

Rectus Sternalis: A Part of Syndrome of Musculoskeletal and Renovascular Anomalies?

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How to cite this article:

Manisha B. Sinha, Dharmendra Kumar, Prasenjit Bose. Rectus Sternalis: A Part of Syndrome of Musculoskeletal and Renovascular Anomalies?. Indian J Anat. 2020;9(1):90-92.

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Received 04.10.2019 | **Accepted** 07.12.2019

Abstract

Rectus sternalis is a strap muscle occasionally present in anterior thoracic wall. Rectus sternalis if present, can be used in breast reconstruction surgeries after mastectomy in association with pectorals and also in head and neck reconstructive surgery. During routine dissection for the undergraduates on the anterior thoracic wall, unilateral presence of rectus sternalis muscle was found on right side of the chest. The muscle was extending from 5th rib on the right side (3.6 cm away from sternum) to sternum (at the level of manubriosternal junction). The muscle was 7.2 cm long and 0.8 cm broad in the middle part of the muscle. Both attachments were tendinous. This strap like muscle was seen running between superficial fascia and pectoral fascia of the chest. It may cause confusion as tumor mass or desmoids in anterior chest wall. In this case, rectus sternalis was seen associated with renovascular and other musculoskeletal anomalies. Accidental finding of rectus sternalis might be a predictor for renovascular anomaly for surgeons and radiologist.

Keywords: Rectus sternalis; Pectoralis minor; Tumor; Mastectomy.

Introduction

Among anterior chest wall muscles, the muscle rectus sternalis is a rare feature in the human beings. This muscle as the name suggests, is

attached to the sternum at one end while the other end is either attached to pectoralis major or aponeurosis of rectus abdominis. The appearance of Rectus Sternalis (RS) creates lots of confusion while doing mammography and other imaging investigations because of its similarity to various pathologies such as breast carcinoma, extra – abdominal desmoid tumors, granular cell tumours, diabetic mastopathy, abscesses, hematomas, sclerosing adenitis, lymphadenitis, fat necrosis, and surgical scars¹ (Anjamrooz SH, 2013). It often leads to misdiagnosis of recurrence of breast cancer after treatment. As it is a small muscle in the chest, breast tissue may go deep and hence, may be left during mastectomy. It may create a difference in the depth of internal mammary lymph nodes causing problems during radiotherapy of breast carcinoma. Though function of RS is not known, this muscle is useful in breast reconstructive surgery² and in head and neck graft.^{3,4} Here, we report a case of right sided rectus sternalis with left sided higher origin of pectoralis minor muscle in chest.

Incidence of this muscle has been described in both sexes equally. In Indian population, it has been reported in 4-8%.⁵ But its association with variation in origin of pectoralis minor and renovascular anomalies have not been reported ever in India. Our case is unique because of its association with muscular and renovascular variation.

Case Report

During routine dissection for the undergraduates on the anterior thoracic wall of a 65 year old Indian male cadaver at All India Institute of Medical Sciences, Raipur, we found a rectus sternalis muscle on right side of the chest. The muscle was extending from 5th rib on the right side (3.6 cm away from sternum) to sternum (at the level of manubriosternal junction). The muscle was 7.2 cm long and 0.8 cm broad. Both attachments are tendinous (Fig. 1). This muscle was strap like, present between superficial fascia and pectoral fascia of the chest. Inferior extent of its tendon was attached to external oblique aponeurosis. In association with it, the left pectoralis minor was found originating from 2nd, 3rd, 4th costochondral junction. Right pectoralis minor and both pectoralis major were normal. Also anomalies of mal-ascend and mal-rotation of left kidney and its vascular supply were also present in the same cadaver.

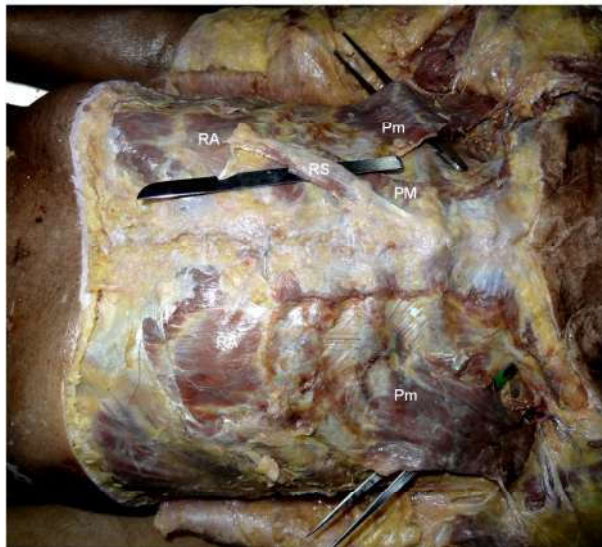


Fig. 1: Photograph showing tendinous attachment of right side Rectus Sternalis to sternum and external oblique muscle and higher origin of left pectoralis minor in anterior chest wall. RS Rectus Sternalis, RA Rectus Abdominis, PM Pectoralis Major, Pm Pectoralis Minor.

