CASE REPORT

A Rare Incidence of Langer's Axillary Arch

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Abstract

The Langer's axillary arch muscle (AA) is a rare anatomical variant in the axillary region, generally arising from the latissimus dorsi muscle and inserting at various sites. Found in approximately 7% of axillary explorations, AA can contribute to conditions like costoclavicular compression, thoracic outlet syndrome and nerve entrapments.

Case report: In a routine axillary dissection, one unilateral AA was identified in the left axilla in a cadaver of a 76-year-old male, measuring 7.5 cm in length and 8 mm in breadth. Dissection revealed the AA originating from the lateral border of latissimus dorsi, passing superior to the axillary vein and brachial plexus, and inserting into the pectoralis major tendon. This muscle may complicate surgical access in breast cancer surgeries and increase risk of misdiagnosis, highlighting the need for anatomical awareness among healthcare providers to avoid diagnostic and procedural complications.

Keywords: Langer's axillary arch, Brachial plexus, Latissimus dorsi, Pectoralis major, Panniculus carnosus

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Introduction

Axillary region is a complex anatomical region bounded by pectoralis major and latissimus dorsi muscles, anteriorly and posteriorly, respectively. It contains very important structures including vessels, lymph nodes and nerves, particularly the brachial plexus which supply upper limb region (1). Thus, there can be anatomical variations in those structures. Axillary arch is such a rare muscular variation seen in axillary region, especially during cadaveric dissection and is of a clinical importance (2). It also known as axillary arch muscle (AA), Langer's muscle (3), axillopectoralis, pectodorsalis and arcus axillaris (4). This muscle may carry a significant surgical implication during axillary surgeries particularly in breast cancers (3).

Axillary arch is a connective tissue or muscle band mostly arising from latissimus dorsi muscle (LDM) (5) and it passes over brachial plexus to insert various areas of upper limb (2). There may be variations in the size, shape, consistency, insertion and even in the origin (1,5). The first accurate description on this muscle was provided by Karl Langer in 1846 (4). It is hypothesized that, axillary arch is originated from panniculus carnosus embryologically (6). Its prevalence is documented as upto 7% of axillary explorations (7) however it may vary across different genetic groups (2).

Though there are multiple studies done on the structure of axillary arch around the world, reported case studies are lacking in Sri Lankan context. Here we report an incidence of unilateral axillary arch detected during cadaveric dissections.

Case Report

During the routine axillary dissection of a 76-year-old male cadaver in Department of Basic Sciences, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka, unilateral muscular slip suggestive of an axillary arch was noticed in the left axilla. Following removal of axillary fat, further dissections were carried out by staff members to identify its origin and insertion.

Among the bilaterally dissected total 18 cadavers of the dissection hall, this was the only cadaver with an axillary arch. It was observed that there were no features to suggest previous injury or surgical procedures done in the axillary area. Upon inspection, it was observed that the muscle originates from the lateral border of the latissimus dorsi muscle. Then it passes anterior to the brachial plexus, axillary vein and artery, and inserted into the tendon of pectoralis major muscle (Figure 1). Its length was around 7.5 cm, and breadth was 8 mm at its broadest point. However, no evidence suggestive of an axillary arch was observed in the right axilla making it a unilateral axillary arch.

The intercostobrachial nerve was running freely in the space between AA and the lateral border of LDM. A tiny nerve was supplying the base of the AA which was coming between the teres major muscle and the LD from their superior most relations but had no connection with long thoracic nerve, thoracodorsal nerve

Figure 1. Left axilla with axillary arch muscle. (AAM: Axillary arch muscle, AV: Axillary vein, LD: Latissimus dorsi muscle, PM: Pectoralis major muscle, Pm: Pectoralis minor muscle)

nor any part of brachial plexus. However, to the difficulty in access the exact origin of the nerve could not be identified. The formation of the median nerve was also observed to be more distal compared to the right side (Figure 2).

Discussion

Having been first described in 1783 by Bugnone, and more precisely described by Langer in 1846 (4), axillary arch is a rare muscular variation seen in the axillary region with special surgical implications (3). According to the literature, incidence of axillary arch in population is around 7-8% (8), but different sources show it may range from 1.7% to 43.8% across various populations (1). However, in our study only one cadaver was found out of 18 bilaterally dissected cadavers (incidence 5.6%).

