International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Website: https://ijmpr.in/

Research Article

Variation in Thyroid Gland Vasculature

[1]Ms.Bhairvi Jangid, [2]Dr.Charushila Shinde

Department of Anatomy and M.G.M. Institute of Medical Sciences, Kamothe, Navi Mumbai- 410209

OPEN ACCESS

Corresponding Author:

Ms. Bhairvi Jangid
Department of Anatomy and M.G.M. Institute of Medical Sciences, Kamothe, Navi Mumbai- 410209.

Received: 29-01-2026
Accepted: 01-03-2026
Published: 10-03-2026

ABSTRACT

Successful thyroid surgery relies on detailed anatomical knowledge and awareness of individual variations. This study investigates the variations in the superior thyroid artery (STA) and inferior thyroid artery (ITA) using dissections of 30 cadavers at MGM Medical College, Navi Mumbai. Measurements of artery lengths and their origins were taken, revealing that the left STA is generally longer than the right, with no significant length difference between the ITAs. These findings underscore the importance of recognizing anatomical variations to mitigate surgical risks, particularly nerve damage during thyroidectomy. This research emphasizes the need for precise surgical planning to improve patient outcomes.

Keywords*: Thyroid surgery, Vascular anatomy, Superior thyroid artery (STA), Inferior thyroid artery (ITA), Anatomical variations, Thyroid gland vasculature, Recurrent laryngeal nerve, Superior laryngeal nerve, Surgical complications, Cadaveric dissection, Thyroidectomy risks, Pre-tracheal fascia, Thyroid ima artery, Thyrocervical trunk, Blood vessel architecture.*

INTRODUCTION

Excellent knowledge of normal anatomy is necessary for successful surgical outcomes. Aside from that, the surgeon must be aware of possible differences in anatomical structure across individuals. Risks must always be evaluated and minimized in relation to procedures because they carry the potential for fatal complications such air leaks, hemorrhage, edema, and coma. Accurate knowledge of vascular patterns and blood vessel architecture is particularly crucial given the risk of uncontrolled bleeding during surgery.[2]

The thyroid gland is highly vascularized and is supplied by the superior and inferior thyroid arteries, as well as the thyroid ema artery on occasion.

The superior thyroid arteries pass through the pretracheal layer of the deep cervical fascia, descend to the superior poles of the gland, and divide into anterior and posterior branches, supplying mostly the anterosuperior portion of the gland.[8]
The inferior thyroid arteries, the largest branches of the thyrocervical trunks arising from the subclavian arteries, run superomedially posterior to the carotid sheaths to reach the posterior aspect of the thyroid gland and supply the posteroinferior aspect, including the inferior poles of the gland. A tiny, unpaired thyroid ima artery (L. arteria thyroidea ima) emerges from the brachiocephalic trunk in around 10% of adults. Among all the structures, the recurrent laryngeal nerve, a branch of the vagus nerve, and the thyroid gland have a close relationship.[1]

.

MATERIALS AND METHODS

After receiving approval from ethical committee of MGM Institute of Medical Sciences. The study was conducted in MGM Medical college, Kamothe, Navi Mumbai, Maharashtra, India.

The sample 30 cadavers were collected. And the study was proceeded with the help of dissection over all the respective cadavers.