Abbreviations

RS - Rectus Sternalis
RA - Rectus Abdominis
PM - Pectoralis Major
Pm - Pectoralis minor

Discussion

As we found in this case, rectus sternalis is a part of syndrome of musculoskeletal and renovascular

anomalies. According to embryologist, nerve supply depends on development of the muscle and it is either from pectoral nerve or intercostal nerve. Sadler explained ventral longitudinal column of muscle arising from ventral tip of hypomeres.⁶ Larsen WJ, 1997 described a rectus column which is restricted up to abdomen; occasionally it develops parasternally as sternalis muscle.

Unilateral rectus sternalis has been more commonly illustrated. Right sided uniceps sternalis was the presentation of our case. Anjamrooz SH¹, 2013 found biceps sternalis, a Y-shaped muscle on anterior chest wall lacking sternal attachment. Uniceps sternalis, was first described by Bradley et al.,⁸ 1996 in six women during mammographic imaging. Left sided rectus sternalis was illustrated by Arraez-Aybar et al., 2003³ and Deepali et al., 2010⁹. Unilateral three right rectus sternalis was described by Ramachandran and Kothandaraman, (2010).¹⁰ A bilateral case of sternalis was observed by Shen et al., 1992 and Kumar et al., 2009.^{11,12}

In this study, mal-ascended and mal-rotated left kidney with double arterial supply was found. Vascular variant of right kidney, suprarenal gland and testis along with biceps sternalis has been previously reported.^{13,14} Association with anencephaly and anomalies of the adrenal gland has also been found earlier.¹⁵

It looks like syndromic presentation with rectus sternalis, as musculoskeletal, urogenital and vascular involvement.

Few muscles which are used for breast reconstructive surgery are latissimus dorsi, rectus sternalis.¹⁶ Common flap of pectoralis and rectus sternalis as tissue expander is also an option to the surgeons.³

Conclusion

So in incidental finding of rectus sternalis, surgeons and radiologist should be cautious about other adrenal and renovascular anomalies. This muscle may be considered as an anticipation of musculoskeletal and renovascular anomalies for clinician.

Conflict of interest: Authors have no conflict of interest.

References

1. Anjamrooz SH. Biceps sternalis: a Y-shaped muscle on the anterior chest wall. J cardiothoracic surg, 2013;8:38-40.

2. Schulman MR, Chun JK The Conjoined sternalis-pectoralis muscle flap in immediate tissue expander reconstruction after mastectomy. *Ann Plast Surg* 2005;55(6):672-75.
3. Arraez-Aybar LA, Soaoo-Perez, Merida-velasco JR. Left musculus sternalis. *Clinical anatomy* 2003;16(4):350-54.
4. Raikos A, Paraskevas GK, Tzika M, Faustmann P, et al. Sternalis muscle: an underestimated anterior chest wall anatomical variant. *J Cardiothorac Surg* 2011;6:73.
5. Jetti R, Pamidi N, Vollala VR, Vasavi R, Nerella VM. Right Sternalis Muscle. *International Journal of Anatomical variation* 2009;2:41-42.
6. Sadlar TW. *Langman's Medical Embryology*, 9th ed, Lippincott Williams and Wilkins Publisher USA 2004;202-3.
7. Larsen WJ, *Human Embryology*. 2nd ed. Edinburgh: Churchill- Livingstone 1997.
8. Bradley FM, Hoover HC Jr, Hulka CA, et al. The Sternalis Muscle an unusual normal finding seen on mammography. *AJR Am J Roentgenol*. 1996 Jan;166(1):33-6.
9. Deepali UK, Umesh KK. Unilateral rectus sternalis muscle - A Case Report. *Al Ameen Journal of Medical Sciences* 2010;3(2):169-71.
10. Ramachandran K, Kothandaraman U. Three unilateral recti sternalis muscles- an unusual variation and its clinical significance. *Eur J Anat*, 2010;14(1):99-103.
11. Shen CL, Chien CH, Lee SH. A Taiwanese with a pair of sternalis muscle. *Kaibogaku Zasshi* 1992; 67(5):652-54.
12. Kumar MRB, Bhagath KP, Siddaraju G, Sternalis muscle revisited in South Indian male cadaver: a case report. *Cases Journal* 2009;2:6318.
13. Anjamrooz SH, Azari H, Abedinzadeh M. Abnormal patterns of the renal veins. *Anat Cell Biol* 2012;45(1):57-61.
14. Anjamrooz SH, Azari H. Coexistence of multiple anomalies in the hepatobiliary system. *Anat Cell Biol* 2012;45(1):62-5.
15. Harish K, Gopinath KS. Sternalis muscle: importance in surgery of the breast. *Surg Radiol Anat*. 2003 Jul-Aug;25(3-4):311-4.
16. Umar DK. Use of the rectus sternalis in augmentation mammoplasty: case report and literature search. *Aesthetic plastic surgery* 2008; 32(1):21-24.

