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Case Report

An Axillary Arch Muscle And Its Clinical Importance- A Case Report

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ABSTRACT

The axilla is a pyramidal space, situated between the upper lateral part of the chest and the medial side of the arm. Axilla is the area connects the cervical and upper limb regions; most of the important structures from neck region passes through the axilla and reach the upper limb. Knowledge of muscular, vascular, and neural variations in the axilla is of great clinical importance, especially in mastectomies, breast reconstruction, and axillary bypass operations. During routine dissections for undergraduate medical students at Department of Anatomy, in an 84-year-old male cadaver, we found a muscular slip on the right axillary fossa that originated from latissimus dorsi muscle and attached to the deep surface of the tendon of pectoralis major muscle.The axillary artery proximal to the arch muscle showed variable course. The compression of neurovascular bundle of axilla by an axillary arch muscle is discussed in literature. Presence of an axillary arch muscle has immense clinical and morphological significance.

KEYWORDS: Axilla, Axillary arch, Latissimus dorsi, Neurovascular bundle, Variations.

INTRODUCTION

The axillary arch muscle is an accessory muscle that extends between the pectoralis major and latissimusdorsi [1]. Among the variety of terminology that describes this variant structure as “Achselbogen”, “axillopectoral muscle”, “axillary arch”, “Langer’s axillary arch” or “muscular axillary arch” [2], we prefer the term “axillary arch” (“arcus axillaris” in Latin) in this report. The axillary arch is a variant muscular slip of this muscle and is about 7 to 10 cm in length, splits from the upper edge of the latissimus dorsi and crosses the axilla in front of the axillary vessels and nerves [3].Ramsay, in 1795, described the axillary arch for the first time. He gave the description of a muscle bundle connecting pectoral muscle and latissimus dorsi [4]. However, the muscle has been named after Langer who gave the first description of the muscle in 1846 [5] The incidence of axillary arch muscle reported in different population groups as 7% in Japanese, 10% in Belgian, 0.25% in British Population [6]

Axillary arch can receive nerve fibers from the lateral pectoral nerve, medial pectoral nerve, intercostobrachial nerve or thoracodorsal nerve [2]. Its embryonic origin is not clear and some anatomists consider muscular arches of the axilla as rudimentary phylogenetic remnants of the panniculus carnosus [7]primarily, the axilla contains the diverging elements derived from the brachial plexus and axillary vessels [1]. Occasional presence of an anomalous muscle i.e. axillary arch muscle and the relative closeness of

vital structures are of importance to the surgeons and also for academic purposes.

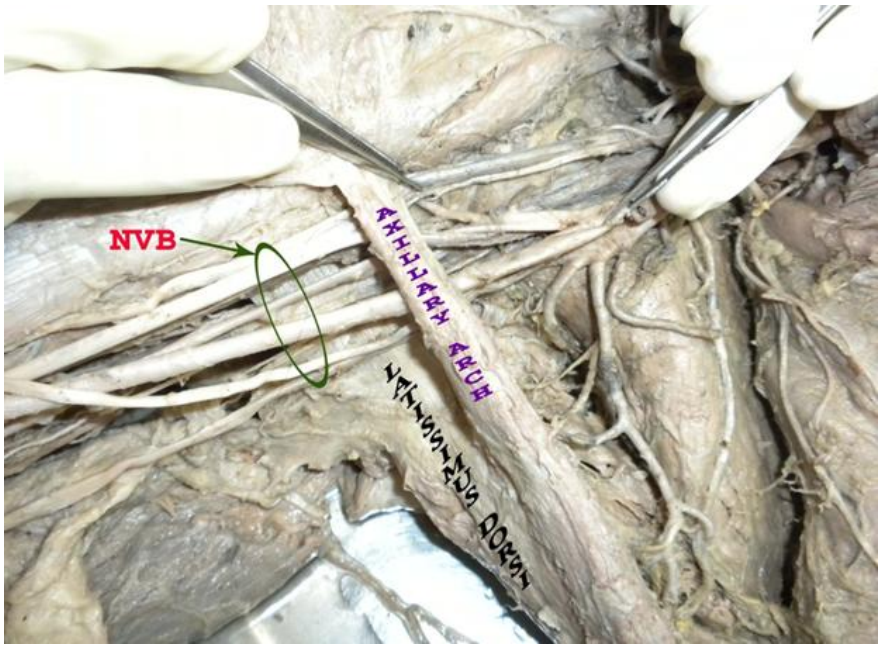
Knowledge of muscular, vascular, and neural variations in the axillary region is of clinical importance in mastectomies, breast reconstruction, and axillary bypass operations [8]. The axillary arch can cause thoracic outlet syndrome and shoulder instability. Entrapment of the neurovascular bundle within the arch can lead to entrapment syndrome. In addition, the axillaryarch hides a small group of lateral axillary nodes, which can mislead the surgeon during breast surgery [9].