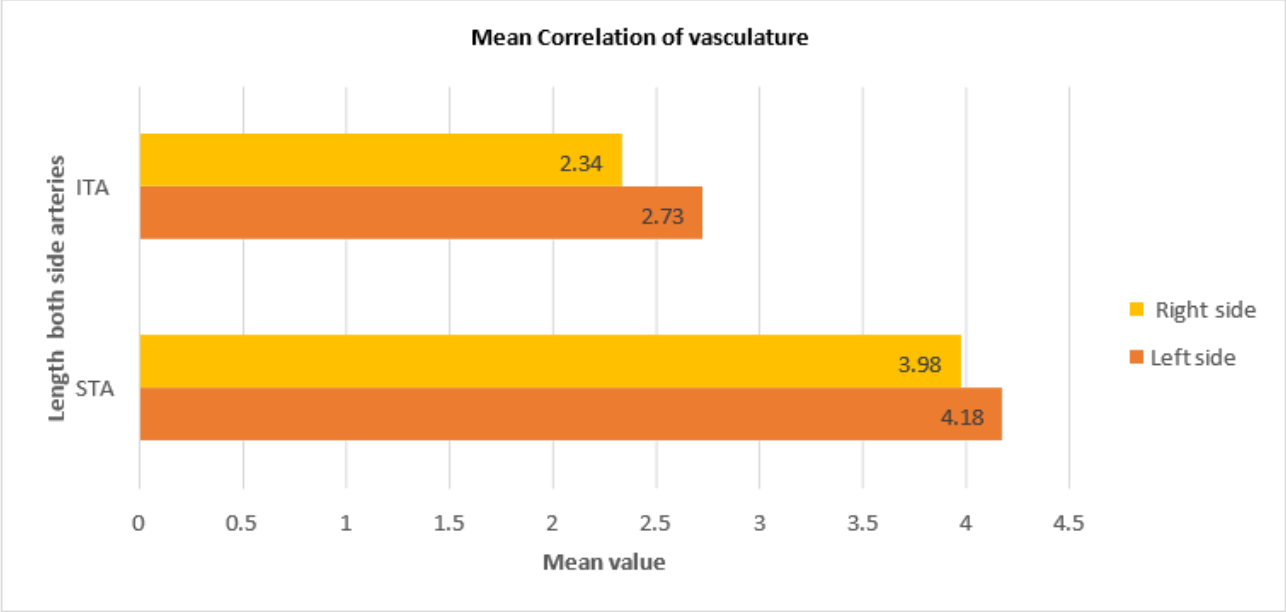
The following observations were recorded to give final conclusion-

- ✓ Length of Superior Thyroid Artery (STA) and Inferior Thyroid Artery (ITA) from its origin and distance from the respective thyroid lobe is be measured.
- ✓ Variation in origin of STA& ITA was noted
- ✓ Relation of superior laryngeal nerve & recurrent laryngeal with STA & ITA were noted.

RESULTS

- Normal mean: -

- Minimum length of right STA was found to be 2 cm while maximum was (5.5) cm.
- Minimum length of left STA was found to be 2.7 cm while the maximum length was (6.1) cm
- Minimum length of right ITA was found to be 1.3 cm while maximum length was (4.2) cm.
- Minimum length of left ITA was found to be 1.2 cm while maximum was (5.5) cm.
- The study revealed variations in the length and origin of the STA and ITA. The minimum and maximum lengths of both arteries were documented. Notably, the mean length of the left STA was slightly longer than that of the right STA. However, the difference in length between the left and right ITA was insignificant.



Mean value for vasculature:

Dimension	Mean	t-value	p-value
Left SupThyroidArtery	4.180	0.915	0.368
Right SupThyroidArtery	3.983		
Left InfThyroidArtery	2.737	1.624	.115
Right InfThyroidArtery	2.343		

Correlations

		Weig ht (gms)	Left_Length _cm	Left_Wi dth	Left_Thick ness	Right_Lengt h_cm	Right_Wi dth	Right_Thick ness
Weig	Pearson							
ht	Correlat	1	0.555**	0.324	0.374*	0.501**	0.491**	0.364*
(gms	ion							
)	Sig. (2-		0.001	0.081	0.042	0.005	0.006	0.048
	tailed)							
	N	30	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

