative closeness to vital structures are of importance to surgeons. This was identified by Alexander Ramsay in 1795, reported in 1812. Langer in 1846, described the muscle more accurately so that there after it came to be known as Langer's arch.

Langer's arch usually a single band, but can be divided into multiple slips which extend across the axilla. In complete form it arises from latissimus dorsi and inserts into pectoralis major onto the humerus. In incomplete form it presents with the varying insertions into the pectoralis minor, coracobrachialis, biceps brachii, coracoid process, first rib or fascia of the axilla. In our case it was an incomplete form where in insertion was to the coracoid process deep to the tendon of pectoralis minor.

Nerve supply to it is usually from medial pectoral or thoraco dorsal nerves. In our case nerve supply was from lower part of posterior cord of brachial plexus.

The most reliable theory of embryonic derivation of Langer's arch describes its origin from panniculus carnosus, which is an embryological remnant of single subcutaneous sheet of muscle which regresses in humans with high shoulder mobility.

Aziz in 1980 described a possible genetic association who found it in a patient of trisomy 13. Elaborate dissection of neonates with trisomy 13 and 18 have revealed numerous supernumerary muscles, which do not occur regularly in humans.

Limb muscles arise in situ from mesenchyme in 4 phases around developing bones, being derived from lateral plate mesoderm. Cihak described that during phase 3 of this, some muscle primordia from different layers fuse to form single muscle. Persistence of some cells between latissimus dorsi and teres major? May account for axillary arch formation.

### Clinical implications

Langer's arch usually does not produce symptoms but it can cause confusion during routine axillary clearance for breast cancer. It's presence can block adequate exposure of lymph nodes (sentinel group) which may result in partial clearance of the axilla. It can also be of...
significance while performing axillary node biopsy, for proper exposure and good haemostasis. The arch muscle may present as lump in the axilla and can compress the adjacent neurovascular bundle which leads to various symptoms and blocking an easy axillary access. It can cause difficulties in staging lymph nodes & axillary clearance. \(^1\)

Clinically it has been implicated in compression of median nerve, unstable shoulder, hyper abduction and thoracic outlet syndrome\(^2\) and with intermittent axillary vein obstruction. Identification of this variation before surgery is possible by phlebography followed by simple excision of this muscle is curative. \(^1\)

Although its presence assists in adduction of shoulder, it can compress the axillary nerves and vessels. Prior anatomical knowledge of its presence maybe helpful for surgeons performing surgeries of axilla and ligation of axillary vessels. Clinicians diagnosing abduction shoulder syndrome and radiologists interpreting axillary mass in daily practice. \(^{1,6}\)

The Langer's arches were preoperatively diagnosed with multi detector computerized tomography in 10.8% of cases. Single arch in 70%, another anomalous muscular band besides it in 21%, rare axillary arches 3% of cases. The sentinel lymph node identification failure rate was 5.1% in its presence. The axillary arch knowledge during sentinel lymph node biopsy is must because this would be associated with other variations that affect sentinel lymph node biopsy. \(^{1,4}\)

**Conclusion**

Knowledge of this muscular anomaly and the chances of identifying it are essential for lymph node staging and resection and are also required for the management of neurovascular complications. Contraction of this muscular band may produce traction of the radial nerve. It should be considered in differential diagnosis of compression syndromes of the axilla. Clinical examination of axilla is a must and has to be supplemented with investigations.

**References**