ejpmr, 2017,4(8), 570-572

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Case Report

ISSN 2394-3211

EJPMR

CONCOMITANT PECTORALIS MINOR, PECTORALIS QUARTUS AND AXILLARY ARCH

Dr. Suman Verma* and Dr. Sulochana Sakthivel

Assistant Professor, Department of Anatomy, Jawaharlal Institute of Postgraduate Medical Education and Research Pondicherry–605006.

***Corresponding Author: Dr. Suman Verma**

Assistant Professor, Department of Anatomy, Jawaharlal Institute of Postgraduate Medical Education and Research Pondicherry-605006.

Article Received on 03/06/2017 **Article Revised on 24/06/2017** **Article Accepted on 14/07/2017**

ABSTRACT

Pectoralis minor, a flat muscle underneath pectoralis major, takes origin from third to fifth ribs and forms an important landmark for axillary artery. Pectoralis quartus is an accessory muscle sometimes seen along lateral margin of pectoralis major. Axillary arch is typically seen crossing over the neurovascular structures in the axilla and its presence can compress the axillary vessels. During dissection in a female cadaver, a bilateral variation in the origin of pectoralis minor along with the presence of pectoralis quartus and axillary arch was found. The pectoralis minor was attached to second to fourth ribs on the right, and second and third ribs on the left side. The pectoralis quartus was seen bilaterally as a broad muscle lateral to the pectoralis minor, and was inserted on the fascia covering the short head of biceps brachii and coracobrachialis. An atypical axillary arch on left side was seen between lateral margin of pectoralis quartus and fascia over short head of biceps brachii. Its identification is especially relevant during axillary lymphadenectomy for delineating the surgical field boundaries. The presence of variant pectoralis minor and pectoralis quartus would affect the approach to pectoral region for breast implant surgeries or mobilizing pectoral muscle flaps for grafting.

KEYWORDS: pectoralis minor, accessory muscles, pectoralis quartus, axillary arch, pectoral muscles.

INTRODUCTION

Pectoralis minor (PM) is a triangular muscle attached to the thoracic wall from third to fifth ribs at the costochondral junctions and intervening intercostal spaces. The coracoid process receives the distal narrow end of the muscle on its medial margin. It is a flat muscle, wholly undercover of pectoralis major and receives innervation from two pectoral nerves, the medial and lateral.[1] The presence of PM forms a significant landmark for the axillary artery.[2]

According to the anatomical descriptions, a typical Axillary arch (AA) extends from the latissimus dorsi to the pectoralis major and crosses over the axillary vessels, whereas an atypical AA extends from latissimus dorsi or serratus anterior to the coracoid process.[3] The Pectoralis quartus (PQ) muscle may take origin either from the fifth and sixth ribs, the lateral margin of pectoralis major or the rectus sheath. Mostly, PQ extends along the lateral margin of pectoralis major and inserts near its tendon but sometimes it attaches near AA origin on the latissimus dorsi.[3] Both PQ and AA are amongst the commonly encountered accessory muscles in axilla, and are especially significant in surgeries like axillary lymphadenectomy.[3]

Various authors have come across accessory muscles in the pectoral region and axilla. There are accounts of a unilateral PQ, a PQ with AA or pectoralis intermedius, and a double PQ with AA and chondroepitrochlearis in literature.[3,4,5,6,7] We are reporting a rare appearance of variant PM origin with PQ and AA.

CASE REPORT

During the routine dissection of anterior thoracic wall, in a 60-year-old female cadaver, we encountered multiple accessory muscles in the pectoral and axilla region. When the skin and the pectoralis major were reflected, we observed a broad and flat accessory muscle mass along the lateral margin of PM on both the sides. This accessory muscle was identified as PQ. On the right side, PM took attachment from the second to fourth ribs near costochondral junctions and from the first to third intercostal spaces. The distal part of the muscle was attached to the coracoid process. PQ took origin from the fourth intercostal space, the fifth rib near costochondral junction and the external oblique aponeurosis. Distally, this muscle was attached on to the fascia covering the short head of biceps brachii and coracobrachialis just lateral to the coracoid process (Fig 1). On the left side, PM was attached to the second to third ribs near costochondral junctions and to the first two intercostal spaces, and it was inserted into the coracoid process.