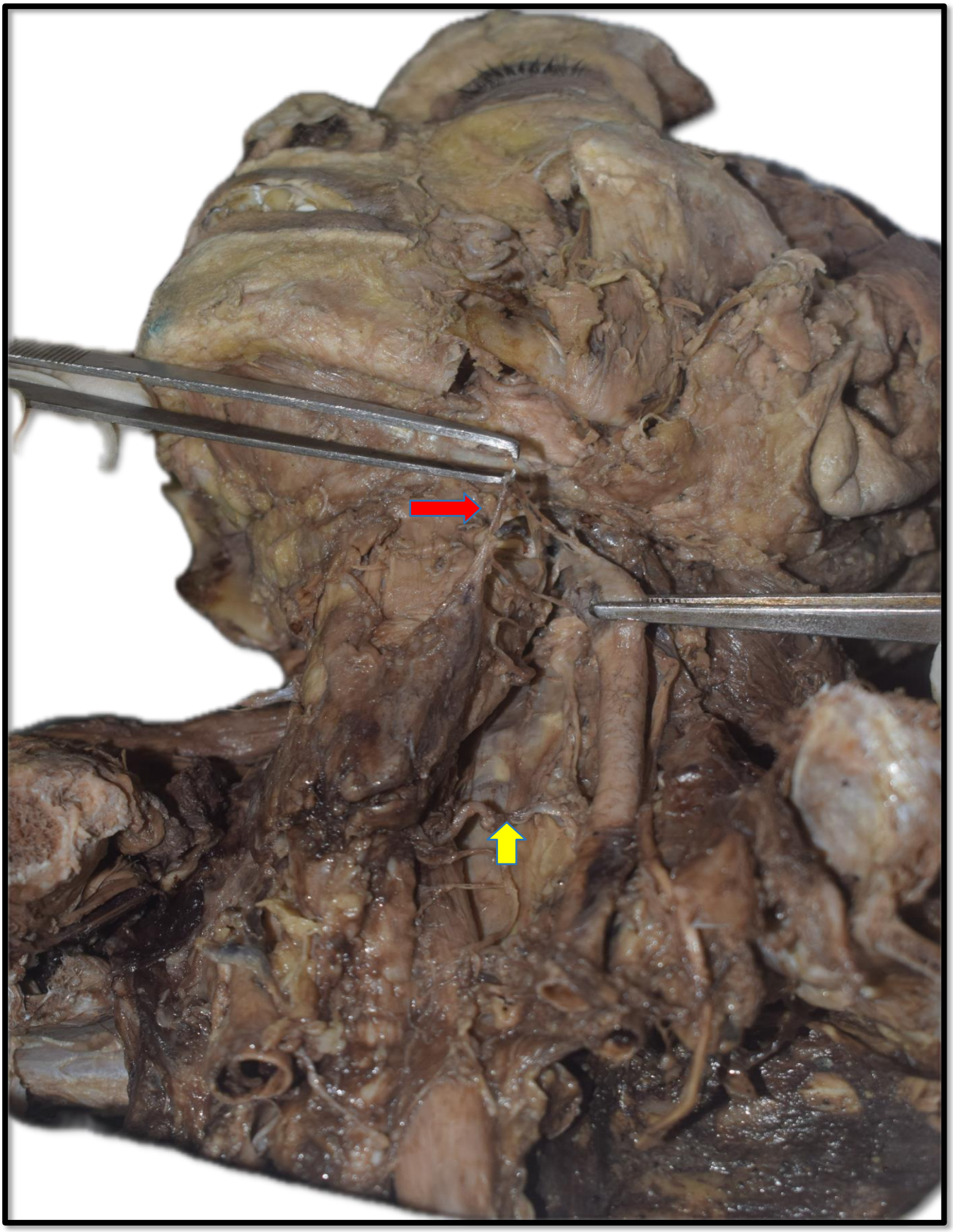


Figure Legends: Fig 1: - Red arrow showing Superior Thyroid Artery &Yellow arrow showing Inferior Thyroid Artery