CASE REPORT

During routine dissection of the axilla for undergraduate teaching in the Department of Anatomy, allure sitarama raju academy of medical sciences, Eluru, Andhrapradesh, India, an axillary arch crossing the distal part of axillary artery and vein as well as the nerves related to them was observed on the right upper limb of a 85-year-old male cadaver [Figures 1, 2]. The fleshy fibers of axillary arch were attached posteriorly to the belly of latissimus dorsi just proximal to its insertion. Anteriorly the fibers were merging with the fleshy fibers of pectoralis major on its deeper surface.

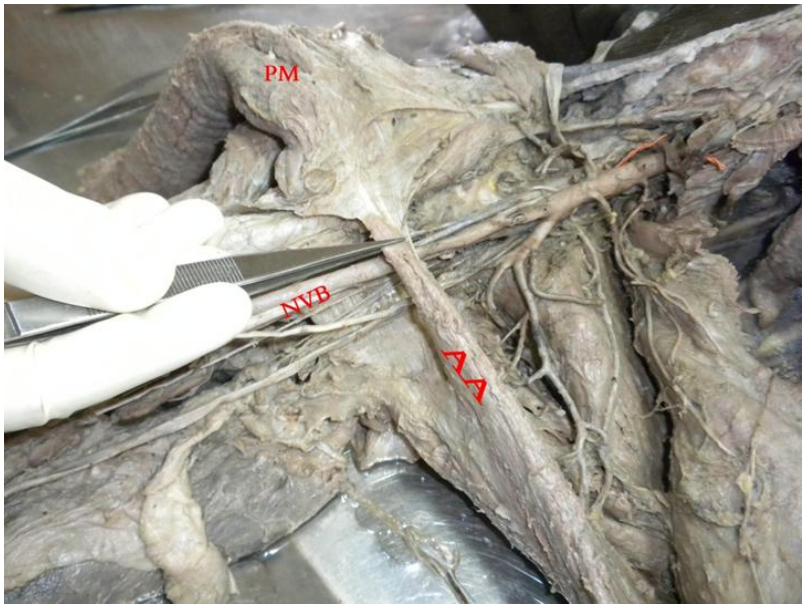
The muscle slip was about 9 cm in length and was passing superficially across the neurovascular bundle (3rd part of axillary artery, distal part of axillary vein, median nerve, and medial cutaneous nerve of forearm and ulnar nerve which are sandwiched between the artery & vein) of the axilla. The axillary arch was mostly muscular and partly fibrous. The muscular slip at the base originated from the latissimus dorsi, which were 2.1 cm wide and 7.5 cm long. The fibrous part of the arch, measuring 1.5 cm in length and 0.5 cm in width, was attached to the deeper surface of the pectoralis major [Figure 2].

Fig 1:Axillary arch muscle arising from latissimus dorsi muscle.



NVB: Neurovascular bundle

Fig 2:Axillary arch muscle inserting in to deeper surface of Pectoralis major muscle.



