

Case Report

SCALENUS ANTERIOR MUSCLE WITH TWO HEADS ASSOCIATED WITH VARIATION IN THE BRANCHES OF SUBCLAVIAN ARTERY: A RARE PRESENTATION

A. Perumal *¹, K. C. Shanthi ², K. R. Srinivasan ³.

*¹ Associate Professor, Department of Anatomy, Banas Medical College & Research Institute, Palanpur, Gujarat, India.

² Associate Professor, Department of Anatomy, Vinayaka Missions Kirupananda Variyar Medical College, Salem, Tamil Nadu, India.

³ Professor, Department of Anatomy, Aarupadai Veedu Medical College & Hospital, Pondy Cuddalore Main road, Bahour Commune Panchayat, Kirumampakkam, Puducherry, India.

ABSTRACT

Arterial variations are quite common. Many studies had elaborated variations in branching pattern of subclavian artery. Present study illustrates a unique feature of scalenus anterior muscle having two heads of origin and a common trunk for internal thoracic artery (ITA) and thyrocervical trunk (TCT). This rare common trunk passes between two heads of right scalenus anterior. Such rare variation was not reported so far. The rarity of such variation signifies the necessity of the present study. On the left side all branches arose normally from subclavian artery except dorsal scapular artery which originates from second part itself instead of third part which is a quite common variation. The Internal thoracic artery is widely utilized as a great conduit for Myocardial Revascularization. This common truncal origin is of great surgical importance to Cardiothoracic Surgeons, Cardiovascular Surgeons and Interventional Therapy Radiologists.

KEY WORDS: Internal Thoracic Artery, Thyrocervical Trunk, Scalenus Anterior Muscle, Common Trunk for Internal Thoracic Artery, Thyrocervical Trunk.

Address for Correspondence: Dr. A. Perumal, Associate Professor, Department of Anatomy, Banas Medical College & Research Institute, Palanpur, Gujarat-385001, India.

E-Mail: perumal_sas@yahoo.com

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INTRODUCTION

The right subclavian artery arises from the brachiocephalic trunk and the left subclavian artery from the arch of aorta. For descriptive purpose, each artery is divided into first part from its origin to the medial border of scalenus anterior muscle, a second part behind this muscle and a third part from the lateral margin of scalenus anterior to the outer border of the first rib where the artery continues as the

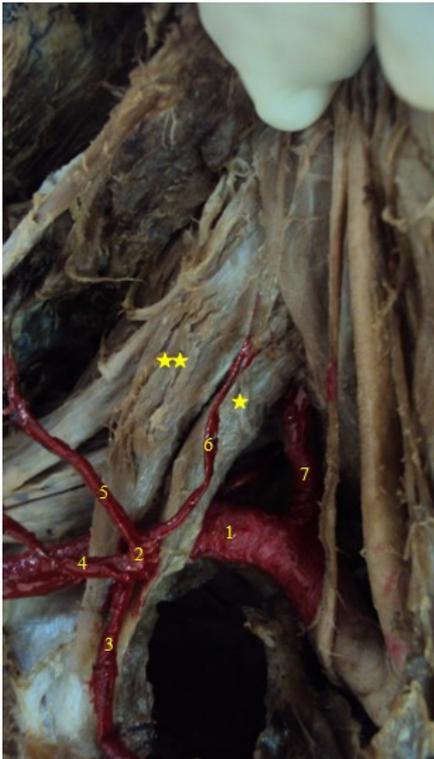
axillary artery. Commonly from the first part of right subclavian artery internal thoracic artery (ITA), vertebral artery and thyrocervical trunk (TCT) branches out. Costocervical trunk arises from the second part and dorsal scapular artery originates from the third part. The branching pattern is similar on the left subclavian artery except the costocervical trunk arises from the first part itself [1].

Nowadays the subclavian, axillary and radial

arteries are having great significance in the field of cardiac surgery. They are used in cannulation and for grafting in cardiac by pass surgeries. In surgeries of cardiovascular area, the arterial variations are often noticed and having an idea about these variations are very essential for the Cardiovascular Surgeons.

