

**Case Report / Olgu Sunumu**

## Bilateral Arcus Axillaris Case

### *Bilateral Arkus Aksillaris Olgusu*

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Bilateral arcus axillaris was found on a 55-year-old male cadaver in our laboratory of anatomy during routine dissection. This variation which is also called as axillary arch, axillopectoral muscle or axillary arch of Langer could be fibromuscular or muscular. In our case, a fasciculus separating from latissimus dorsi muscle ended at the tendon of pectoralis major muscle after overlying the neurovascular bundle in the axilla. Although left muscular arch was innervated by intercosto-brachial nerves, right muscular arch's nerve was not identified. It might have caused neurovascular symptoms in the hand, arm and forearm.

**Key words:** Axilla; variation; latissimus dorsi muscle.

Rutin kadavra disseksiyonu esnasında 55 yaşında bir erkek kadavrada bilateral arcus axillaris'e rastlandı. Literatürlerde "Arcus axillaris", "Aksillopektoral kas" veya "Langers'in aksillar arki" olarak da bildirilen bu yapı fibröz yada muskuler karakterde olabilmektedir. Bizim olgumuzda m. latissimus dorsi'den ayrılan bir kas demeti aksillar damar sinir paketinin önünden geçip m. pectoralis major'un tendonunda sonlanıyordu. Sol muskuler ark interkostobrakiyal sinir tarafından innerve edilmesine karşın sağ taraftakini innerve eden herhangi bir sinire rastlanmadı. Arkus aksillaris, kol, ön kol ve elde nörovasküler semptomlara yol açabilmektedir.

**Anahtar sözcükler:** Aksilla; varyasyon; m. latissimus dorsi.

The axillary fossa is an anatomical space between the lateral part of the chest wall and the medial aspect of the upper limb. Its confines are the latissimus dorsi, teres major and subscapularis muscle posteriorly, serratus anterior muscle and first 4-5 rib medially, pectoralis major, and pectoralis minor anteriorly and biceps brachii coracobrachialis muscle laterally.<sup>[1,2]</sup> It can be modified by anatomical muscular variations.<sup>[3,4]</sup> The most commonly used terms in different languages define the muscular variation as an arch-shaped structure in the region of the axilla

– "arcus axillaris" in Latin by Jouffroy, Schramm and Graf von Keyserlingk, Kalaycioglu et al.,<sup>[5,6]</sup> "Achselbogen" in Germany by Gegenbaur, Birmingham, Tobler, Gehy,<sup>[5,7]</sup> "axillary arch", "axillopectoral muscle" in English by Marciniak and Serafin, Boileau Grant and Basmajian, Clemente, Babu and Khashaba, Bonastre et al., Smith and Cummings.<sup>[5-8]</sup>

According to Pitzorno (1911), the first description of this variation was made by Bugnone in 1783. He mentioned a muscular slip originating

from the latissimus dorsi m. and inserting to the humerus with the pectoralis major m.<sup>[9]</sup>

Other researchers such as MacAlister, Eisler, Bergman et al. reported that the first description was defined by Ramsay (1812). In 1795, he observed an oblong muscle stretching from the pectoralis major m. to the latissimus dorsi and teres major m. Langer mentioned that a number of anatomists had noted a variant structure in the axilla, related to the latissimus dorsi m, at the beginning of Ramsay's work.<sup>[5,10]</sup>

Langer described in detail the anatomy of the axillary fossa. He mentioned a large number of muscular or fibrous slips originating from latissimus dorsi m and passing either to pectoralis major and minor muscles, to biceps brachii m, coracobrachialis m, to the coracoid process. Testus had given the name "arc axillaire de Langer" ("Langer's axillary arch") to the muscular variation.<sup>[5]</sup>

The embryological origin of the axillary arch is not clear.<sup>[3,11]</sup> It has been regarded as an incomplete dorsoepitrochlearis m, a homologue of the pectoralis quartus m, a remnant of the superficial common layer of the latissimus dorsi and pectoralis major muscles or as a remnant of the panniculus carnosus in the region of the axilla. Most of the anatomists supposed an origin from the "panniculus car-

nosus".<sup>[5]</sup> "Panniculus carnosus", which is an embryologic remnant of a more extensive sheet of skin-associated musculature, lying at the junction between the superficial fascia and the subcutaneous fat.<sup>[11]</sup>

The purpose of our article is to describe the axillary arch. It has previously been reported as the cause of axillary vein entrapment syndromes, presenting as an axillary mass, and a role has been suggested in the development of lymphoedema of the upper limb following breast surgery.<sup>[12]</sup>

### CASE REPORT

During routine dissection in our laboratory of anatomy, bilateral muscular arch of axilla was observed in a 55-year-old male cadaver. Right and left muscular arches were extending from the lateral edge of latissimus dorsi muscle to the insertion of the pectoralis major muscle. It's length and width for right-left side were 7 cm, 2.7 cm (Fig. 1) and 6 cm, 1.5 cm (Fig. 2), respectively. The axillary artery, veins and the nerves of the brachial plexus were under this muscle arch at the right-left side. Although left muscular arch was innervated by intercostobrachial nerves, right muscular arch's nerve was not identified. Both right and left muscular arches did not have independent blood vessels.

