Case Report

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Unilateral sternal muscle in an adult melanodermic cadaver

Abstract

The sternal muscle, also known as sternalis, rectussternal, parasternal or japonicus is a curious case of anatomical variation of the anterior chest wall. During a routine dissection, a muscle mass related to the sternum was found in the anterior wall of the right hemithorax in a melanodermic female cadaver. The literature, its incidence is mentioned to vary from 3.1 to 23.5%, and little is known about its function with divergences regarding its origin, insertion, innervation and vascularization. Clinically, some mastologists report that this finding is often confused with a tumor, making it difficult to distinguish between normal structures or lesions that symbolize cancer.

Keywords: sternalis, chest, breast, surgery, radiography, mammogram

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Abbreviations: SM, sternal muscle; SCM, sternocleidomastoid muscle; PMM, pectoralis major muscle

Introduction

The sternal muscle also called 'presternalis,' sternalis, rectus sterni or 'sternalis brutorum,' 'thoracicus'[1] is an interesting case of anatomical variation, being described in the literature as a small and irregular subcutaneous muscular mass, located superficially to the sternum bone and the pectoralis major muscle, [2] being present in about 4% to 7% in whites, 8.4% in blacks and 11.5% in Asian populations[3] and can be found both uni and bilaterally.[4] The muscle was first described in 1604, and it is still a topic of debate in the scientific community, especially in relation to its function, vascularization, innervation, as well as its variety of arrangements in its fixation sites along the chest.[2] It is known in the literature that the main fixation sites for this muscle are: proximally, the tendon of the sternal portion of the sternocleidomastoid muscle,[5–7] pectoralis major fascia, [6] manubrium of the sternum,[4,8] and aponeurosis of the external oblique muscle of the abdomen,[6,9,10] and distally, the sheath of the rectus abdominis muscle at the level of the xiphosternal joint, [10] aponeurosis of the external oblique muscle, [2] and from the 5th to the 7th costal cartilages.[5,11] Its presence varies from a few short fibers to a well-formed sternal muscle, found unilaterally or bilaterally. Jelev et al.,[8] studying the sternal muscle in the Bulgarian population and based on the belly morphology of the sternal muscles, observed in the literature eight variations, which were classified into two types: type I, unilateral sternal muscle and type II, bilateral sternal muscle and both encompassing four subtypes. However, there is also a wide variation in height (4.8 ± 1.97 cm), width (15.1 ± 6.84 mm) and thickness (3 ± 0.91 mm).[12]

The vascularization of the sternal muscle has been little reported in the literature, but for Jelev et al.,[8] this irrigation is performed by the perforating branches of the internal thoracic artery. Its innervation is performed by the medial or lateral pectoral nerves,[8] intercostal nerves[8,13] or by both.[14] Clinically, the sternal muscle can be confused with several benign or malignant lesions, especially breast tumors.[15] Hence, mastologists must be aware of these anatomical variants to distinguish between normal structures and lesions that can represent breast cancer. Therefore, the objective of our work is to report the existence of and describe the sternal muscle in an adult melanodermic female cadaver.

Case report

During a routine dissection, at the Anatomy Laboratory of the Morphology Department of the Federal University of Sergipe, of a female adult human corpse with approximately 40 years old, a sternal muscle (Figure 1) was found on the anterior wall of the right hemitorax, oblique in direction and lying on the sternal origin of the pectoralis major muscle. It originated from an arch between the two origins of the sternocleidomastoid muscle and its insertion was fixed into the 3rd, 4th and 5th right costal cartilages, mainly the 5th. The muscle length was 10.8 cm, 6.7 cm in its muscular portion and 4.1 cm in its tendinous portion. Its maximum width was 1.7 cm in its tendinous part and 2.1 cm in its muscular part. It was not possible to observe the innervation of the sternal muscle, because the branches of the pectoral nerves were easily damaged as they were mistaken for connective tissue during dissection.