PM: Pectoralis major; AA: Axillary Arch; NVB: Neurovascular bundle

DISCUSSION

The axillary arch, an infrequent and often overlooked variant of the latissimus dorsi, has been recognized in 0.25%–37.5% of subjects, depending on the population studied [10].The axillary arch is considered as one of the common variations in the axillary region. However, the origin, course, insertion, tissue composition, and dimensions of the axillary arch are variable [5]. The axillary arch may arise from the latissimus dorsi muscle, either directly or indirectly with an interposed tendon [5].

The most common insertion of axillary arch is as a single muscular band into the muscles including pectoralis major, pectoralis minor, coracobrachialis, short head of the biceps brachii, teres major or to the coracoid process or to the neighboring axillary or brachial fascia [5, 10] In the present case, the male cadaver had a unilateral axillary arch on the right side. A major part of the axillary arch was made up of a musculararband, which is rarely reported in the literature.

Tobler reported couple of cases where in one of the cases it was inserted into the fascia covering the biceps brachii and the coracoid process and in the other case insertion was into the pectoralis major tendon (muscular part) and coracoid process (aponeurotic part) [5]. Similarly, the cases of up to three tendinous insertions were reported by Langer and Dharap [5, 11].

An axillary arch reported by Turgut et al., was unique in its attachment. It was originating from the coracoid process of the scapula and extending to the long head of triceps brachii muscle [12]. A case of axillary arch with two slips entrapping neurovascular bundle in axilla is reported by Koshy et al. [13].] The most widely accepted view of embryological development of the axillary arch suggests that it is a remnant of the panniculus carnosus found in mammals [5].

During the embryonic period, limb muscles arise in situ from the mesenchyme, which in turn is derived from the somatic layer of lateral plate mesoderm that surrounds the developing bone. As described by Cihak et al. [14], the ontogenesis of muscle has 4 fundamental phases. During phase 3, muscle primordia from different layers fuse to form a single muscle, while some muscle primordia disappear through cell death in spite of differentiated myofilaments [15]. In phase 4, connective tissue elements develop and start their integration with muscle fibres. In the present case, the anomaly probably arose during phases 3 and 4, during which the majority of muscle fibres must

have undergone apoptosis (during phase 3). The fibrous slip of the axillary arch might be persistent connective tissue formed between the latissimus dorsi and the pectoralis major muscle. Identification of the axillary arch and its variations may help avoid accidental injury to axillary vessels and the brachial plexus during surgical procedures.

The axillary arch can pose difficulty during sentinel lymph node biopsy because the slip stretches in the hyperabducted position and shifts the node higher [16]. The latissimus dorsi is of clinical significance, especially in breast cancer surgeries, because the deep fascia surrounding the muscle is continuous anteriorly with the axillary fascia, and the nerve supply to this muscle traverses the axilla [17]. The anterior edge of the latissimus dorsi marks the dorsal extent of a total mastectomy [18]. Knowledge of possible variations in the region of axilla especially axillary arch is essential for the clinicians and surgeons during the clinical examinations and when dealing with any investigative surgical procedures or a case of injury to the axilla. Axillary arch may obscure lymph nodes and may be responsible for compressive pathologies of the axillary vessels and brachial plexus. Hence, surgeons have to keep them in mind during axillary lymphadenectomy [4]. Axillary arch crossing the axillary vessels and causing an obstruction has also been reported [19].The potential presence of an axillary arch presents several clinical considerations for the physical therapist. The existence of an axillary arch should be considered in patients with signs and symptoms consistent with upper extremity neurovascular compromise similar to thoracic outlet syndrome. Including this variant in the differential diagnostic process may assist physical therapists in the management of patients with signs and symptoms consistent with thoracic outlet syndrome [20].

CONCLUSION: To conclude, we would like to state that it is very essential not only for the anatomists but also for the clinicians and surgeons to be aware of the probable variations of the axillary arch for proper diagnosis and planning of operative treatment. Our observations in the present case will supplement the knowledge of variations in the anatomical sciences.

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