Journal of Morphological Sciences
J Morphol Sci
Brazilian Society of Anatomy

Case Report
J Morphol Sci 2021;38:428-430

A Rare Variant of Thyroid Gland with Levator Glandulae Thyroidae and Absence of Isthmus – a Case Report in a Cadaver

Vidya C S[1] Hemamalini,[2] Manjunath HN[3]

[1]Professor of Anatomy, Department of Anatomy, JSS Medical College JSS AHER Mysore
[2]Associate Professor, Department of Anatomy, JSS Medical College JSS AHER Mysore
[3]Tutor, Department of Anatomy, JSS Medical College JSS AHER Mysore

Disclose and conflicts of interest: none to be declared by all authors

ABSTRACT

Introduction: thyroid gland being a highly vascular endocrine gland is situated in midline of neck in front of 3rd to 5th tracheal rings. The development of thyroid gland often shows variations such as thyroid hypoplasia, absent isthmus, presence of pyramidal lobe and also ectopic thyroid tissue.

Case report: In our case report we encountered a rare variant of thyroid gland, with absence of isthmus, pyramidal lobe from left lobe and levator glandulae thyroidae in a male cadaver aged around 65 years. The levator glandulae thyroidae was 5cms long and the distance between right and left lobe was 1.7cms.

Conclusion: The anatomical variations of thyroid gland will help surgeons to alter the surgical procedure during thyroidectomy and other head and neck surgeries for effective outcome and to reduce iatrogenic complications.

Key words: Thyroid gland, variation, Levator glandulae thyroidae

Introduction

Thyroid gland consists of two lateral lobes which are connected by a median Isthmus. The isthmus connects lower parts of the two lateral lobes, although occasionally it may be absent.[1]Sometimes presents an additional pyramidal lobe more often on the left side which may be free or connected to the hyoid by a fibromusculoglandular band called levator glandulae thyroideae. The development of thyroid gland often shows variations such as thyroid hypoplasia, or dyshormonogenesis, thyroid ectopia, athyreosis (absence of thyroid gland).[2]

Incidence of agenesis of isthmus has been reported to range from 5-10%.[3] and it is very rare anomaly in the development of thyroid gland.[4,5]

It may be associated with agenesis of lateral lobe, thyroid ectopia, parathyroid hyperplasia.[6] and hypothyroidism or hyperthyroidism.[7] Agenesis of isthmus can be due to high separation of thyroglossal duct which give rise to two independent thyroid lobes and a pyramidal lobe.[5 8]

On an average, in 50% of population, additional thyroid tissue may form the pyramidal lobe on or near the superior surface of the thyroid gland.[9] Levator glandulae thyroideae is a fibromuscular band, it is usually seen on the left side, to connect the pyramidal lobe of thyroid gland and the hyoid bone.[2]

Eisler and Der did an extensive study on the levator glandulae thyroideae and its innervation. They stated that muscle fibers of LGT may be derived from cricothryoid, infrahyoid and inferior constrictor muscles of pharynx based on that innervation is either by ansa cervicalis or through vagus nerve.[10]

The knowledge about the development anomalies of thyroid gland would greatly help the surgeons for safer surgical procedure and to prevent iatrogenic complications.

Case report

During routine dissection for I MBBS students in Department of Anatomy, JSS Medical College we encountered a rare variant of thyroid gland, with absence of isthmus, pyramidal lobe from left lobe and levator glandulae thyroidae in a male cadaver aged around 65 years. (Figure 1). The levator glandulae thyroidae was 5cms long and the distance between right and left lobe was 1.7cms as shown in Figure 1. Levator glandulae thyroidae extended upto lower border of hyoid bone. According to Mori's classification it is Hyo-pyramidalis type.[11] Length and breadth of right thyroid lobe was 3.2 cms and 2.8 cms respectively. Length and breadth of left thyroid lobe was 3.1 cms and 2.8 cms respectively. There was no ectopic thyroid tissue found in this case. There was no innervation for levator glandulae thyroidae band

The tissue of levator glandulae thyroidae was subjected to histology processing and stained with H&E and observed under Olympus microscope with 10x objective. The section showed only collagen fibres and connective tissue as shown in Figure 2. The microscopic section of thyroid gland of both the lobes showed active follicles as shown in Figure 3.

