

A case of an anomalous pectoralis major muscle

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[Received 15 July 2005; Revised 30 November 2005; Accepted 2 December 2005]

We present a case of a right sided accessory head of the pectoralis major muscle located inferior to its abdominal head. This variation was found during a routine anatomy dissection at the American University of the Caribbean School of Medicine. The muscle fibres of the accessory head of the pectoralis major muscle arose from those of the serratus anterior muscle and travelled superolaterally towards the axilla. The accessory muscle terminated by fusing with the tendinous fibres of the pectoralis major muscle as they underwent their normal anatomical rotation before insertion upon the lateral lip of the bicipital groove of the humerus. Although variations in the pectoral muscles are not uncommon, this case appears to be unique in the literature. The possible clinical implications are discussed.

Key words: anomalous pectoralis major muscle, pectoralis minor muscle, serratus anterior muscle, medial pectoral nerve, lateral thoracic artery, axillary arch

INTRODUCTION

Variations of the pectoral muscles are not uncommon findings in the literature [12]. The pectoralis major muscle is a thick triangular muscle that usually arises from the medial half of the clavicle, the sternum, and the first six costal cartilages. These three heads, the clavicular, sternocostal and abdominal, combine to form a tendon that inserts into the bicipital groove of the humerus. The pectoralis major muscle is innervated by the medial and lateral pectoral nerves.

The most common variations of the pectoralis major muscle include absence of the abdominal slip, decussation of fibres across the midline and absence of the sternocostal head [2, 12]. Mosconi and Kamath [8] describe a case in which the sternocostal head of the pectoralis major muscle was absent on the left and the entire pectoralis major muscle was absent on the right. Several cases of additional musculature in the axillary region have also been reported. These include the following: a sternalis mus-

cle, which runs parallel to the sternum [5, 9]; a pectoralis quartus muscle which arises from the rectus sheath [2], runs parallel to the pectoralis major muscle and inserts into the tendon of the pectoralis major [1]; a chondroepitrochlearis (thoracoepicondylaris) muscle which has varied origins and insertions but has been found arising from the lateral edge of the pectoralis major muscle and inserting into the medial epicondyle of the humerus [6].

We present a unique case of an accessory head of the pectoralis major muscle (AcPM) located inferior to its abdominal head.

CASE REPORT

We present a case of unilateral occurrence of a right sided accessory head of the pectoralis major muscle (AcPM) in a 70 year-old female (Fig. 1). No other gross abnormalities or evidence of axillary or thoracic procedures were observed. The muscle was discovered during a routine dissection at the American University of the Caribbean School of Medicine