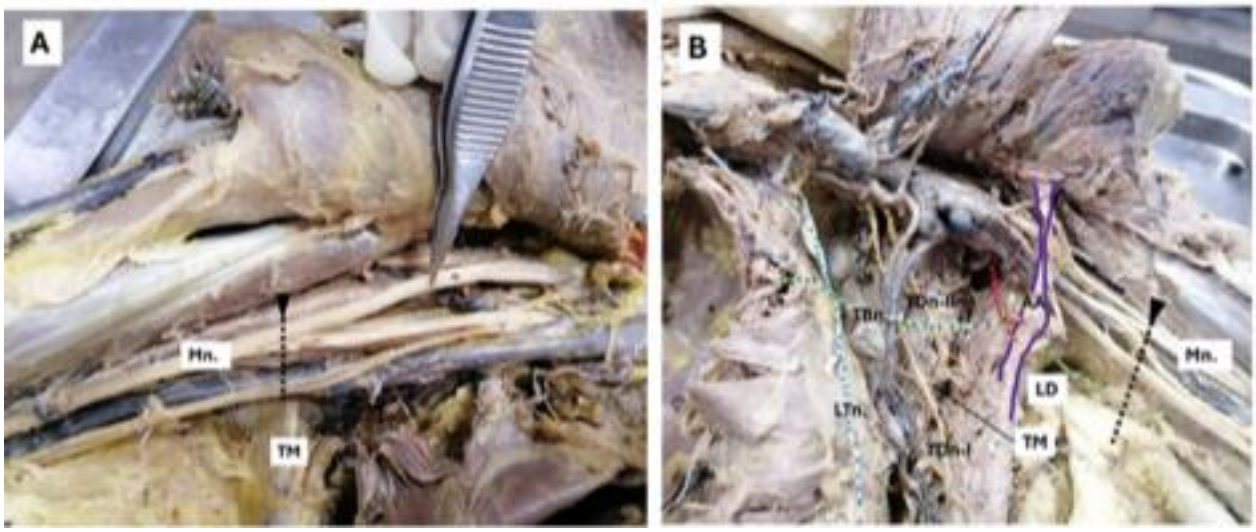

Figure 2: Right side axilla (A) and Left side axilla (B). (A) shows the position of the formation of the median nerve (Mn.) which is at the level of teres major muscle (TM). (B) shows the same at a more distal position compared to the lateral border of axilla. Purple outline shows the axillary arch (AA), and the dotted lines show the nerves running in the region; (red) shows the unknown nerve supply the base of the AA, (blue) shows long thoracic nerve (LTn.) over the serratus anterior muscle, (yellow) show two thoracodorsal nerves (TDn.) supplying latissimus dorsi muscle (LD), (green) shows thoracobrachialis nerve running between AA and LD.

Most of the time, Langer's axillary arch appears as a single band with single origin and single insertion site. But it may be divided into two or more parts with several insertions (8). In the current study, a single band of axillary arch was found with a single origin and insertion. Its origin is latissimus dorsi muscle (9), similar results seen in our case. However, its insertion can be single or multiple with pectoralis major muscle, coracoid process, short head of the biceps tendon, coracobrachialis (9), sometimes pectoralis minor muscle and the axillary fascia can act as possible insertion sites (4). In our case the insertion was pectoralis major muscle. Axillary arch muscles have been observed both unilaterally and bilaterally with unilateral variant being the most common (10). But a study done by Weninger et al. (1) reports an equal occurrence of these variants. In our case, it was a unilateral arch.

Depending on the location of axillary arch in relation to the axillary neurovascular bundle, axillary arches are divided into two groups: the superficial group and the deep group (9). Superficial arches cross anterior to the neurovascular bundle whereas deep arches cross posterior or lateral to it. A superficial type of axillary arch was observed in our study.

According to the literature AA is innervated mainly by the lateral pectoral nerve. However, its innervation from intercostobrachial, internal thoracic, and thoracodorsal nerves also been reported (2). In our case the nerve supply was not from any of the above nerves and variations in the innervation is open to further explore.

Axillary arch is thought be developed from panniculus carnosus (6), a subcutaneous muscle system developed in mammals but is restricted to facial, palmar and scrotal musculature in humans. Though considered vestigial, axillary arch has significant clinical implications. During clinical examinations, it can be mistaken for axillary tumour and the axillary fullness might make palpation of axillary lymph nodes difficult (11). Thus, it can increase the chance of misdiagnosis during palpation and also in imaging (9). As it lies in close relation to the axillary neurovascular structures, it can cause compression on those structures resulting in axillary vein obstruction (12), deep vein thrombosis in upper limb (13), brachial plexus impingement, thoracic outlet syndrome (8), shoulder instability and hyperabduction syndrome (14). As the arch is crossing anteriorly to the brachial plexus most of the time, median nerve is more susceptible to get affected producing symptoms in forearm muscles and lateral aspect of the hand (9). Sometimes, musculocutaneous nerve and ulnar nerve maybe affected (15).

Langer's axillary arch is of a greater surgical importance when it comes to axillary surgery, specially for breast cancer. As it would limit access to certain axillary lymph node groups, axillary clearance is difficult in those individuals (3). In reconstructive breast surgeries, where latissimus dorsi muscle flap is used, it is important to know about axillary arch and its attachments in order to identify the extent of the muscle (9). As sometimes axillary arch has attachments in shoulder joint capsule, it is important to identify the arch in case of shoulder surgeries as well (3).

Though detection of axillary arch in live individuals is difficult, it is possible to identify axillary arch in computed tomography or magnetic resonance imaging in axillary region (9,12).

To conclude, though the presence of Langer's axillary arch muscle is rare, it can increase risk of misdiagnosing and recurrences of carcinomas. Hence knowledge regarding morphology and variations of axillary arch are essential for healthcare professionals including plastic surgeons, physiotherapists, oncologists as well as to the radiologists.

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