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Case Report Open Access

The Importance of Sternalis Muscle in Breast Surgery

Firat Kocaay[1], Salim I Basceken[1], Cihangir Akyol[1*], Toygar Sari[1], Utku Celik[1], Serkan Oztanaci[2], Volkan Genc[1] and Semih Baskan[1]

[1]*Department of Surgery, School of Medicine, Ankara University, Turkey*

[2]*Department of Anatomy, School of Medicine, Rize University, Turkey*

[*]**Corresponding author:** Cihangir Akyol, Ankara University School of Medicine Department of Surgery, 06100 Sihhiye Ankara Turkey, Tel: 00905052653497; Fax: 00903123093989; E-mail: cihangirakyol@gmail.com

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Abstract

The sternalis muscle is a well-known anatomic variant of the anterior chest wall from anatomists. Nevertheless, surgeons and radiologists are not familiar with this entity. It is the most frequently reported incidental finding during routine anatomic dissection and most common seen during mastectomy. In this case, during a right modified radical mastectomy operation on a 72-year-old female patient, a sternalis muscle was detected on the pectoralis major muscle in the superficial fascia. It was in craniocaudal position and was paralel to the body of sternum, so we protected the muscle. In some cases the sternal muscle is determined intraoperatively and the clinicians have to be familiar with this entity.

Keywords: Breast; Mastectomy; Sternalis muscle

Introduction

The sternalis muscle is a supernumerary muscle of the pectoral region and the incidence rate is varied from 0.7% to 18.2 % in literature [1,2]. It has been reported both in males and females. It is more commonly unilateral than bilateral and the frequency varies among different ethnic groups. This muscle can present in different morphologies and these morphologies are classified by anatomists [3]. The most important feature of this muscle is, it can be misdiagnosed as a breast mass in radiological findings usually in unilateral cases. Even, it may be mistaken as a tumor on the mammogram by radiologists, may appear as a mass requiring surgical resection or it may be mistaken as a recurrence of malignancy by surgeons [4]. In multidetector computed tomography and magnetic resonance imaging it can be differentiated from a mass [5]. The function of this muscle is insignificant but it can be helpful in breast reconstruction surgeries after mastectomy and can be used as a flap [3,6].

Case Presentation

A 72-year-old patient admitted to our clinic with a right breast mass. Physical examination and preoperative sonography confirmed breast mass with suspicious of malignancy. Trucut needle biopsy revealed invasive ductal carcinoma. We performed modified radical mastectomy and during the operation the sternalis muscle was seen lying on the pectoralis major (Figure 1). It was originating from the upper sternum and terminates on sheath of the rectus abdominis muscle. The dissection plan was enlarged through above and under the muscle. Related connective tissue and fascia were removed and the muscle is spared in our case.

Discussion

The sternalis muscle (also known as episternalis, presternalis, sternalis sternalis brutorum, rectus thoracic, rectus sterni and superficial rectus sterni) is a mysterious muscle that is rarely found on the anterior thoracic wall. Turner, Cabrolius was the first anatomist to observe the sternalis muscle in 1604 [7].

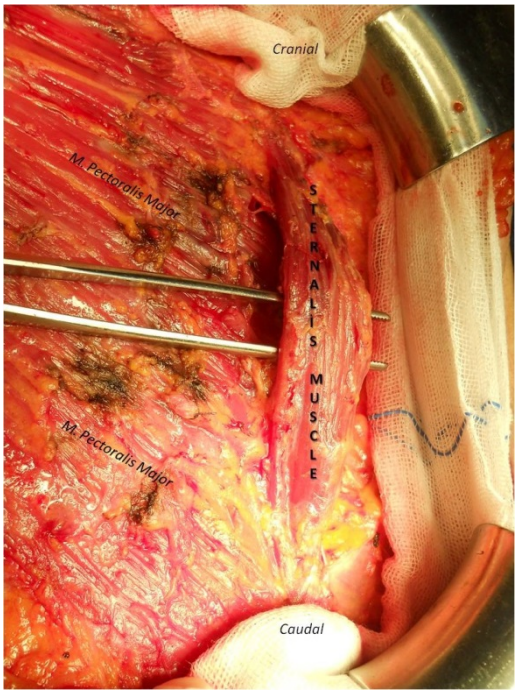


Figure 1: The intraoperative view of the sternalis muscle during modified radical mastectomy.

It is a slender muscle, look like a band of fibers running parallel to the sternum and lies superficial to the pectoral fascia [8]. The muscle may be unilateral or bilateral and there are still variances in reported literature regarding the origins, insertions and nerve innervations [9]. Caudally, it attaches to the cartilages of the lower true ribs into which

abdominis was inserted, but in some cases insertion point may be the right half of the anterior aspect of sternum, the costal cartilages of the 6th rib and also takes fibers from the rectus abdominis muscle or rectus sheath [10]. Cranially, it terminates in the pectoral fascia, sternal body, costal cartilages or the sternal head of the sternocleidomastoid muscle. Nerve supply to the sternalis is variable and it may be innervated through the intercostal nerves or by the pectoral nerve [4].

