

BILATERAL BIPARTITE COMPOSITION OF PECTORAL MAJOR MUSCLE- A CASE REPORT

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ABSTRACT

BACKGROUND

The anatomical variation of the pectoralis major muscles is uncommon, especially the agenesis of the pectoralis major muscle due to the morpho-functional alterations. The presence of supernumerary pectoralis major muscle is not common and their physiological, clinical and surgical importance are depending on the stages of its development. This supernumerary muscle, while crossing the anterior wall of the axilla and inserting on the humerus may confuse the surgeon or make surgical access difficult to the content of the axillary fossa. We observed an anomalous disposition of the muscular slips of pectoralis major on both sides in an adult male cadaver during routine gross anatomy teaching session. The pectoralis major muscle comprised of two heads, sternal and clavicular separated by an intramuscular cleft. The origin and insertion of pectoralis major muscle were as usual and unremarkable. The two slips of muscles on both sides innervated by branches of medial and lateral pectoral nerves. The separate nerve supply to each slip increases its suitability for its use in reconstructive procedures. These variants of the pectoral muscles may also have implications in biomechanical studies.

KEYWORDS

Pectoralis Major Muscle; Muscle; Anomaly; Innervations.

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BACKGROUND

The pectoralis major muscle is a thick triangular fan-shaped muscle of the anterior chest wall. The pectoralis major is a powerful adductor and medial rotator of the arm.⁽¹⁾ The pectoralis major muscle normally originated from medial half of anterior surface of the clavicle from lateral part of anterior surface of sternum up to 6th costal cartilage, 2nd to 6th costal cartilage and the aponeurosis of the external oblique muscle of the abdomen. The muscle is inserted in the lateral lip of the intertubercular sulcus of the humerus through the two lamina: anterior and posterior. The sternocostal part is the chief adductor and the clavicular fibres assist in flexion. When the upper limb is fixed in abduction, the pectoralis major acts as a useful accessory muscle of inspiration drawing the ribs upwards towards the humerus. The pectoralis major is supplied by the medial and lateral pectoral nerves.⁽²⁾

After a thorough review of literature, it was found that the common variations of pectoralis major muscle are absence of one of the slips or unilateral absence of the muscle.^(3,4) We found a unique bilateral pectoralis major muscles with double slips on both sides, each slip was supplied by branches of medial and pectoral nerves. Multiple nerve supply of muscle assumes relevance while performing muscle transfers. A sound anatomical knowledge of pectoral musculature is imperative for interpretation of MRI and for reconstructive surgeons who may find it useful to utilise these supernumerary slips during surgeries.

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CASE REPORT

During routine dissection, an anomalous disposition of pectoral muscles was observed in an adult male cadaver on both sides. External appearance of the anterior thoracic wall did not indicate any obvious abnormality. The pectoralis major muscles on both sides had two slips, i.e. clavicular head and sternal head, having a cleft between the two heads giving false impression of delto-pectoral groove in first look. The two heads united near their insertion at the humerus [Figure-1]. Bilaterally, both the slips were supplied by medial and lateral pectoral nerves. No other muscular anomaly was detected.



Figure 1. Bilateral Bipartite Pectoralis Muscle

DISCUSSION

Anomalous pectoral musculature has been usually reported earlier in literature.⁽²⁾ Bilateral partial absence of clavicular head of pectoralis major with large gap was found between the clavicular and sternocostal head.⁽⁵⁾ Unilateral four headed pectoralis major muscle with an accessory head was observed.⁽⁶⁾ The sternocostal head is most commonly ill-developed and when absent it is accompanied by hypertrophy of clavicular head. Thus, the primitive muscle mass giving rise to pectoral muscles attaches to the clavicle first, then fans out and subsequently attaches to the sternum and ribs. When the developmental arrest is partial, the sternocostal fibres are more likely to be affected, sparing clavicular fibres.⁽⁴⁾ In the present study, pectoralis major had two muscular slips

separated by an incomplete intramuscular cleft. Developmentally, the pectoral musculature is derived from dorsal limb bud masses, which arise from myoblasts that migrate out of last five cervical and first thoracic myotomes into developing limb buds during fifth week of development.^(7,8) The pectoral muscles assume their final forms through a combination of migration, fusion and apoptosis of muscle cell precursors.⁽⁹⁾ In present study, the clefts observed between the pectoralis major muscle could be explained by improper fusion of cervical myotomes destined to form pectoral pre-muscle mass. The position of nerves supplying the pectoralis major muscle is important, while performing pectoralis major island flap transfers to head and neck region through the gap in delto-pectoral groove.⁽¹⁰⁾ Another advantage attributed to the additional innervation is that the risk of post-operative paralysis of pectoralis major muscle is minimised. The bipartite composition presenting additional slips could also be used for post-mastectomy repairs.

The utility of pectoralis major in head and neck reconstructions is immense. The pectoralis major myocutaneous flap has been extensively used in head and neck and axillary reconstructive surgeries.⁽¹¹⁾ The topographical relationship, rich vascularity and thickness of the muscle are attributes which enhance the suitability of pectoralis major as a good candidate for flap transfers to reconstructions. We suggest that unique composition of the pectoralis major in the present study makes it a reliable source for performing these muscle transfers. The topography of the muscle and related nerves assume importance for surgeons to avoid intra-operative complications.

CONCLUSION

It is important to be familiar with the anatomic variations of pectoral musculature and to identify them early in order to achieve an appropriate dissection plane during surgery of chest wall. Such anatomical anomalies may prove to be

advantageous for cosmetic augmentations during reconstructive surgery of breast where pectoralis major can be partly preserved because of additional nerve supply.

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