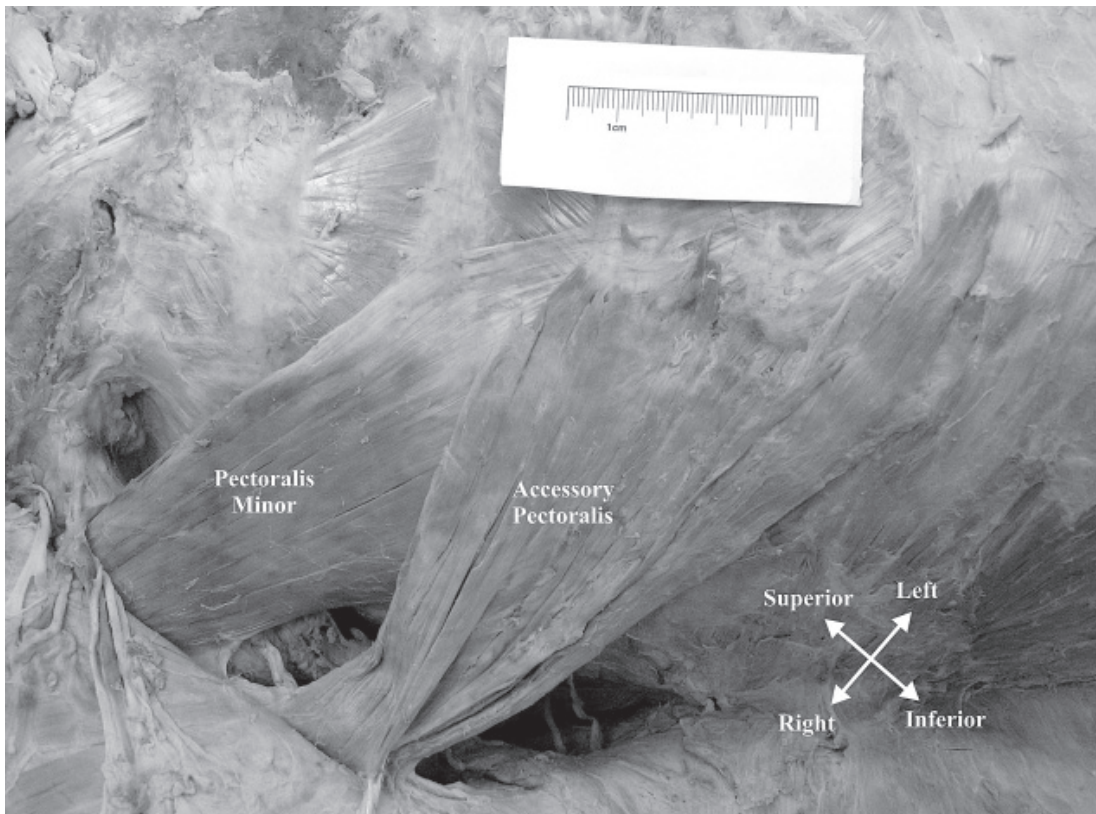


Figure 1. This figure demonstrates fibres of the right sided AcPM arising from fibres of the serratus anterior muscle. Note the relatively large width of the muscle belly as compared to the pectoralis minor muscle.

during the spring semester of 2005. AcPM was seen as a thin triangular muscle originating from the fibres of the serratus anterior muscle from the T4 to the T6 rib levels, just inferior to the abdominal head of the pectoralis major. From its point of origin AcPM travelled superolaterally toward the tendon of the pectoralis major muscle. The muscle fibres of AcPM were deep to, but distinctly separate from, those of the pectoralis major and pectoralis minor muscles. AcPM terminated by fusing with the tendinous fibres of the pectoralis major muscle as they underwent their normal anatomical rotation before insertion upon the lateral lip of the bicipital groove of the humerus. The arterial supply of AcPM was provided by a branch arising from the lateral thoracic artery, which travelled at the inferior border of the pectoralis minor muscle to enter the muscle midway along its muscular belly (Fig. 2). The nerve supply to AcPM was through a branch of the medial pectoral nerve, which crossed the axillary artery inferiorly to innervate the muscle near its insertion into the tendon of the pectoralis major muscle. The pectoralis minor muscle did not show any abnormality, although its distal attachments to ribs T4 and T5 were

covered with those of AcPM (which fused with the serratus anterior).

DISCUSSION

Despite the wealth of data concerning anatomical variations of the pectoralis major muscle, it remains important to continue describing rare variations as they arise.

Our case is distinct from those described previously in the literature in that AcPM arose as an individual head of the pectoralis major muscle, which fused with the fibres of the serratus anterior muscle.

Embryologically, the pectoral musculature is derived from the dorsal limb bud masses, which arise from myoblasts that migrate out of the last five cervical and first thoracic myotomes into the developing limb buds during the fifth week of development [13]. The pectoral muscles assume their final forms through a combination of migration, fusion and apoptosis of the muscle cell precursors [3]. It is possible that AcPM is a result of the failure of designated myoblasts to undergo apoptosis. Alternatively, phylogenetic analysis demonstrates similarities between AcPM and the pectoral musculature of some