Lateral to the PM, the PQ was attached to the fourth to fifth ribs at costochondral junctions, and to the third and fourth intercostal spaces. The insertion of the left PQ was similar to that of the right side. In left axilla, a very small muscle was attached from the lateral margin of PQ to the fascia over coracobrachialis (Fig 1, inset). This muscle resembled an atypical axillary arch and hence was named as AA. Both the PM and PQ were supplied by the medial pectoral nerve. An axillary arch muscle could not be appreciated clearly on the right side, due to earlier dissection by undergraduate students.

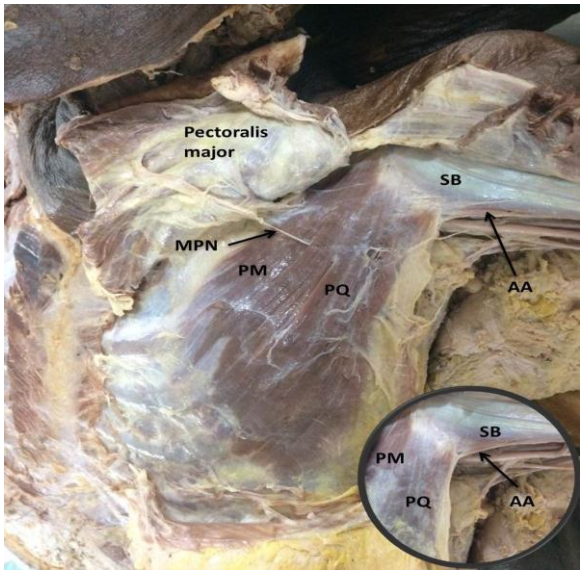

Fig 1: Left pectoral region and axilla after the reflection of pectoralis major. Inset: Anterior view of left axilla. pm–pectoralis minor, pq- pectoralis quartus, aa- axillary arch, sb- short head of biceps brachii, mpn- medial pectoral nerve.

DISCUSSION

Variant attachment of the PM to the ribs is likely to affect the implant placements between the pectoral muscles for breast augmentation surgeries.[2] Hojo et al. studied the origin of PM in Japanese cadavers and compared it in both sexes. As per their observation, the most common origin of PM in Japanese female cadavers was from the second to fourth ribs and the lowest rib of origin was fifth.[8] The attachment of PM to a single rib i.e., fifth on the right side was reported by Turan-Ozdemir and Cankur.[2]

Terfera and Kelliher described a PQ lateral to the PM, taking origin from sixth and seventh ribs, and attaching to coracobrachialis on the right side, in a female cadaver. In their case, the PQ was associated with ipsilateral sternalis, partly absent pectoralis major, and no PM abnormality. Also, it received an additional innervation from the intercostal nerve apart from medial pectoral nerve.[4] In a case reported by Arican et al., PQ appeared on the right side as a narrow, long band from the fifth and sixth rib, and inserted on the lateral lip of intertubercular groove and the tendon of short head of biceps brachii. This muscle was seen with a pectoralis intermedius muscle and was innervated by the fourth intercostal nerve.[5] In contrast, we found PQ on both the sides as a broad fleshy muscle, almost fused with the lateral margin of PM, and not associated with any accessory pectoral muscles. Here, the origin of PQ varied but nerve supply was same on both the sides.

The muscle variations in the axilla may cause neurovascular compression and are likely to affect the surgical procedures such as axillary lymphadenectomy. The presence of PQ or AA would alter the margins of surgical field in axilla during lymphadenectomy and would pose problem in the exposure of axillary lymph nodes.[3] The concomitant PQ and AA have been noted earlier. In a study on 107 cadavers, unilateral presence of PQ and AA was observed in three and five cadavers respectively. The muscle PQ was seen close to the lateral margin of pectoralis major, taking origin from the rectus sheath in one and from the fifth rib in two cadavers and was inserted at AA origin and arm fascia respectively. Furthermore, both the PQ and AA were seen on the right side in one cadaver.[3] These muscles, especially the PQ, are rarely detected before surgery,[3] so the cognizance of anatomical variations would aid their identification during surgical explorations.