DOI: 10.51929/jms.38.74.2021
ISSN 2177-0298

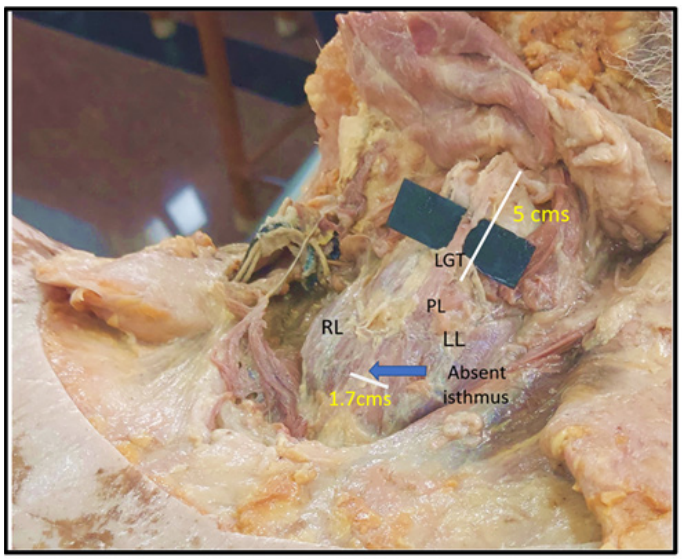

Figure 1. Showing morphological variation of thyroid gland , RL -right lobe , LL-left lobe , PL – Pyramidal lobe, LGT- Levator glandulae thyroidae

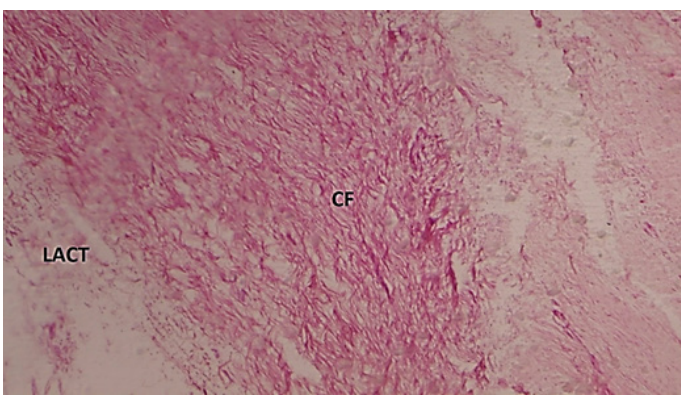

Figure 2. Shows levator glandule thyroidae, LACT (loose- areolar connective tissue), CF (Collagen fiber).

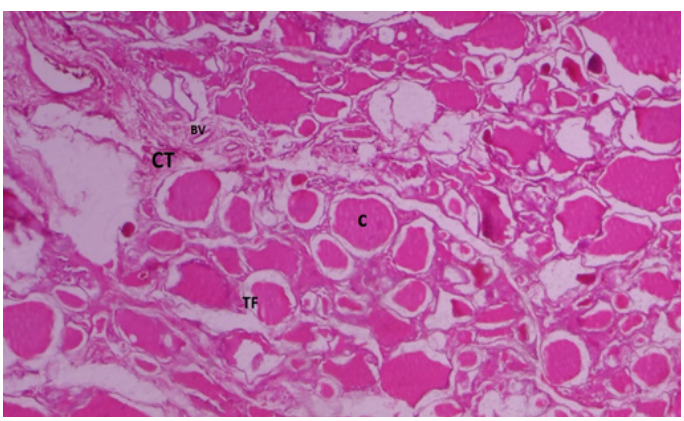

Figure 3. Shows Thyroid gland, BV (blood vessel), CT (Connective tissue), C (Colloid), TF (Thyroid Follicle)

Discussion

The frequency of presence of pyramidal lobe varies from 29-55%.[12] During partial or total thyroidectomy a residual thyroid tissue in the pyramidal lobe can be responsible for recurrence or complications of the disease, as in cancer or Graves' disease.[13] Clinically, the diagnosis of absence of isthmus can be identified with scintigraphy, ultrasound, CT, MRI or during thyroidectomy. In clinical practice, when such a condition is diagnosed, it is important to check for other pathologies like localized nodular lesion independent of TSH control, papillary carcinoma, metastasis and thyroid ectopia.[7]

Anjan and others studied morphological variations of thyroid gland in 80 cadavers (49 male and 31 female cadavers). Presence of pyramidal lobe, levator glandulae thyroideae and absence of isthmus were the only morphological variations observed in the gland. 48 out of the total glands dissected had morphological variations the others had normal anatomy. Morphological variations were more common in males but the difference was not statistically significant.[14]

Ranade AV and others investigated the gross anatomical features of the thyroid gland in 105 (88 male and 17 female) cadavers from Southern India. They observed that pyramidal lobe was present in 61 male cadavers, and 52 cadavers showed the presence of the levator glandulae thyroideae. 33 percent of the specimens showed agenesis of the isthmus.[9] Hence the study done by Anjan and Ranade correlated with our findings.