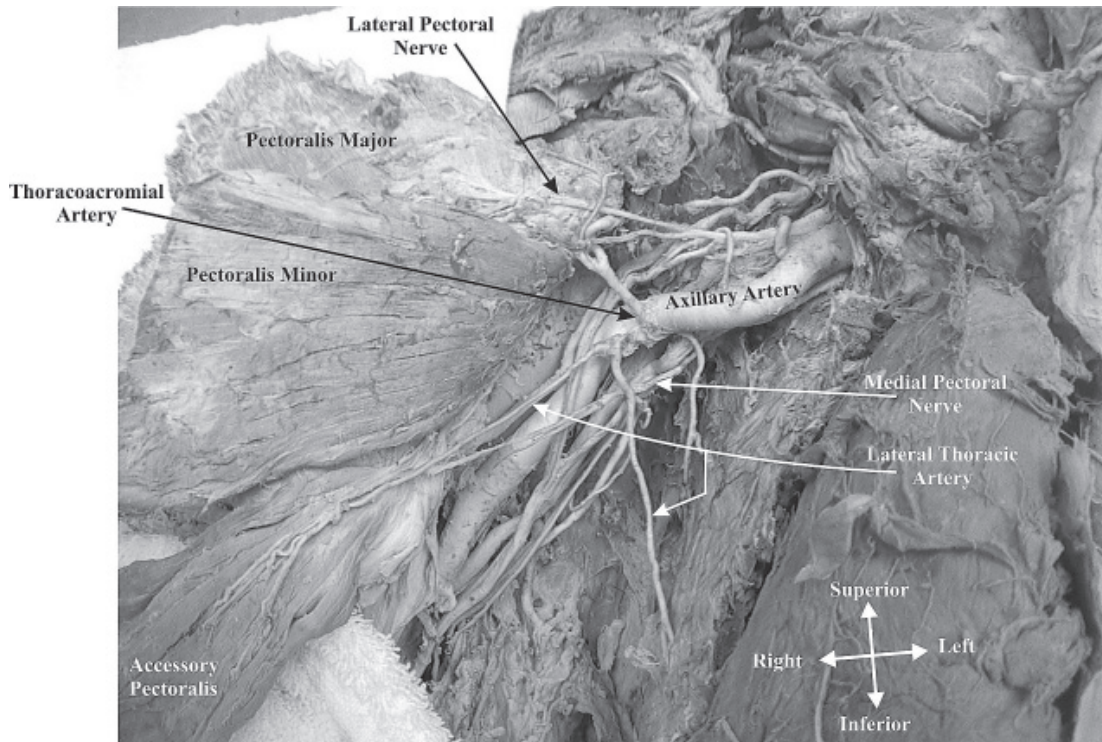


Figure 2. This figure demonstrates the arterial and nerve supply to AcPM, as arising from the lateral thoracic artery and medial pectoral nerve respectively.

quadrupeds, with possible homology to the panniculus carnosus [8].

Because of its lateral attachment AcPM may be functionally important. It is possible that this additional muscle could act as an anchor to impair the ability of abduction of the arm. Examples of this possible complication are described by Voto and Weiner [14] and Di Gennaro et al. [4], who presented cases of patients in whom functional mobility of the limbs (decreased abduction) were limited as a result of the presence of chondroepitrochlearis muscles. In both of these cases the full range of motion was restored after surgical tenomyotomy. In the present case it is unknown whether AcPM imparted any functional or cosmetic abnormalities upon the affected patient. However, in the event of the patient being affected, restoration of mobility might prove more difficult owing to the increased width of AcPM and its location deep to the pectoralis major muscle.

An additional clinical problem could arise if AcPM were to be mistaken for a mass or tumour during CT or MRI [5]. Furthermore, the presence of an AcPM could lead to other clinical consequences similar to those reported in cases with chondroepitrochlearis muscle, axillary arch muscle, axillopectoral muscle of Langer and pectoralis quartus muscle. These may

include ulnar nerve entrapment or difficulties during pectoral flap procedures [4, 7, 10, 11, 14].

AcPM may also have had positive implications regarding the functionality of the involved arm. It is possible that the increased size and origin of the pectoralis major muscle through the addition of AcPM may have increased the angle of optimal function for the shoulder. This may have included increased stability through a greater range of motion or increased load carrying capacity.

This case report illustrates the need for continued reporting of anatomical variations and ongoing discussion of their functional and clinical significance.

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