Rectus sternalis muscle: An anatomical variant of anterior chest wall

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Abstract
Introduction
Knowledge of variations in the anterior chest wall musculature is important for clinicians as it can befuddle diagnosticians causing misinterpretations. Rectus sternalis is a variant located along the sides of the sternum in the anterior chest wall musculature. Existence of this muscle can be misinterpreted as a tumour on mammography or as a hernia of the pectoralis major and can also cause alterations in ECG. Awareness of this variant also has implications in therapeutics.

Case report
Here we report a case of bilateral rectus sternalis in a 70-year-old South Indian female. Its origin, insertion and importance in clinical diagnosis and therapeutics have been discussed.

Conclusion
Awareness of this muscle is of paramount importance to the general, plastic surgeons and radiologists during clinical approaches.

Introduction
Rectus sternalis is a small supernumerary muscle in ribbon form seen as a variant of anterior chest wall musculature. It lies superficial to fascicles of the pectoralis major muscle. Discovery of sternalis dates back to 1604 when Carbollius first demonstrated it and then Du puy reported it precisely in 1726¹. It is also referred as musculus sternalis, pre sternalis, rectus sternalis and sternalis brottrum or thoracis by various authors².

The incidence of occurrence is about 3±5%³ of the population with no predominance of sex eventhough some anatomists report it to be more prevalent among women and white-skinned people⁴. The frequency of occurrence varies in various ethnic groups, the least seen in Taiwanese (1%) and most seen among Asians (11.5%)⁵. It is twice as often unilateral than it is bilateral³.

Although the rectus sternalis muscle has been demonstrated 30 years ago, its origin, insertion, nerve supply and action remains controversial. Hereby, we report a case of the rectus sternalis muscle observed bilaterally in a cadaver. This report can help to avoid the misinterpretations caused during diagnostics and prevent aggressive treatment in an improper way.

Case Report
During routine dissections for undergraduate medical students, we observed, a distinct muscular mass of 15 cm length bilaterally in the pectoral region of a 70-year old embalmed female cadaver. It was located on either sides of sternum deep to superficial fascia but was superficial to the fascicles of pectoralis major separated by pectoral fascia (Figure 1). It originated from the aponeurosis of external oblique muscle and from 5-7th costal cartilages about 5cm from the midsternal line. Two small twigs from the anterior intercostal nerves pierced the muscle from its deeper aspect. Its cranial part extended to blend with the sternal origin of the sternocliedomastoid. The pectoralis major on either sides appeared to be normal.

Discussion
The rectus sternalis muscle is occasionally seen as a superficial slip in the pectoral region in human beings but regularly seen in lower animals⁶. The superficial location of the muscle with its direction of fibres indicates the elevation of lower chest wall on its contraction.

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Figure 1: Dissection showing thin strip of bilateral rectus sternalis muscle. SCM- sternal heads of sternocliedomastoid; PM- pectoralis major; RS- rectus sternalis.

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Various theories attribute towards the origin of the rectus sternalis muscle. Kumar et al. considers sternalis to be derived embryologically from the ventral longitudinal column of muscle arising from the ventral tip of the hypomeres. This is represented by the infrayhoid muscles in the neck, rectus abdominis in the abdomen and occasionally by the rectus sternalis in the thorax. Barlow opines that morphologically, rectus sternalis represents the remains of panniculus carnosus. Saed et al. claims that this muscle would have derived from the pectoralis major with its innervations from pectoral nerves or from the rectus abdominis with innervation from intercostal nerves.

Despite numerous descriptions of rectus sternalis in literature, reports indicate that this muscle remains unknown to clinicians. This could be due to its non-existence in medical training or because it is not sufficiently stated in standard medical textbooks. However, the presence of this muscle remains clinically important. Its presence may evoke a diagnosis of hernia of the pectoralis major muscle or can cause alterations in ECG during investigation. The sternalis muscle is stated to have a variety of appearances that should be familiar to the radiologist and surgeon to avoid confusion with a malignant lesion during CT, MRI and mammography. During oncological surgeries, if this muscle is encountered during radical mastectomy, it is important to excise this muscle as part of breast tissue lies deep to it. It can also be used to cover the prosthesis in its most medial part during the procedure of augmentation mammoplasty.

**Conclusion**

Rectus sternalis is a rare variant of anterior chest wall and since there are no reliable clinical tests to verify the presence of these anomalous muscle slips, awareness of this muscle is of paramount importance to the general, plastic surgeons and radiologists during clinical approaches.

**References**