RESULTS

Fig.1: Common Trunk for Right TCT and ITA passing between two heads of right Scalenus anterior muscle.



1. Subclavian artery, 2. Thyrocervical trunk, 3. ITA, 4. Suprascapular artery, 5. Transverse cervical artery, 6. Inferior thyroid artery, 7. Vertebral artery.

★- Medial head of scalenus anterior,
★- Lateral head of scalenus anterior

Fig. 2: Branches of subclavian artery (Left side).



1. Subclavian artery 2. Thyrocervical trunk 3. ITA 4. Transverse cervical artery 5. Suprascapular artery 6. Inferior thyroid artery 7. Vertebral artery.

★- Costocervical trunk, ★- Dorsal scapular artery.

In an approximately 65 year old male cadaver, during our routine dissection in the Department of Anatomy, VMKVMC, Salem we have found a rare variation of right scalenus anterior muscle having two heads of origin. One head arises from C3 and C4 vertebrae and another head arises from C5 and C6 vertebrae. Both the heads are inserted separately into the scalene tubercle of the first rib. In our case study we also observed the existence of a common trunk for internal thoracic artery and thyrocervical trunk in the right subclavian artery. This common trunk passes between the two heads of scalenus anterior muscle and then branches into internal thoracic artery and thyrocervical trunk (Fig.1). On the left side all branches arose normally from subclavian artery except dorsal scapular artery which originates from second part itself instead of third part which is a quite common variation (Fig.2).

The common origin of the left ITA and TCT branches could be undetected intraoperatively which could be identified by angiography. For Thoracic and Cardiovascular Surgeons, the awareness of such ITA anatomical variations potentially causing surgical complications is essential. Such variations are highly significant because internal thoracic artery is used in coronary artery bypass graft. This case report enlightens Surgeons to avoid future complications in their various procedures in this particular body region.

DISCUSSION

Branches of first part of subclavian artery are Internal thoracic artery (ITA), Vertebral artery and Thyrocervical trunk (TCT). From the second part of subclavian artery costocervical trunk arises and from the third part dorsal scapular artery originates. The branching pattern is similar on the left subclavian artery except that the costocervical trunk arises from the first part itself [1].

The present case shows, the vertebral artery and costocervical trunk originates from the first part of right subclavian artery. From the second part there was a common trunk which divides into Internal thoracic artery (ITA) and Thyrocervical trunk (TCT). From TCT, inferior thyroid artery, transverse cervical and suprascapular arteries

originate. There was no branch found on the third part of left subclavian artery which is an anomaly. We also found that the common trunk which originates from second part of right subclavian artery passes between the heads of right scalenus anterior muscle. This common trunk divides into ITA and TCT. Then the ITA turns medially and crosses the tendon of medial head of scalenus anterior muscle and then enters into thoracic cavity. On the left side all branches arose normally from subclavian artery except dorsal scapular artery which originates from second part itself instead of third part which is a quite common variation.

Usually scalenus anterior originates from anterior tubercle of transverse process of C3, C4, C5 & C6 vertebrae. These four muscular slips are directed downwards & laterally, join as a single belly and get inserted into the scalene tubercle of first rib. In this cadaver we found two separate heads of origin for scalenus anterior muscle. One head arises from C3 and C4 vertebrae and another head arises from C5 and C6 vertebrae. Both the heads were inserted separately into the scalene tubercle of the first rib.

There were reports showing presence of scalenus accessorius and its relation with brachial plexus [2]. But the presence of two separate origin of scalenus anterior muscle observed in the present study is a rare anomaly.