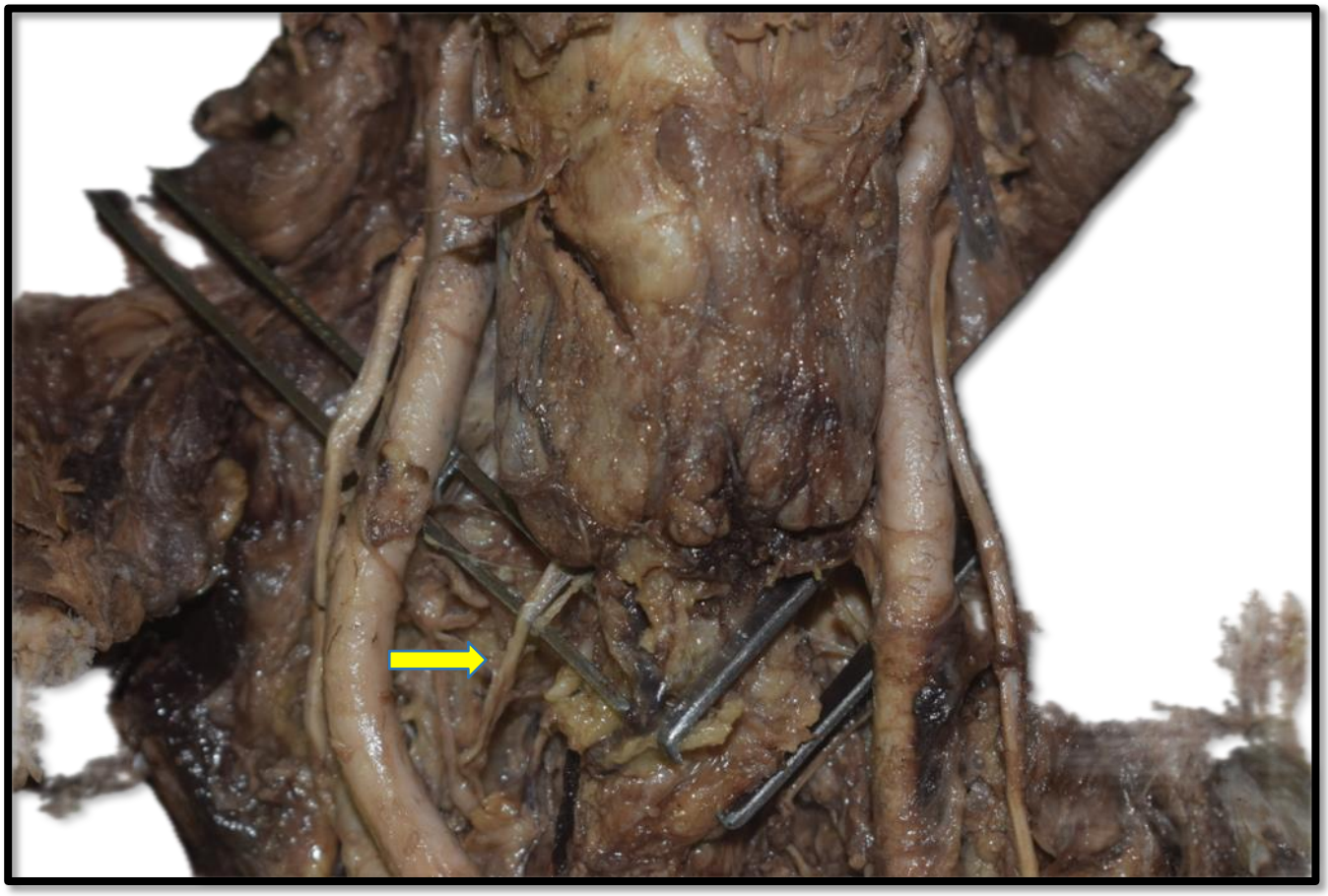


Fig 2: - Yellow arrow showing Inferior Thyroid Artery

DISCUSSION

Thyroid surgery demands meticulous attention to the anatomical structures within the neck region. Failure to identify these structures correctly can lead to severe complications, including nerve palsies and airway obstruction. The findings of this study align with existing literature, emphasizing the importance of understanding anatomical variations to mitigate surgical risks. Notably, the risk to the superior laryngeal nerve during thyroidectomy is highlighted, particularly when dealing with variations in the STA's course.

