Axillary arch: Clinical significance in breast cancer patients

Deep Lamichhane, Sanjit Kumar Agrawal, Sumit Mukhopadhyay, Rosina Ahmed

ABSTRACT

Introduction: Langer’s axillary arch is a muscular slip extending from the anterior border of latissimus dorsi muscle to tendons, muscles or fascia around the superior part of humerus, lying anterior to the neurovascular bundle. It is the best-known anatomic variant of the axilla, with definite clinical and surgical implications.

Case Report: A 55-year-old female presented with a 3x3 cm carcinoma in the superomedial quadrant of the right breast, with no palpable regional lymph nodes. She underwent breast conservation surgery with axillary nodal clearance. During axillary dissection, an unusual muscle slip was identified crossing the axilla, connecting the anterior border of latissimus dorsi to the posterior surface of pectoralis major, anterior to the axillary artery, vein and brachial plexus.

Conclusion: Preoperative knowledge is essential to identify such unusual anatomy and to appropriately tackle it to avoid surgical complications and adequate axillary lymph node clearance.
Axillary arch: Clinical significance in breast cancer patients

Deep Lamichhane, Sanjit Kumar Agrawal, Sumit Mukhopadhyay, Rosina Ahmed

ABSTRACT

Introduction: Langer's axillary arch is a muscular slip extending from the anterior border of latissimus dorsi muscle to tendons, muscles or fascia around the superior part of humerus, lying anterior to the neurovascular bundle. It is the best-known anatomic variant of the axilla, with definite clinical and surgical implications.

Case Report: A 55-year-old female presented with a 3x3 cm carcinoma in the superomedial quadrant of the right breast, with no palpable regional lymph nodes. She underwent breast conservation surgery with axillary nodal clearance. During axillary dissection, an unusual muscle slip was identified crossing the axilla, connecting the anterior border of latissimus dorsi to the posterior surface of pectoralis major, anterior to the axillary artery, vein and brachial plexus.

Conclusion: Preoperative knowledge is essential to identify such unusual anatomy and to appropriately tackle it to avoid surgical complications and adequate axillary lymph node clearance.

Keywords: Axillary arch, Axillary lymph node dissection, Breast carcinoma

INTRODUCTION

Anatomical variations in the axilla are of great relevance during all surgical procedures performed in this region. This includes minimal axillary procedures such as sentinel lymph node biopsy, where precision in recognizing anatomical landmarks is essential, axillary dissection in case of malignancy and also a number of larger reconstructive procedures and vascular bypass operations [1].

Various accessory muscular slips have been described in the axilla. The best known variant, the axillary arch (AA), is a muscular or fibromuscular slip of variable dimensions extending from latissimus dorsi muscle, which crosses over the neurovascular structures to join the under surface of the tendon of pectoralis major, coracobrachialis or the fascia over the biceps brachii [2, 3].

The presence of the axillary arch has important clinical implications. This variation occurs unilaterally in about 7% of the population, more commonly in females than in males [3].
CASE REPORT

A 55-year-old female presented with a right breast lump of six months duration. Clinical examination revealed a 3x3 cm lump in the superomedial quadrant of the right breast, with no palpable regional lymph nodes. Mammography showed a BIRADS 5 lesion at 1 o’clock, with suspicious axillary lymph nodes on ultrasonography. Core biopsy showed invasive ductal carcinoma (IDC) Grade III, estrogen and progesterone receptor negative, HER-2 positive. She underwent breast conservation surgery with axillary nodal clearance.

During axillary dissection, an unusual muscle slip was identified, which crossed the axilla, connecting the anterior border of latissimus dorsi to the posterior surface of pectoralis major, anterior to the axillary artery, vein and brachial plexus. It was measured 7 cm in length and 1.5 cm in width (Figure 1). The lymph nodes medial and deep to the arch were successfully dissected and the arch was left undisturbed. The procedure and recovery were uneventful.

Pathological assessment confirmed IDC 3 cm, grade III with two lymph nodes positive for malignancy out of 36 dissected. Metastatic staging was normal, and she received adjuvant chemotherapy, trastuzumab and radiotherapy. Postoperative imaging showed a bilateral axillary arch along with postoperative changes in the right breast and right axilla (Figure 2).

DISCUSSION

Langer’s axillary arch, a variation in axillary musculature, was first identified by Ramsay in 1795 and later described in detail by Langer in 1846 [2]. Testu’s classification (1884) described the complete axillary arch, extending between the latissimus dorsi muscle and the tendon of the pectoralis major near its insertion on the humerus, and the Incomplete Arch, extending from the latissimus dorsi muscle to the axillary fascia, biceps brachii muscle, coracobrachialis, inferior edge of pectoralis minor muscle or the coracoid process [2]. In an additional classification, two forms of arch-shaped variations have been described, muscular (type I) and tendinous (type II), with different subtypes based on nerve supply and site of attachment. The term clinical axillary arch was introduced by Jelev, who described it as a site of entrapment for nerves and vessels, and also classified the condition into superficial and deep [2]. Superficial arches cross in front of the vessels and nerves and primarily present with features of intermittent obstruction of veins. Deep arches occur on the posterior or lateral walls of the axilla and cross-only parts of the neurovascular bundle, axillary or radial nerves [2, 4]. The patient we described had a complete, superficial, muscular axillary arch.