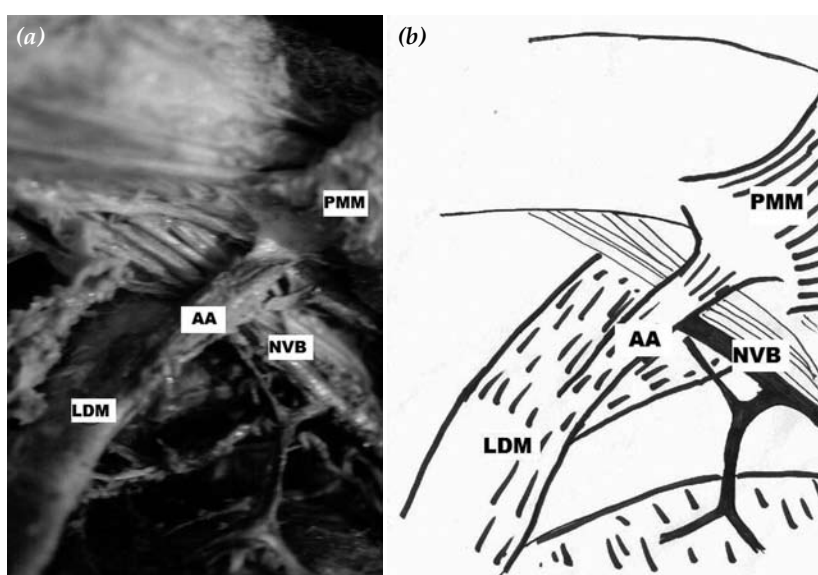


Fig. 1. (a) The photography and (b) a schematic drawing of the right axillary region. LDM: latissimus dorsi muscle; NVB: neurovascular bundle; PMM: pectoralis major muscle; AA: arcus axillaris.

## DISCUSSION

The latissimus dorsi is a triangular, flat muscle, which covers the lumbar region and the lower half of the thoracic region.<sup>[1,2]</sup> MacAlister had described this muscle as “very liable to vary”. Since 1871, he had been mentioned in 26 different anomalies of latissimus dorsi m.<sup>[9]</sup>

The axillary arch has been studied both in dissected human cadavers and also in living individuals.<sup>[4,5,12-16]</sup> The reported incidence of this variation is between 2.5% and 27%.<sup>[9]</sup>

Miguel et al.<sup>[3]</sup> mentioned three cases that were emerging from latissimus dorsi, crossing over the axillary neurovascular bundle and inserting deep to the insertion of pectoralis major m. or into coracoid process. Kameda<sup>[16]</sup> also determined the similar anomalous muscles in 10 sides out of 380 axillary regions of 190 human cadavers. This muscle arose from lateral margin of scapula, the surface of the subscapularis muscle or the latissimus dorsi tendon and inserted on the subscapularis m. Kameda classified the muscles into three types according to the basis of its nerve supply and its relation to the brachial plexus. Dharap<sup>[15]</sup> observed a triangular muscular slip 3.5 cm long and 2.5 cm wide, in the left side of an adult male cadaver. It was arising from the lower border of latissimus dorsi and inserting

by a slender 6 cm long tendon into coracoid process of the scapula.

According to Wagenseil, axillary arch is seen more often among Chinese than in Caucasians and is more common in women than in males.<sup>[9,11]</sup>

Schramm and Keyserlingk reported two different kinds of this anomaly in their four cases out of 60 cadavers. In three cases, a small fasciculus with a width of 1-2 cm, arose from the anterior margin of the latissimus dorsi, passed the neurovascular bundles anteriorly and attached to the short head of the biceps brachii m. These fasciculi were observed unilaterally and their innervation could not be certainly determined. In the fourth case, a fasciculus arose from the latissimus dorsi on the right side, coursed similarly, but became attached to the coracoid process of the scapula and coracobrachialis m.<sup>[5]</sup> Ucerler et al.<sup>[17]</sup> described an axillary arch which was extending between latissimus dorsi and pectoralis major muscles in a male cadaver on the left side. Kalaycioglu et al.<sup>[6]</sup> mentioned in only one out of 60 cadavers dissected in their laboratory of anatomy. Takafuji et al. examined 94 axillary regions of 47 Japanese adults cadavers. In addition, they classified Langer's arch into two groups as type I (muscular structure) and type