Bonastre et al. reported a PQ with an atypical axillary arch in the left axilla and the PQ was seen lateral to pectoralis major as a narrow, long band. It was attached from the rectus sheath to the fibrous axillary arch.[6] PQ has been reported to be attached near AA when coexistent.[9] We did not come across a typical axillary arch in the present case, whereas, a small accessory muscle slip was seen in the axillary fascia, stretching between the lateral margin of PQ and the fascia over the short head of biceps brachii. According to the clinical classification offered by Jelev et al., it was recognized as a deep clinical AA overlying the distal part of axillary artery.[10]

The pectoral muscles develop from a common muscle mass.[5] The PQ is proposed to develop from same muscle mass as well,[6] which explains its fusion with PM and nerve supply by medial pectoral nerve in present case. It is also proposed that the PQ derives from the same muscle mass as that of the intercostal muscles and thus explains its innervation by the intercostal nerve in some cases.[5] The panniculus carnosus is a sheet of muscle in lower animals and is believed to be derived from the pectoral muscle mass.[9] In humans, the upper limb mobility has rendered panniculus vestigial and the remnants of panniculus may persist as the additional muscles. These muscles are occasionally seen coming from below the pectoralis major, and get attached to the axillary fascia, humerus, coracoid process, or to the fascia between coracobrachialis and PM. This has led to the opinion that AA is probably a remnant of panniculus carnosus.[9]

The presence of accessory muscles in the pectoral region and axilla is not uncommon. The existence of multiple accessory muscles is particularly noteworthy during surgical approach to this region. The lack of attentiveness to variant PM origin and to accessory muscles is likely to confound the surgical field during breast implant placements and axillary lymphadenectomy. The awareness of these accessory muscles would also help in consistent interpretation of imaging scans.

REFERENCES

1. Standring S. Gray's anatomy: The anatomical basis of clinical practice. 40th ed., Edinburgh; Churchill Livingstone, 2008.
2. Turan-Ozdemir S, Cankur NS. Unusual variation of the inferior attachment of the pectoralis minor muscle. Clin Anat, 2004; 17: 416-7.
3. Natsis K, Vlasis K, Totlis T, Paraskevas G, Noussios G, Skandalakis P, Koebke J. Abnormal muscles that may affect axillary lymphadenectomy: Surgical anatomy. Breast Cancer Res Treat, 2010; 120: 77-82. doi:10.1007/s10549-009-0374-5.
4. Terfera DR, Kelliher KR. Unilateral presentation of three muscle variants in the pectoral region. Eur J Anat, 2014; 18: 335-9.
5. Arican RY, Coskun N, Sarikcioglu L, Sindel M, Oguz N. Co-existence of the pectoralis quartus and pectoralis intermedius muscles. Morphologie, 2006; 90: 157-9.
6. Bonastre V, Rodriguez-Niedenfuhr M, Chol D, Sanudo JR. Coexistence of a pectoralis quartus muscle and an unusual axillary arch: case report and review. ClinAnat, 2002; 15: 366-70.
7. Bergman RA. Doubled pectoralis quartus, axillary arch, chondroepitrochlearis, and the twist of the tendon of pectoralis major. Anat Anz, 1991; 173: 23-6.
8. Hojo T, Nakashima T, Tsuruno T. A statistical study on anatomical variation in the origin of the Japanese pectoralis minor muscle. J Uoeh, 1987; 9: 315-9.
9. Bergman RA, Afifi AK, Miyauchi R. Panniculus Carnosus. Opus I: Muscular System. In: Illustrated Encyclopedia of Human Anatomic Variation, 2017. http://www.anatomyatlases.org/AnatomicVariants/MuscularSystem/Text/P/05Panniculus.shtml
10. Jelev L, Georgiev GP, Surchev L. Axillary arch in human: Common morphology and variety. Definition of "clinical" axillary arch and its classification. Ann Anat, 2007; 189: 473-81.