The prevalence of this variation appears to be higher in dissected cadavers than found during surgery in the axilla. The prevalence of axillary arch in cadaveric dissection in Japanese, Turkish and Bulgarian populations is 9.1%, 1.9% and 3.6% respectively [5–7]. On the other hand, it has been recognized in only 0.25% of patients during axillary surgical procedures [8]. The difference in prevalence in anatomical and surgical reports may be due to a failure to identify or report the variation when observed during surgery, whereas the specific aim of cadaveric studies is to identify anatomical anomalies [8].

Clinically, axillary arch may be palpable during physical examination as an axillary mass and may be confused with lymphadenopathy or soft tissue tumor. Most patients, similarly to the one described here, are asymptomatic. However, entrapment of the axillary neurovascular bundle by an axillary arch during arm movements has been described, and may cause circulatory insufficiency, chronic pain or paraesthesia [8]. The simple division of the arch is curative in such situations [9].

During axillary surgery, it may be mistaken for the lateral margin of the latissimus dorsi muscle, leading...
dissection to be extended superior to the axillary vein, with the risk of injury to the axillary artery and brachial plexus [10]. It can also pose difficulty during sentinel node biopsy as it stretches in the hyper abducted position, shifting the nodes higher [11]. During axillary clearance for breast cancer some groups of axillary nodes such as lateral nodes, may be concealed under the axillary arch, and may be missed during routine dissection [10]. This may lead to inaccurate staging, which would negatively affect adjuvant systemic therapy decisions and also to an increased chance of local recurrence [10]. The possible presence of accessory muscle slips should also be kept in mind while draining axillary abscesses and while constructing latissimus dorsi flaps.

Some authors suggest routine division of axillary arch at the level of the axillary vein to be able to identify anatomical landmarks and to facilitate dissection of lymph nodes. Division might also reduce the possibility of postoperative axillary vein compression and associated lymphedema [10, 11]. The possibility of precipitating lymphedema is higher in patients having latissimus dorsi flaps for breast reconstruction and in this situation it is advisable that the axillary arch should be divided [11]. In this case, we were able to dissect nodes beneath the arch, without the need to divide it and there were no specific postoperative problems.

CONCLUSION

The axillary arch has both clinical and surgical implications, and surgeons must remember its possible presence and must be cautious during axillary dissection. It may be a reason for confusion during routine axillary surgery and can both affect procedural safety and adjuvant treatment decisions.

*********

Author Contributions

Deep Lamichhane – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Sanjit Kumar Agrawal – Substantial contributions to conception and design, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Sumit Mukhopadhyay – Acquisition of data, Drafting the article, Final approval of the version to be published
Rosina Ahmed – Acquisition of data, Drafting the article, Final approval of the version to be published

Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None

Conflict of Interest

Authors declare no conflict of interest.

Copyright

© 2017 Deep Lamichhane et al. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited. Please see the copyright policy on the journal website for more information.

REFERENCES

**About Edorium Journals**

Edorium Journals is a publisher of international, high-quality, open access, scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

**Invitation for article submission**

We sincerely invite you to submit your valuable research for publication to Edorium Journals.

**Why should you publish with Edorium Journals?**

In less than 10 words: “We give you what no one does”.

**Vision of being the best**

We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day.

**Exceptional services**

We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

**Editorial review**

All manuscripts submitted to Edorium Journals undergo pre-processing review followed by multiple rounds of stringent editorial reviews.

**Peer review**

All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

**Early view version**

Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

**Manuscript status**

From submission to publication of your article you will get regular updates about status of your manuscripts.

**Our Commitment**

**Six weeks**

We give you our commitment that you will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this commitment by even one day, we will give you a 75% Discount Voucher for your next manuscript.

**Four weeks**

We give you our commitment that after we receive your page proofs, your manuscript will be published in the journal within 14 days (2 weeks). If we fail to honor this commitment by even one day, we will give you a 75% Discount Voucher for your next manuscript.

**Favored author program**

One email is all it takes to become our favored author. You will not only get 15% off on all manuscript but also get information and insights about scholarly publishing.

**Institutional membership program**

Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in publication fees.

**Our presence**

We have high quality, attractive and easy to read publication format. Our websites are very user friendly and enable you to use the services easily with no hassle.

**Something more...**

We request you to have a look at our website to know more about us and our services. Please visit: www.edoriumjournals.com

---

We welcome you to interact with us, share with us, join us and of course publish with us.

[QR Code for Edorium Journals: On Web]

[QR Code for Browse Journals]

CONNECT WITH US

---

This page is not a part of the published article. This page is an introduction to Edorium Journals.