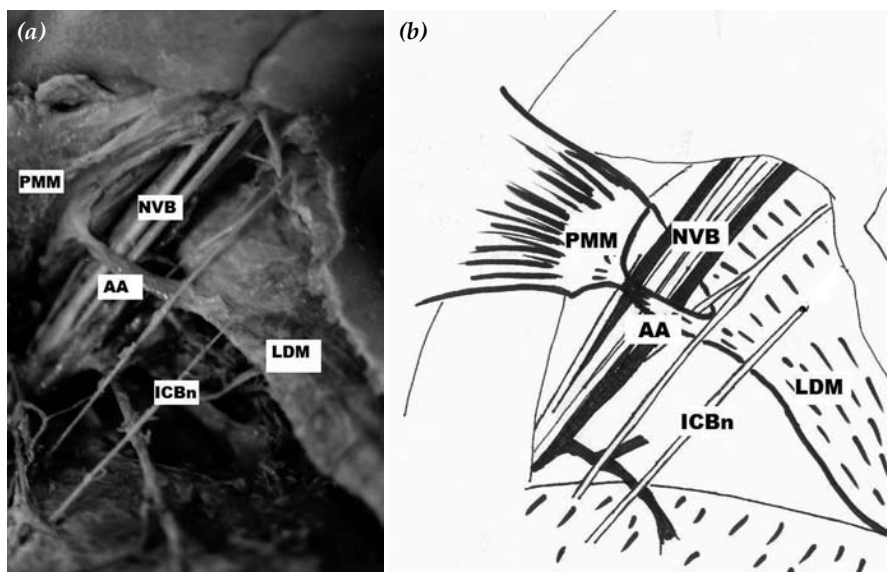


Fig. 2. (a) The photography and (b) a schematic drawing of the left axillary region. LDM: latissimus dorsi muscle; NVB: neurovascular bundle; PMM: pectoralis major muscle; ICBn: intercostobrachial nerve; AA: arcus axillaris.

II (tendinous structure), each including four different sub-types depending on nerve supply and site of insertion.<sup>[11,18]</sup>

The axillary arch can be detected by physical investigation. Pichler was the first who informed that the axillary arch may be palpable in living persons.<sup>[5,9]</sup> He observed a total of 197 subjects with axillary arches: present on both sides in 80, on the left side in 77 subjects and on the right side only in 40 subjects.<sup>[9]</sup>

The presence of this variant muscles in the axillary fossa could be demonstrated by imaging techniques as magnetic resonance axillography, mammography and echography.<sup>[4,5,19]</sup> Because of the possible compressive effect on the axillary vein, an axillary arch can be detected by phlebography. Sachatello<sup>[20]</sup> mentioned a patient with high-grade intermittent obstruction of the axillary vein owing to this anomaly.

The axillary arch may be found during surgical exploration in the region of the axilla.<sup>[21]</sup>

Kutiyanawala et al.<sup>[21]</sup> documented the anatomy of the axilla in 100 patients with breast cancer who had an axillary dissection. There were six patients who had an abnormal band of muscle and/or tendon across the axilla. In two patients, this originated from latissimus dorsi m and passed the axilla medially to insert into the coracoid process. In the others, it laid across the axilla passing from latissimus dorsi to the pectoralis major.

Various nerves in the axillary region have been reported to innervate the axillary arch. Most of the researchers have mentioned that it was innervated by the lateral pectoral nerves, the medial pectoral nerve, the medial pectoral nerve with a communicating branch from the lateral pectoral nerve, the intercostobrachial nerve and the thoracodorsal nerve.<sup>[5,9,14,15]</sup>

Axillary arch may compress the neurovascular bundle during some arm movements and may provoke circulatory deficiency, chronic pain and paresthesia in the arm, forearm and hand.<sup>[5,6]</sup> Thoracic outlet syndrome can also be a consequence of the axillary arch.<sup>[5,9]</sup> The presence of the axillary arch may result in misleading lym-

phoscintigraphic findings and difficult sentinel lymph node localization.<sup>[19]</sup>

Most of the authors attributed a venous obstructive compression and thrombosis of the upper limb to the axillary arch.<sup>[5,20]</sup> Mérida-Velasco et al. mentioned a possible compression of the radial nerve by an axillary arch.<sup>[5]</sup> Although arcus axillaris variation is not rare, it is not diagnosed and explored. Hence, a history of axillary vein obstruction, visual fullness, thoracic outlet syndrome, shoulder instability might suggest the existence of axillary arch.

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