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Case report

Axillary arch and its relations- A rare case report

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ABSTRACT

Axillary arch is a variable, occasional, additional muscular slip of Lattissimus dorsi. It needs careful observation to find out because of its relations with the other structures present in the axilla. It may compress the axillary vessels and cords of brachial plexus leading to pressure symptoms. It also important during block dissection of lymph nodes, it may tear the structure related if it is ignored. In this paper, a rare case of axillary arch is reported during routine dissection of the axillary region of a 50-year old male cadaver present unilaterally on the left side. It is taking origin from both Latissimus dorsi and Teres major particularly more contribution from Teres major; and passed upwards medially (anterior to) through the posterior cord of the brachial plexus, but posterior to the bulk of axillary neurovascular bundle. The posterior cord of the brachial plexus splits in to two separate divisions, upper & lower. Thoracodorsal nerve coming from upper division. Two divisions join together to form radial nerve. Remaining branches of the posterior cord are coming from lower division. Length of splitting distance of posterior cord of the brachial plexus measured from starting point to end point that is 4cm. It is inserted into the root of the coracoid process. The presence of the muscle has important clinical implications, and the position, unilateral or bilateral presence, relation to the posterior cord, and multiple connective tissue attachments makes the case most unique. The anatomy, comparison of study's on axillary arch and surgical implications are discussed in this paper.

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1. Introduction

Axillary arch is described as, a muscular slip, the axillary arch, varying from 7 to 10 cm in length, and from 5 to 15 mm in breadth, occasionally springs from the upper edge of the latissimus dorsi about the middle of the posterior fold of the axilla, and crosses the axilla in front of the axillary vessels and nerves, to join the under surface of the tendon of the pectoralis major, the coracobrachialis, or the fascia over the bicepsbrachii[1,3]. This axillary arch crosses the axillary artery, just above the spot usually selected for the application of a ligature, and may mislead a surgeon. It is described as a muscular variant using MRI data and positively correlated its presence with symptoms of neurological impingement. A fibrous slip usually passes from the upper border of the tendon of the Latissimus dorsi, near its insertion, to the long head of the triceps brachii. This is occasionally muscular, and is the representative of the dorsoepitrochlearis brachii of apes.[4]

Anatomical variations of the axilla are of great relevance due to the increasing surgical importance of this region during axillary surgery for breast cancer; reconstruction procedures, and axillary bypass operations. One of the variations reported has been the presence of a muscle extending from the Latissimus dorsi muscle to the Pectoralis major muscle called variously as Langer's Axillary arch, Axillopectoral muscle, Pectodorsal muscle and Arcus axillaris[5]. The presence of this muscle has important clinical implications. The muscular arch first identified by Ramsay in 1795, and described in 1812, was later confirmed by Langer[9]. We report here a very unusual case of unilateral anomalous axillary arch muscle. This variation occurs in about 7% of the population, more common among Chinese than in Caucasians and more common in females than in males. It is usually bilateral but can occur unilaterally[10].

2. Case report

It is found during routine dissection of axillary region (left side) in a cadaver aged 50 years, heavily built individual. It is measuring a length of 7.5 cm, maximum width of 2 cm at the beginning, 0.5 cm at the insertion, getting origin from Teres major and Latissimus dorsi particularly more contribution from Teres major and inserted to coracoid process of scapula. It is passing

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(behind the axillary vessels related in front to) through the posterior cord of brachial plexus. The posterior cord of the brachial plexus splits in to two separate divisions, upper & lower. Thoracodorsal nerve coming from upper division. Two divisions join together to form radial nerve. Remaining branches of the posterior cord are coming from lower division. Length of splitting distance of posterior cord of the brachial plexus measured from starting point to end point that is 4cm. Axillary vessels and remaining cords of brachial plexus are related anteriorly(Photo 1). No nerve supply was found. Similar structure on right axillary region was not found.

Table 1: comparative study of axillary arch

	Length & width	presence	Origin	Insertion	Nerve supply	incidence
Mohandas RAO KG et al, 2011	-	unilateral	Both LD & PM	-	Musculocutaneous nerve	-
Sharma Tet al, 2009	10 & 1.5cm	unilateral	LD	Coraco brachialis	-	-
H. Üç erler etal,2005	-	unilateral	Both LD &PM	To fascia of biceps brachii	T2&T3	-
Minne Pillay et al 2009	-	bilateral	Both LD &TM	2 slips	Lower sub scapular nerve	-
Present study	7.5cm&0.4-2cm	unilateral	Both LD &TM	Coracoid process	-	1%

Photo 1: dissected left axillary region of a cadaver showing axillary arch and its relations



Ax A- Axillary arch, O LD- Origin of Axillary arch from Lattissimus dorsi, OTM- Origin of Axillary arch from Teres major, AA- Axillary artery, AV- Axillary vein, LD Lattissimus dorsi, TM- Teres major, UD- Upper division of posterior cord of brachial plexus, RN- Radial nerve, AN Axillary nerve, TDN- Thoracodorsal nerve, LSSN- Lower sub scapular nerve.

3. Discussion

The axillary arch was first identified by Alexander Ramsay in 1795, though reported in 1812. However it was Langer (1846) accurately such that thereafter it became known as Langer's arch[9]. Langer's arch usually is seen as a single band, but it can divide into double or, rarely, multiple structures which extend across the axilla. Different variations of the axillary arch muscle have been reported subsequently by many authors(Table1). Lattissimus dorsi is active in adduction, extension and especially medial rotation of the humerus. Humeral adduction and extension are more powerful when the initial position of the arm is one of partial abduction, flexion or combination of two. It assists backward swinging of the arm, as in walking and many athletic pursuits. When the arms are raised above the head, as in climbing, it pulls the trunk upwards and forwards. It takes part in violent expiratory efforts such as coughing or sneezing. Electromyography suggests that it aids deep inspiration, but it also active towards the end of forcible expiration. Coastal fibers help in inspiration by elevating lower ribs. Despite this range of actions, surgical transection of the muscle does not produce any serious restriction of normal activity[1,3]. Axillary arch extends from the Lattissimus dorsi to the Pectoralis major and compresses upon axillary vessels causing venous thrombosis[1]. In our case, the muscle was found attached to Lattissimus dorsi and Teres major but more contribution from Teres major. Both these muscles are closely

linked anatomically and functionally. The unilateral presence, contribution from both Latissimus dorsi and Teres major, and its relations with of the posterior cord and axillary vessels all put together, makes this case a very unique one. Langer's arch can occasionally be palpable during clinical examination, when presenting as an axillary mass, and can be confused with enlarged lymph nodes or soft tissue tumours. Compression by the muscular axillary arch should be considered in the differential diagnosis of patients with thoracic outlet and hyperabduction syndromes[8]. However, Langer's arch is usually asymptomatic, and its main importance is in the confusion it can cause during routine axillary surgery for breast cancer. The presence of muscular or tendinous fibres of the arch can impede adequate exposure of the true axillary fat, and in particular may limit access to the lower lateral group of axillary lymph nodes, thus resulting in an incomplete clearing of the axilla[2]. It is possible that the Langer's arch could form a direct relation of the axillary structures, such as thoracodorsal neurovascular bundle, the brachial plexus, the lateral lymphatic trunks, or the axillary vein. These structures may be at risk if the presence of Langer's arch is not considered, leading to bleeding, venous thrombosis and nerve damage[1]. Inadequate dissection may also predispose to excessive lymphatic destruction and consequent lymphoedema[7].

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