The Internal thoracic artery is widely utilized as a great conduit for myocardial revascularization [3-5] and its variability in origin is of great surgical importance. A study reveals that 1% of right ITA originates from right thyrocervical trunk [6]. Nidhi Puri et al. reported in their study that a common trunk gives rise to ITA with other branches of subclavian artery in 12% on right side and 4% on left side [7]. A study on pattern of ramification of the subclavian artery in 56 cadavers (112 sides) reported that subclavian artery lying in front of the scalenus anterior muscle (3.5%) and also stated that the ITA originated from the TCT in 11.8% of cases [8]. Lischka et al [9] mentioned in their study that the left ITA originated from the TCT in 10% of his cases, while the right ITA had the similar origin only in 2%. Aneurysm of the subclavian artery leads to Dysphagia Lusoria [10]. For the surgical correction of aneurysm the branching pattern of the

subclavian artery is very much essential. The variations at this site may complicate the surgical grafting procedure. The common origin of the left ITA and TCT branches could be undetected intraoperatively. Hence angiography could appear useful in such cases [2]. The awareness and knowledge of variations are essential for thoracic and cardiovascular surgeons potentially causing surgical complications such as ITA's anatomical variations.

CONCLUSION

The variations of right scalenus anterior muscle arising by two heads, one head from C3 and C4 and another head from C5 and C6 has not been reported in the literature so far. Similarly Common trunk for ITA and TCT from right subclavian artery passing between the two heads of scalenus anterior muscle also was not reported so far in the literature. Hence we are reporting those anomalies for the first of its kind for the benefit of other researchers. These two new anomalies observed in our study reported for the first time will enlighten the risk of complications expected to the Surgeons operating in this body region and also is of great surgical importance to Cardiothoracic Surgeons, Cardiovascular Surgeons and Interventional Therapy Radiologists.

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Conflicts of Interests: None

REFERENCES

- [1]. Susan Standing. Gray's Anatomy. The Anatomical Basis of Clinical Practice. Churchill Livingstone. 2008; 40: 447-451.

- [2]. Rajanigandha V, Anu V Ranade, Mangala M Pai, Rajalakshmi Rai, Latha V Prabhu, Soubhagya R Nayak. The Scalenus Accessorius Muscle. *Int. J. Morphol.* 2008; 26(2):385-388.
- [3]. George Paraskevas, Konstantinos Natsis, Maria Tzika, Orestis Ioannidis, Panagiotis Kitsoulis. Abnormal origin of internal thoracic artery from the thyrocervical trunk: Surgical considerations. *Journal of Cardiothoracic Surgery.* 2012; 7: 1-5.
- [4]. Peric M, Sagic D, Miric M, Bojic M. Angiographic characteristics of the internal thoracic artery - Anatomical variations and their surgical importance. *Med Pregl.* 2000;53(5-6):245-9.
- [5]. Murray AC, Rozen WM, Alonso-Burgos A, Ashton MW, Garcia-Tutor E, Whitaker IS. The anatomy and variations of the internal thoracic (internal mammary) artery and implications in autologous breast reconstruction: clinical anatomical study and literature review. *Surg Radiol Anat.* 2012; 34(2): 159-65.
- [6]. Babu BP. Rare origin of the right internal thoracic artery from thyrocervical trunk. *International Journal of Anatomical sciences.* 2010; 1: 39-41.
- [7]. Nidhi Puri, Prem Kumar Gupta, Tek Singh Mahant, Deepak Puri. Bilateral internal thoracic artery harvesting; Anatomical variations to be considered. *IJTCVS.* 2007; 23: 192–196.
- [8]. Uemura M, Takemura A, Ehara D, Yasumitsu H, Ohnishi Y, Suwa F: Comparative study of the ramification patterns of the subclavian branches as the subclavian artery passes in front or behind the scalenus anterior muscle. *Anat Sci In.* 2010; 85(3):160–166.
- [9]. Lischka MF, Krammer EB, Rath T, Riedl M, Ellböck E. The human thyrocervical trunk: Configuration and variability reinvestigated. *Anat Embryol (Berl).* 1982; 163(4): 389–401.
- [10]. Ntlhe LM, Koto N, Mokotedi SD, Nxumalo J. Dysphagia lusoria – Report of 2 cases and a review of the literature. *SAJS.* 2006; 44(4): 140-142.

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