Discussion

The sternal muscle is an anatomical variant of the anterior chest wall,[16] often described as remnants of the fleshy panicle (panniculus carnosus)[6] and its presence is still a dilemma in the differential diagnosis for radiologists as well as for surgeons,[17] as far as concerns to breast tumors. Its occurrence in humans varies from 3.1 to 23.5%,[8] although its prevalence is directly influenced by sex. According to data in the literature, its prevalence is higher in women than in men, which is in accordance with our case, as well as that of other authors.[2,8,9,15] Regarding ethnicity, it is more frequent in the Asian population,[3,18] specially in the Indians.[8]

In our study, the sternal muscle found is in accordance with the morphological characteristics described by Jelev et al.,[8] as being a type I muscle, that is, unilateral muscular belly, its fibers presented an oblique direction and rested on the origin of the pectoralis major muscle. Its proximal attachment occurred from a tendinous arch formed between the sternal origins of the sternocleidomastoid muscle; this is in agreement with the works of several authors,[5–7] whereas its distal attachment was at the level of the 3rd to 5th costal cartilages, mainly the 5th; this is in contrary to the result Raikos et al.,[5] who found the distal attachments of the muscle situated between the 10th and 12th costal cartilage. Because our study was performed on a cadaver, it was not possible to assign a specific function to the sternal muscle, despite being frequently associated with elevation of the lower portion of the pectoralis major muscle, where it acts as a synergist in inspiration.[9,19] In view of this, the abundance of different origins and insertions of the variations of the sternal muscle, makes it difficult to reach a consensus regarding its function.[20]

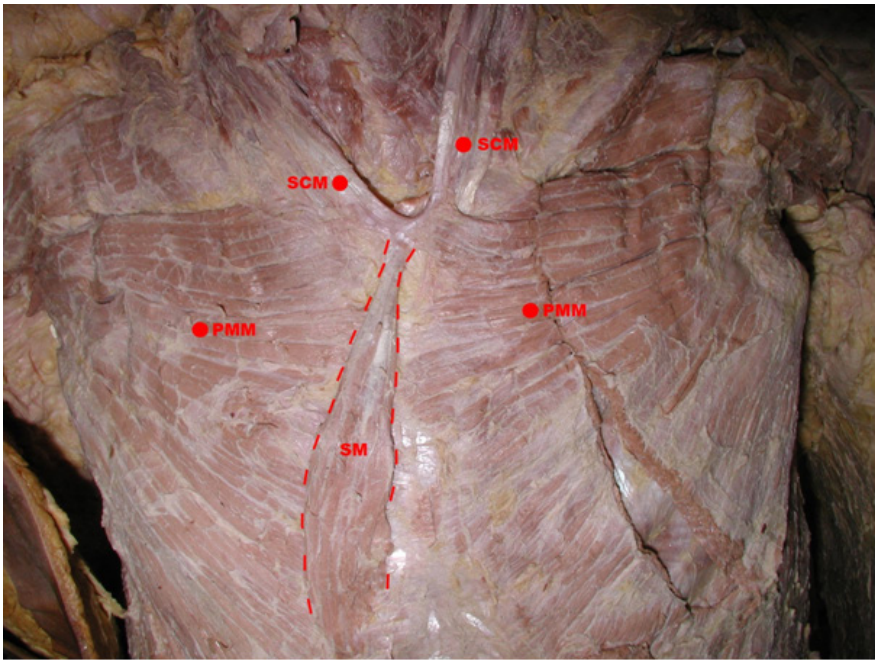

Figure 1 Sternal muscle found in the anterior wall of the right hemithorax.

SM - Sternal muscle

SCM - Sternocleidomastoid muscle

PMM - Pectoralis major muscle

The morphometry of the sternal muscle in adults is very variable, with a length between 10 and 23 cm on the right side and 13,5 to 26 cm on the left side,[7–9,15,17] which is in accordance with the dimensions found in our study, where its dimensions were 10.8 cm long and 3.8 cm broad.

Innervation of the sternal muscle, is derived from the intercostal nerves,[4,8,11] the pectoral nerves[8] or both of them.[14] In our study it was not possible to identify the innervation of the sternal muscle, because in the dissection the branches of the pectoral which are easily confused with the connective tissue, were removed or damaged.

Conclusion

The sternal muscle, undoubtedly, is a curious case of anatomical variation existing in the human body, not only due to its incidence in the general population, but also due to the great variation found in terms of origins, insertions, morphology of their bellies, and laterality. In view of this, knowledge about this muscle by both medical students and radiologists, mastologists and plastic surgeons is essential to avoid possible diagnostic errors in breast and chest surgeries.

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Conflicts of interset

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