The prevalence of this muscle is varying with respect to gender and ethnicity. The unilateral sternalis muscle has been reported to be found in 4.5% of subjects whereas bilateral presence is reported in less than 1.7% [2], while being reported 8.7% in females and 6.4% in males [4]. The highest incidence rate which is about 3 times more than these rates was reported in Chinese population [5]. This variant was seen unilaterally and in the right breast in our case. In our case type A anatomical variation of this muscle is detected per the anatomical variation classification done by Raikos et al. [3].

In preoperative evaluation of patients with breast cancer, ultrasonography and mammography are performed routinely and the awareness of the sternalis muscle is generally impossible with these techniques. If the pectoralis major muscle is relaxed, it will project into the field of view on the craniocaudal view in approximately 30% of the images [11].

Thereby, this muscle is incidentally determined by clinicians during the operation in most of patients. Sometimes, sonography can mislead to surgeons in male or thin female patients because this muscle may be interpreted as a malignancy. The differential diagnosis is a mass (benign or malignant) or a variable attachment of the pectoralis muscle (this is a slip of pectoralis muscle abutting the sternum and is imaged on bothcranio-caudal and medio-lateral oblique views). If doubt still exists, a multidedector CT scan or magnetic resonance imaging (MRI) can confirm the presence of the sternalis muscle. So, unnecessary biopsy of this normal variant can be avoided if one is aware of the entity [12,13].

When the surgeon determines this muscle in breast surgery, muscle can be resected or spared. There is no oncological difference between two procedures. If the surgeon spares the muscle in breast surgery the radiologist must be informed in the follow-up period. Otherwise when this muscle was known before surgery it can be used in onco-plastic surgical procedures as a muscular flap [3,6].

The sternalis muscle is a rare and little-known variation in human. Although it is a benign anomaly, it may pose a diagnostic dilemma to the surgeons and the radiologists. During mastectomy whenever this muscle is encountered it is important to identify the correct dissection plane, and care should be taken not to leave behind any breast tissue under this muscle [14]. In modified radical mastectomy, it may be necessary to remove the muscle for an excellent anatomic dissection. On the other hand, modified radical mastectomy technique which is used in breast cancer surgeries nowadays, the dissection of the muscles does not improve survival of the patients. In addition, the excision of this extremely rare variant muscle located in the anterior chest wall, no good oncologic outcomes were predicted and radiologist should be informed about this muscle in the follow-up period. Also we recommend that a special record should be taken to avoid a misdiagnosis for a recurrence in the follow-up period.

References

1. Harish K, Gopinath KS (2003) Sternalis muscle: importance in surgery of the breast. Surg Radiol Anat 25: 311-314.
2. Young Lee B, Young Byun J, Hee Kim H, Sook Kim H, Mee Cho S, et al. (2006) The sternalis muscles: incidence and imaging findings on MDCT. J Thorac Imaging 21: 179-183.
3. Raikos A, Paraskevas GK, Yusuf F, Kordali P, Ioannidis O, et al. (2011) Sternalis muscle: a new crossed subtype, classification, and surgical applications. Ann Plast Surg 67: 646-648.
4. Hung LY, Lucaciu OC, Wong (2012) Back to the debate: Sternalis muscle. Int J Morphol 30: 330-336.
5. Ge Z, Tong Y, Zhu S, Fang X, Zhuo L, et al. (2014) Prevalence and variance of the sternalis muscle: a study in the Chinese population using multi-detector CT. Surg Radiol Anat 36: 219-224.
6. Khan UD (2008) Use of the rectus sternalis in augmentation mammoplasty: case report and literature search. Aesthetic Plast Surg 32: 21-24.
7. Turner WM (1867) On the musculus sternalis. J AnatPhysiol. 1: 246-253.
8. Zaher WA, Darwish HH, Abdalla AME, Vohra MS, Khan MM (2009) Sternalis: A clinically important variation. Pak J Med Sci 25 : 325-328.
9. Liu H, Holmes V, Nordon-Craft A, Reeves R (2012) Variation of sternalis muscle: A case report. Int J Anat Var 5: 59-61.
10. Natsis K, Totlis T (2007) A rare accessory muscle of the anterior thoracic wall. Clin Anat 20: 980-981.
11. Eklund GW, Cardenosa G (1992) The art of mammographic positioning. Radiol Clin North Am 30: 21-53.
12. Meerkotter D (2009) Mammographic normal variant: the sternalis muscle. South African J of Radiol 13: 72-74.
13. Ozbalci EA, Saracoglu FO (2013) The musculus sternalis: Ultrasonographic verification of a rare but benign mammographic finding. J Breast Health; 9: 169-171.
14. Kulkarni DU, Kulkarni UK (2010) Unilateral rectus sternalis muscle – a case report. Al Ameen J Med Sci 3: 169-171.