According to Vidya Shankar et al., the superior thyroidartery measures 4.38 cm on average, with the right thyroidartery measuring 4.48 cm and the left thyroidartery measuring 4.28 cm, which is longer.[6]

In our study, the left superior thyroid artery's mean length (4.18) is somewhat longer than the right's mean length (3.98); this difference is significant with a t value of (0.91) and a p-value of (0.36). It was shown that the right STA's maximal length was longer than usual at 6.0 cm.The internal branch of the superior laryngeal nerve is only at risk if the STA is cut during the thyroidectomy. The EBSLN may be put at danger while ligating the STA trunk out of the pretrachial fascia, which happens during the majority of the STA's course.

In SR et al study, the length of Inferior Thyroid artery was measured from origin of artery to its entry into the gland. The mean length on the right side was 5.38cm and on the left side was 5.76cm.[7]

In our study, The mean (2.73) length of left inferior thyroid artery and mean (2.34) length of right inferior thyroid artery show difference of (0.39) which is insignificant.

CONCLUSION

An understanding of anatomical variations in thyroid gland vasculature is crucial for surgical planning and execution. This study contributes valuable insights into the variations observed in the length and origin of the superior and inferior thyroid arteries. Such knowledge is essential for surgeons to minimize complications and optimize patient outcomes in thyroid surgeries. Further research in this area is warranted to enhance surgical techniques and patient safety.

REFERENCE

1. Standring *et al,* Gray's Anatomy: The Anatomical Basis of Clinical Practice. Edinburgh: Churchill

Livingstone/Elsevier, 2008.
2. A. Mohebati *et al,* Anatomy of Thyroid and Parathyroid Glands and Neurovascular Relations, clinical journal 201, vol-25(19-31).
3. Rohini Motwani *et al,* Variant Branching Pattern of Superior Thyroid Artery and Its clinical Relevance: A case study, Journal of Clinical and Diagnostic Research 2015 Jun, vol-9(6).
4. Kaan Esen *et al*, Variations in the origins of the thyroid arteries on CT angiography, Japan Radiological Society 2017, vol- 36(96-108).
5. Anagnostopoulou S, Mavridis I. Emerging patterns of the human superior thyroid artery and review of its clinical anatomy. Surgical and Radiologic Anatomy. 2013;36(1):33–8.
6. Shankar VV, N K, Shetty S. A cross-sectional study of superior thyroid artery in human cadavers. International Journal of Anatomy and Research. 2017;5(4.3):4751–5.
7. S R, Pandey N, Bhivate V, Kharate RP. Morphometric study of inferior thyroid artery in cadavers. International Journal of Anatomy and Research. 2015;3(4):1726–31
8. Bhargav PR. Salient anatomical landmarks of thyroid and their practical significance in thyroid surgery: A Pictorial Review of Thyroid Surgical Anatomy (revisited). Indian Journal of Surgery. 2013;76(3):207–11.
9. Won S-Y. Anatomical considerations of the superior thyroid artery: Its origins, variations, and position relative to the hyoid bone and thyroid cartilage. Anatomy & Cell Biology. 2016;49(2):138.
10. Gupta P, Bhalla AS, Thulkar S, Kumar A, Mohanti BK, Thakar A, et al. Variations in superior thyroid artery: A Selective Angiographic Study. Indian Journal of Radiology and Imaging. 2014;24(01):66–71.
11. Natsis K, Raikos A, Foundos I, Noussios G, Lazaridis N, Njau SN. Superior thyroid artery origin in Caucasian greeks: A new classification proposal and review of the literature. Clinical Anatomy. 2011;24(6):699–705.
12. Ozgur Z, Govsa F, Celik S, Ozgur T. Clinically relevant variations of the superior thyroid artery: An anatomic guide for Surgical Neck Dissection. Surgical and Radiologic Anatomy. 2008;31(3):151– 9