

'Digastricus' axillary arch: A potential source of hyperabduction syndrome- Case report

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ABSTRACT

Axillary arch is an anatomical variant musculo-tendinous structure that originates from the latissimus dorsi muscle and often inserted to the pectoralis major muscle. Being musculo-tendinous, its one end is generally muscular and another end is tendinous. Here we report a variant muscular arch with its both ends muscular and were joined by an intermediate tendinous slip; thus, the name digastricus axillary arch. This variant form of axillary arch was encountered unilaterally in an elderly female cadaver and appeared to be compressing the neurovascular structures at the vicinity of axilla. Presence of axillary arch known to cause various complications such as brachial plexus compression, hyperabduction syndrome, thoracic outlet syndrome etc. The clinicians, therefore must have a prior knowledge of rare existence of axillary arch muscle before considering differential diagnosis in the patients presenting upper extremity neurovascular symptoms without demonstrable compressions

Keywords

Langer's arch; brachial plexus compression; digastricus; hyperabduction syndrome

INTRODUCTION

Axillary arch of Langer's, is a vestigial muscle in humans which is homologous with the panniculus carnosus. In lower mammals like rodents and rats the latter can be found beneath the panniculus adiposus as a layer of straited muscle. It has been observed that the incidence rate of axillary arch is ranging from 3%-27%¹ and its prevalence is more in females when compared to males².

The axillary arch most often emerges from the latissimus dorsi muscle as a muscular slip which becomes tendinous as it merges with the pectoralis major. For this reason,

it is termed pectodorsalis and since it encloses the axillary bundle it is also called axillans or axillopectoral muscle³.

Studies have reported the differences on its morphology with double or multiple bands of insertion as well as with variations in their attachments where it is termed a 'complete' form if it gets attached to pectoralis major and an 'incomplete' form if its insertion is to other muscles like biceps brachii, coracobrachialis, pectoralis minor etc². Major part of the axillary arch can exist either in muscular or tendinous form and if it's mainly muscular, a big part of it is contributed by pectoralis major while if it is largely tendinous, latissimus dorsi would be the major contributor⁴.

Most often minor twigs from lateral pectoral nerve innervates the muscular part of the axillary arch even though in some cases it may be supplied by medial pectoral and thoracodorsal nerves. Arterial supply mainly comes either from

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Figure-1: Dissection of left axilla showing the presence of axillary arch extending between latissimus dorsi and pectoralis major muscles. The Pectoralis major muscle was reflected to its site of insertion in 'A', but it was partly removed in 'B'. MN- Median nerve, UN- Ulnar nerve, AA- Axillary artery, MCN- musculocutaneous nerve, BB-Biceps brachii muscle, TDVN- Thoracodorsal vessel & nerve

lateral pectoral or thoracodorsal arteries. Furthermore, imaging techniques can be used to confirm its uncommon presence.

In the hyper abducted position of arm, the axillary arch becomes taut exerting undue pressure on neurovascular bundles lying beneath it, causing the patient to experience circulation problems, excruciating pain, paresthesia, and edema of the arm³. Therefore, doctors must be cognizant of an uncommon occurrence of axillary arch muscle whenever a patient presents

with upper extremity neurovascular complaints with no obvious compressions even though functionally in humans it is of very little significance.

In this case report we intend to call the axillary arch as the "digastricus axillary arch" owing to its muscular bellies at its both ends joined together by an intermediate tendinous slip. This report stresses on the possible compression of the nearby structures by this variant form of axillary arch with special emphasis on the brachial plexus similar to hyper abduction syndrome.

Case Report

During routine cadaveric dissection of axilla, a unilateral existence of axillary arch was discovered in the left axilla of an adult female cadaver, aged approximately 70 years. We noticed that the arch was muscular at its origin and where it is inserted. A thin intermediate tendinous slip connected its slender muscle bellies. After emerging from the anterior portion of distal part of the latissimus dorsi muscle, it curved across the neurovascular bundle of axilla to get attached with the trilaminar tendon of the pectoralis major muscle (Figure-1A & B). It was seen that the abnormally arched band was slack and wasn't compressing the underlying neurovascular system in adducted arm. However, during the passive arm abduction demonstration, the