In another study in Bangladesh population by dissection method authors revealed that, the pyramidal lobe was found in 25 cases out of 60 (41.67%). The levator glandulae thyroideae was found in 12 cases out of 60 (20%). In all cases, the levator glandulae thyroideae extended from the apex of the pyramidal lobe to the body of the hyoid bone, The histological sections of pyramidal lobe was taken and length, breadth and thickness in males was 10.80±0.84, 5.40±1.3, 3.00±0 respectively.[15]

Prakash and others studied 70 cadavers and reported pyramidal lobe was present 66% and more prevalent on left side. Levator glandulae thyroidae was present in 62% and isthmus was absent in 15%. Hence our case correlates with this study.[16]

The morphology and morphometric study by Joshi and others reported, the average length of the right lobe was 4.32 cm, and the left lobe was 4.22 cm. Pyramidal lobe was present in 34 cases, while the levator glandulae thyroideae was present in 27cases, The isthmus was absent in 15 cases; its relation with the tracheal rings greatly varied from the cricoid cartilage to the fourth tracheal ring.[17]

Conclusion

Thorough knowledge of variations in the lobes of the thyroid gland and the presence of pyramidal lobe, and the presence of levator glandulae thyroidae would be helpful for surgeons in performing tracheostomies, thyroid surgeries and other head and neck surgeries.

References

1. Standring S. In: Gray's Anatomy. 41st Edition. London: Elsevier Churchill Livingstone; 2015. p. 561. 470-471.
2. Priti Chaudhary, Zora Singh, Meenakshi Khullar, and Kamal Arora. Levator Glandulae Thyroideae, a Fibromusculoglandular Band with Absence of Pyramidal Lobe and Its Innervation: A Case Report. J Clin Diagn Res. 2013 Jul; 7(7): 1421–1424.
3. Pastor VJF, Gil VJA, De Paz Fernandez FJ, Cachorro MB. Agenesis of the thyroid isthmus. Eur J Anat. 2006; 10:83-84.
4. Kesici U, Kesici S. Agenesis of the isthmus of the thyroid gland. Turk J Surg. 2018.34(1):60-61.
5. Daksha Dixit, Shilpa MB, Harsh MP, Ravishankar MV. Agenesis of isthmus of thyroid
gland in adult human cadavers: a case series. Cases J. 2009 Apr 20;2:6640.
6. Duh QY, Ciulla TA, Clark OH. Primary parathyroid hyperplasia associated with thyroid hemiagenesis and agenesis of the isthmus. Surgery. 1994; 115:257–263.
7. Vayisoglu Y, Ozcan C, Gen R, Eti CM, Sut H, Gorur K. Thyroid isthmus agenesis Associated with thyroid papillary carcinoma. J Craniofac Surg. 2013;24:428-429.
8. Sgalitzer KE. Contribution to the study of the morphogenesis of the thyroid gland. J Anat 1941;75:389-405.
9. Ranade AV *et al*. Anatomical variations of the thyroid gland: possible surgical implications. Singapore Med J. 2008;49:831–34.
10. Eisler P, Der M. Levator glandulae thyreoidea und verwandte praelaryngeale Muskelbildungen. Aant Anz. 1922;17: 183–96.
11.Mori M. Statistics on the musculature of the Japanese. Okajimas Folia Japan. 1964;40:195–300
12.Braun EM, Windisch G, Wolf G, Hausleitner L, Anderhuber F. The pyramidal lobe: clinical anatomy and its importance in thyroid surgery. Surg Radiol Anat. 2007 Feb; 29(1): 21-7
13. Wahl R, Mah U, Kallee E. Hyperthyroidism with or without pyramidal lobe Graves' disease or disseminated autonomously functioning thyroid tissue? Clin Nucl Med 1997; 22: 451- 8
14. Anjan Jyoti Rajkonwar1, Giriraj Kusre. Morphological Variations of the Thyroid Gland among the People of Upper Assam Region of Northeast India: A Cadaveric Study. Journal of Clinical and Diagnostic Research. 2016 Dec, Vol-10(12): 1-03.
15. Nurunnabi ASM, Alim A, Mahbub S, Segupta K, Begum M, Khatun M, *et al*. Morphological and histological study of the pyramidal lobe of the thyroid gland in Bangladeshi people-a postmortem study. Bangladesh Journal of Anatomy. 2009; 7(2):94-100
16.Prakash, Thimmiah Rajini, Archana R, Geethanjali BS, Sivacharan PV, Varsha Mokhasi. Variations in the anatomy of the thyroid gland: clinical implications of a cadaver study. Anat Sci Int. 2012 Mar;87(1):45-9.
17. Joshi SD, Joshi SS, Daimi SR, Athavale SA. The thyroid gland and its variations: a cadaveric study. Folia Morphol. Vol. 69, (1). 47–50.

Received: November 13, 2021
Accepted: November 16, 2021

Corresponding author
Vidya C S
E-mail: vidyacs@jssuni.edu.in