Rectus Sternalis: A Case Report

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Abstract

The sternalis is an anatomical variant of anterior chest wall muscle. It occurs either unilateral or bilateral. It lies in the anterior chest wall, superficial to the sternal origins of the pectoralis major muscle. The sternalis usually courses longitudinally adjacent to the sternum and does not cross the midline. Several variations regarding the superior and inferior attachments have been noted. The superior attachment can include the tendon of the sternocleidomastoid muscle, sternum, clavicle, pectoralis major, platysma and the upper ribs and costal cartilages. The inferior insertions can include the third to eight costal cartilages, 4th to 8th ribs, the anterior rectus sheath, the pectoralis major fascia, and the subcutaneous adipose tissue overlying the muscle.

The sternalis muscle is a well-known documented normal anatomic variant seen in humans. Many more terms have been used in the literature to describe sternalis muscle such as “parasternalis” and “rectus sternii” muscle.

The reported incidence of the sternalis muscle varies across genders, with a higher incidence in females (8.7% compared with 6.4%). An incidence of 4-8% is reported in Indian subject.

INTRODUCTION

The sternalis is an anatomical variant of anterior chest wall muscle. It occurs either unilateral or bilateral. It lies in the anterior chest wall, superficial to the sternal origins of the pectoralis major muscle. The sternalis usually courses longitudinally adjacent to the sternum and does not cross the midline. Several variations regarding the superior and inferior attachments have been noted. The superior attachment can include the tendon of the sternocleidomastoid muscle, sternum, clavicle, pectoralis major, platysma and the upper ribs and costal cartilages. The inferior insertions can include the third to eight costal cartilages, 4th to 8th ribs, the anterior rectus sheath, the pectoralis major fascia, and the subcutaneous adipose tissue overlying the muscle.

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CASE REPORT

During routine dissection in the Department of Anatomy, of the thoracoabdominal region of a 49-year-old male a variation was seen. A distinct, separate fusiform muscular mass about 12 cm long was found in the left hemithorax, covered by superficial fascia and located anterior to the pectoralis major muscle. The details are given in this case report. There is a lot of debate on the origin of the muscle. This muscle can be misdiagnosed on routine mammography as a breast mass. It can play an important role in reconstruction flap surgeries. Such anatomical variation should be kept in mind during surgical procedures and diagnosis.

Key words: Dissection, Mammography, Sternum
DISCUSSION

According to Turner 1867, Bartolemeu Cabrolio 1529-1603, Professor of anatomy in Montpellier, named it for the first time in his book Anatomies Elencus Accurassimus published in 1604. It was Du Puy, however, in 1726 who was the first author to describe it accurately. The history is compiled in Table 1.

Two radiological reports (Bradley et al. 1996, Murphy and Nokes, 1996) highlighted the diagnostic dilemma posed by a sternalis muscle in the detection of breast cancer. Although sternalis has been well-described in the literature, some confusion persists. For example, it is presented in Gray’s Anatomy, as a variation of pectoralis major and is called rectus sternalis, whereas in the embryology text by Larsen (1997) it is presented as a derivative of the rectus column and called sternalis.

There is a debate since the 17th century particularly about the homology and innervation of sternalis, and there is an extensive literature. The homology debate from the literature reviewed Table 2 shows that the sternalis has been classified by various authors under four main headings, as being derived:

1. From pectoralis major
2. From rectus abdominis
3. From sternomastoid and
4. From the panniculus carnosus.

An examination of the innervation patterns has narrowed the debate. Sternalis is either pectoralis major derived with an innervation from the thoracic pectoral nerves or rectus derived with an innervation from the intercostal nerves.

Recently, two articles reported on the sternalis muscle attributed the nerve supply to be anterior cutaneous branch of the intercostals nerve. Morrita (1944) studied 46 sternalis muscle and never observed the innervation coming from intercostals nerve.

Kida et al. has observed the nerve supply of sternalis in more than 40 cases over 15 years. In those cases, nerve supply came from pectoral nerves only.

There are many reports on the participation of the intercostals nerves. Shephard 1885; Bardeleben, 1888; Fick, 1891; Christian, 1898; Yap, 1921; Taniguchi and Fochihara, 1932; Slobodin, 1934, 1935; Barlow, 1935; Misra, 1954; Rao and Rao, 1954; Kacker, 1960; Blees, 1968; Kitamura et al. 1985; Shen et al., 1992; Jeng and Su, 1998; O’Neill and Folancurran, 1998. However, it’s quite challenging to preserve the accurate nerve supply as the nerves get easily damaged during dissection of pectoralis fascia, so a preferred technique would be microdissection.

This anomaly is not associated with any symptoms. The presence of sternalis muscles has been associated with other congenital abnormalities of pectoralis major muscle and in 48% of anencephalic neonates. According to a recent review by Bradley et al. 1996 the sternalis muscle is identified in only 4 of 32,000 patients during mammography screening. In these cases, it is usually identified on the cranio-caudal projection as a triangular or flame shaped structure, sometimes with ill-defined margins frequently with fat surrounding it in the medial and deep layers of the breast. Using other imaging techniques, such as computed tomography (CT) or magnetic resonance imaging (MRI), the sternalis muscle is clearly revealed.
as a longitudinal structure with a parasternal course. When supine the muscle is flattened or band-like. When person is prone the muscle is mobile and has a bulging appearance. The classic description on CT or MRI is deep, vertically oriented parasternal tubular structure surrounded by fatty tissue. The sternalis can present alterations on electrocardiogram or wrongly interpreted as mass requiring surgical resection. Pichler (1911) stated “in order to reach reliable evidence I used the following method:

“If you let the subject perform stroking, scratching movements in a horizontal direction at the area of the opposite anterior superior iliac spine with the elbow fixed and flexed in a blunt angle, a sternalis muscle if present, would become prominent.”

Despite numerous description of the sternalis muscle in the literature, the muscle though known to anatomists, is relatively unknown by clinicians. Discussion of the muscle is non-existent during medical training or seldom included in standard medical texts.

During medical training a mention of this muscle should be done to prevent any misdiagnosis.

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REFERENCES


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