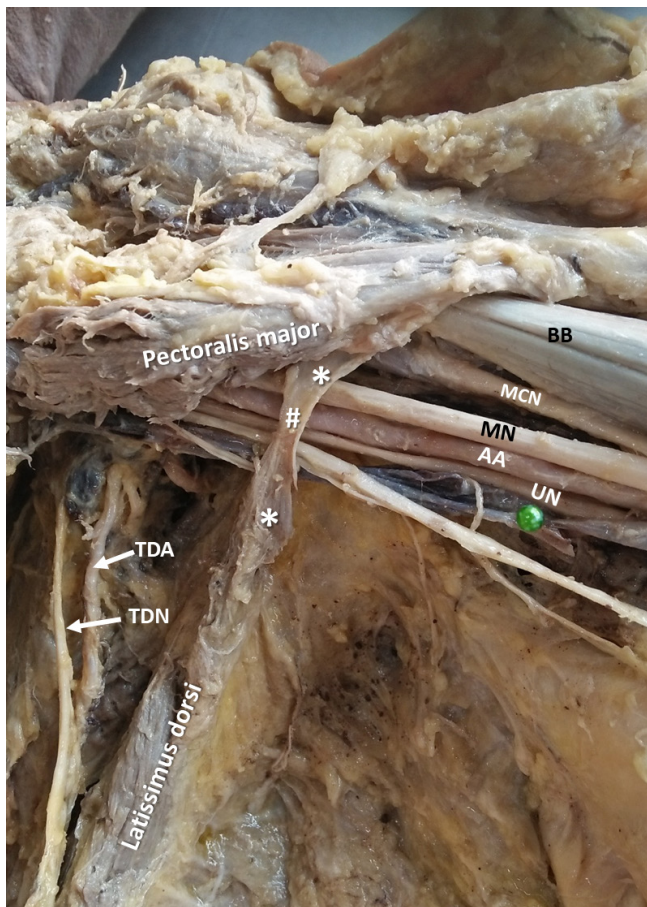


Figure-2: Closer view of the 'digastric' axillary arch with muscular on either side (*) united by an intermediate tendinous slip (#). MN- Median nerve, UN- Ulnar nerve, AA- Axillary artery, MCN- musculocutaneous nerve, BB- Biceps brachii muscle, TDA- Thoracodorsal artery, TDN - Thoracodorsal nerve

arching band was compressing the axillary vessels as well as the median, ulnar, and musculocutaneous nerves of the brachial plexus (Figure 2). There were no further nerve- or vessel-related changes in that limb. There was no discernible nerve supply to either of the axillary arch's muscle bellies.

DISCUSSION

The most common morphological description of the axillary arch is that they are bidirectional band with a solitary origin and insertion. Nevertheless, multiple studies have reported variations in their morphology, with Loukas et al., reporting the presence of numerous bands at the insertion sites⁵, while Shanthakumar et al reports the presence of an extraordinary 'Y' formed axillary arch with a bifid distal attachment, one to the short head of the biceps brachii, and the other to coracoid process⁶.

According to Besana et al., the axillary arch we describe here is the complete form of the arch². However, it is not very common to come across an axillary arch with muscular slips at two ends joined in the middle by a tendinous slip in close contact with some prominent neurovascular structures. Considerable challenges will be posed to a doctor when such an axillary arch compresses neurovascular structures with no noticeable sign of compression.

In the present case, major structures compressed and most likely to be significantly affected by passive abduction of the arm would be the blood vessels, median, ulnar and musculocutaneous nerves. Patients may exhibit a range of symptoms as a result, such as paresthesia in the arm, swelling in the arm or forearm, and worsening pain on shoulder abduction and lateral rotation which is comparable to symptoms observed in thoracic outlet syndrome^{7,8}.

It should be noted that symptoms like venous distension, edema, paresthesia, pain etc. are observed in patients with hyperabduction syndrome⁹, is very similar to the symptoms experienced by patients due to compression of neurovascular structures lying in close contact with the axillary arch. Because of its close proximity, the median and the ulnar nerve are more likely to get impinged by the axillary arch. Moreover, removal of lymph nodes during lymphadenectomy can be a hindrance since its existence may create surgical

difficulties in locating lymph nodes which may be hidden by this abnormal tendon slips¹⁰.

In numerous flap reconstruction operations, skeletal muscle myocutaneous flaps are gaining attention and during latissimus dorsi myocutaneous flap breast restoration if the axillary arch is not effectively separated it might result in flap ischemia⁴.

CONCLUSION

Variant form of axillary arch as introduced in this report as 'digastricus axillary arch' is a rare occurrence and more vulnerable to pose many clinical implications notably hyper-abduction syndrome. Hence, the clinicians should ascertain its incidental occurrence

and consider its clinical consequences associated with the compressive effect on underlying neurovascular structures.

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Author's contribution:

Data gathering and idea of this report: NK, AAEE

Study design: NK, VPS

Data gathering: AAEE, KMRB

Writing and submitting manuscript: NK, VPS

Editing and approval of final draft: VPS, KMRB

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