A STUDY ON MUSCLE VARIANT - RECTUS STERNALIS

Dr. Arunkumar S. Bilodi*1, Dr. P. Sasikala2, Dr.P. Anuradha3, Venkatesh Karthikeyan4

1Professor and HOD, Department of Anatomy, Velammal Medical College Hospital and Research Institute, Madurai 625009.
2Associate Professor, Department of Anatomy, Velammal Medical College Hospital and Research Institute, Madurai 625009.
3Tutor, Mediciti Institute of Medical sciences, Ghanpur, Medchal Mandal, Ranga Reddy District, Telangana 501401.
4First year MBBS student, Velammal Medical College Hospital and Research Institute.

ABSTRACT

Aim: The objective of the present study is to study a rare muscle variant known as rectus sternalis that came across during routine dissection.

Place of Study: The study was conducted in the department of anatomy at Velammal Medical College Hospital and Research Institute, Madura and Annapoorna Medical College and Hospital, Salem. This was found in a male cadaver during routine dissection.

Period of Study: The study was done during December 2013 and 2014*. Materials and Methods:17 cadavers were dissected from 2013 to 2014, 12 from Velammal Medical College and 5 from Annapoorna Medical College.

KEYWORDS: Supernumerary muscle, musculus sternalis, presternalis, rectus sternalis, sternalis thoracis, panniculus carnosus, pectoralis major, muscle variant, rare chest wall muscle.

INTRODUCTION

In 1604, it was Turner who for the first time named sternalis muscle and quoted in his book entitled Anatomes Elenchus Accuratissimus. It is a supernumery muscle situated in anterior chest wall which lies superficial to sternum as well as sternocostal fascicles of the pectoralis major muscle.[1] It was later identified by Du Puyin in 1726. This muscle has been reported both in males and females.[2] It has different nomenclature as quoted by different authors.
According to Costa "abdomino-guttural" by Duges, "abdomino-cutaneous" by Klein, "sternalis brutorum" by Kuhff, and "cutaneous pectoris" by Zenker.\[3\] It has been suggested by few authors that it takes origin from sternocleidomastoid muscle, pectoralis major muscles, rectus abdominis muscle and remnant of panniculus carnosus. Its derivative from the pectoralis major has been described by Novakov and his co-worker.\[4\] Its incidence is as low as 3-5%.\[5\] Saddler has said that rectus sternalis is a part of a ventral, longitudinal column of muscles which arise at the ventral tips of hypomere.\[6\] According to Gray's Anatomy, rectus sternalis is said to be a superficial vertical slip, or slips that ascend upwards from the lower costal cartilages and rectus sheath to blend with sternocleidomastoid or to attach to the upper sternum or costal cartilages.\[7\]

**MATERIALS AND METHODS**

A study was done on this muscle by dissection from the Department of Anatomy at Velammal Medical College Hospital and Research Institute, Madurai and Annapoorna Medical college and Hospital, Salem. Out of 17 bodies of 2013-14 and 2014-15 batches, one body showed bilateral rectus sternalis. Both were arising from the aponeurosis of external oblique muscles running cranially towards cervical region perpendicular to axis of pectoralis major muscles and getting inserted into the fascia covering sternocleidomastoid. Both slips were running obliquely in front of Pectoralis major as distinct muscular mass on either side of sternum. They were measuring 12.5 cm on right side and 10.5 cm on the left side.

**DISCUSSION**

Various authors have called it as musculus sternalis, presternalis, rectus sternalis and sternalis brottrum or thoracis.\[8\] Incidences of rectus sternalis are 2% in European, 6% in African and 11% in Asian descendants\[9\], 3.3% in Priyanka et al studies.\[10\] In Nguyen and Ogawa, it is roughly 5% to 10% of the population.\[11\] Present study has shown 5.8%. It has been observed that only existence of this rectus sternalis may not cause any clinical symptoms but it may be associated with other clinical conditions like anencephaly (48%) and adrenal glands birth defects.\[12\] It has been reported that it occurs more in females (8.7%) when compared to males (6.4%).\[13\] Incidence of 4 - 8% has been reported in Indians by Mishra BD and Shah AC \[14, 15\] and only 2% in Vandana et al.\[16\] Kumar MR Bhat reported a case of sternalis muscle observed in a 60 years old male cadaver. The muscular mass was about 12.3 cm long in the left hemithorax. It was located anterior to the pectoralis major muscle, obliquely as a distinct muscular mass. Cranial part was inserted into aponeurosis with fibers of the
sternochondrocostal portion of the left pectoralis major muscle close to second costochondral junction. Some aponeurotic fibers extended to blend with sternal origin of sternocleidomastoid muscle and sternoclavicular joint. Its caudal end remained of the panniculus carnosus.[17] Cherian and Gandhalam observed case of rectus sternalis muscle on both sides in a 70 year old South Indian female during routine dissections for the undergraduate students. Distinct muscular mass was 15cm long bilaterally. It was located on either sides of sternum. It originated from the aponeurosis of external oblique muscle and from 5th to 7th costal cartilages about 5cm from the midsternal line. It was extending cranially to blend with the sternal origin of the sternocleidomastoid. On both sides pectoralis major were normal.[18] Vandana Mehta et al reported a case of sternalis unilaterally in a 40 year old cadaver origin from the ventral longitudinal sheet of muscle. It was fleshy throughout except at the ends it was aponeurotic. The muscle showed "Y" Configuration at the sternal angle and later merged with respective sternocleidomastoid muscle. The muscle received its nerve supply from the third intercostal nerve.[16] Nguyen Andogawa reported a case of intraoperative sternalis muscle during routine keloid excision in a male patient aged 55 years old who had significant sternokeloids. Hence they took the decision to excise the keloid followed by reconstruction with a propeller flap.[19]

**CLINICAL IMPORTANCE OF RECTUS STERNALIS**

Sternalis muscle is said to occur in different varieties of appearance. So the radiologists and surgeons have to know the various types of appearance of this muscle. Sometimes it will be mistaken for recurrence of malignancy of breast during CT, MRI and mammography especially during post treatment period.[16, 20, 09] During the removal of breast this muscle may be found during subcutaneous plane. Hence it is important for the surgeon to know the plane of the muscle. During radiation, depth of internal mammary lymph nodes to be irradiated can also varied in the presence of this rectus sternalis. This muscle can be used as muscle flap for reconstructions of anterior chest wall, head and neck and breast reconstructions.[21] Developmentally its embryonic origin is not clear. It said to be remnant of the panniculus carnosus or may be derivative of primitive ventral longitudinal muscle.[19]

**PRESENT STUDY**

Present study shows the presence of bilateral rectus sternalis from a male cadaver as a distinct muscular mass running obliquely across pectoralis major on either side of sternum similar to Kumar et al studies. Their incidence in the present study is 5.9%. Both slips were arising
from aponeurosis of external oblique muscle and getting inserted into the fascia covering sternocleidomastoid muscle. They were measuring 12.5 cm on right side and 10.5 cm on the left side. Unlike in the studies of Cherian and Gandhalam it was neither originating from 5th to 7th costal cartilages nor from midsternal line. Muscle bellies in both side did not show 'y' configuration before getting inserted into the fascia covering sternocleidomastoid muscle and it was fleshy belly throughout and not aponeurotic at it ends as seen in studies of Vandana Mehta et al. There was no sterno keloids unlike in studies of Nguyen Andogawa.

**Rectus Sternalis On Either Side Of Sternum As Separate Muscle Slips In A Male Cadaver Aged 65 Years. These 2 Slips Are Lifted By Forceps**
CONCLUSION
The knowledge of this muscle variant will be of paramount importance to radiologists and surgeons. This study gives awareness about the presence of this muscle which is commonly mistaken for recurrence of malignancy of breast during CT, MRI and mammography especially during post treatment period. So this has to be report if present.

CARRY HOME MESSAGE
This muscle if present may or may not cause symptoms. So any case of space occupying lesion in anterior chest wall occurrence of rectus sternalis has to be ruled out by differential diagnosis.

REFERENCES


