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### Case report

## Right Sided Pyramidal Lobe of Thyroid Gland- A Case Report

M J Phukon<sup>\*\*</sup>, R Dutta, G N Reddy, P Bhargabhi, N A Syed

Associate Professor, Department of Anatomy Prathima Institute of Medical Sciences Nagunur, Karimnagar, Andhra Pradesh, India.

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#### ABSTRACT

During routine dissection of a female cadaver in the year 2011, the thyroid gland was observed to be consisting of a pyramidal lobe arising from its right side. A levator glandulae thyroidea extended from the apex of the pyramidal lobe to the hyoid bone. In this case, the isthmus is not present at the normal level i.e. 2<sup>nd</sup> to 4<sup>th</sup> tracheal rings, but an 'S' shaped glandular tissue extends from the right lobe at the level of lower border of thyroid cartilage to the left lobe, at the level of upper border of 2<sup>nd</sup> tracheal ring. The pyramidal lobe plays an important role in thyroid and parathyroid surgery. It may be a cause of recurrent hyperthyroidism in incomplete thyroidectomy, or even a site of cancer metastasis. (Synonyms- Lobus pyramidalis glandulae thyroidea, Lallouette pyramid, Morgagni appendix, pyramid of thyroid.)

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### 1. Introduction

The thyroid is a bilobed endocrine gland found in the neck. It develops from the thyroglossal duct. The lobes are connected by an isthmus. The pyramidal lobe (PL) is a normal constituent of the thyroid gland. Though of varying positions and shapes, it usually arises from the left side of the isthmus. The apex of the pyramidal lobe is attached to the hyoid bone through a fibro muscular band called the levator glandulae thyroidea [1].

### 2. Case

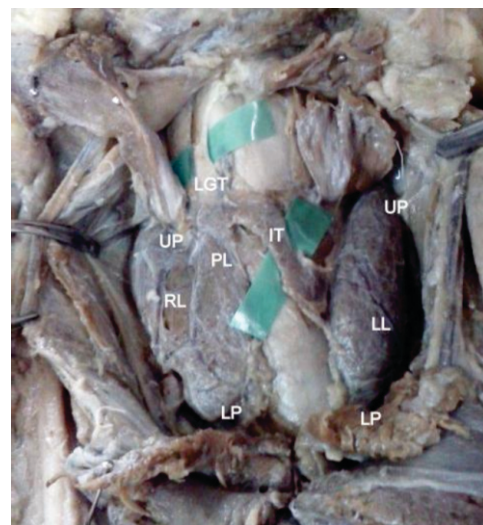
During routine dissection of a female cadaver (year 2011) of an average built presented thyroid gland with a pyramidal lobe on the right side. A levator glandulae thyroidea (LGT) was observed extending from the apex of the pyramidal lobe to the hyoid bone.

### 3. Observation

On dissection, the right lobe of the thyroid gland is found to be bigger than the left one. The isthmus is not present in the normal site i.e. 2<sup>nd</sup> to 4<sup>th</sup> tracheal rings but a 'S- shaped' long glandular tissue is found to be connecting the two lobes. It extends from the

lower border of thyroid cartilage on the right side (right lobe) to the upper border of second tracheal ring on the left side. The pyramidal lobe is seen rising from the medial border of right lobe, 5mm away from the superior pole. A levator glandulae thyroidea connects the apex of the pyramidal lobe to the hyoid bone. Fig1

**Fig1. Right sided pyramidal lobe of thyroid.**



UP=upper pole; RL= Right Lobe LP= Lower Pole PL= Pyramidal lobe  
LGT= Levator glandulae thyroidea IT=Isthmus LL= Left lobe

\* Corresponding Author : Dr Manash Jyoti Phukon  
Associate Professor, Department Of Anatomy  
Prathima Institute Of Medical Sciences, Nagunur Road,  
Karimnagar, A.P. India.  
Mob No :9949908444  
E mail- manash06@yahoo.co.in

## Measurements-

## A) Lobes

Left lobe	Right lobe-
1) Lateral border -5cm	5cm
2) Medial border -6cm	4.5cm
3) Breadth -3cm	2.5cm
4) Thickness -1.3cm	1.1cm

## B) Isthmus -

Length - 2.6cm  
Beadth - 5cm max,  
- 3cm min

C) Pyramidal lobe - length 2.6 cm.  
Thickness – 0.25cm

## On further dissection-

- 1) Superior thyroid and inferior thyroid vessels are found bilaterally near the superior pole and inferior pole respectively on both the sides.
- 2) On the right side , superior thyroid vessels crosses anterior to the sternothyroid muscles ( close to the thyroid cartilage ) to supply the pyramidal lobe , LGT and then branches downward to the rest of the right lobe.
- 3) The isthmus is drained by anterior jugular vein.

## 4. Discussion

The pyramidal lobe is often present and regarded as normal. It may originate from the isthmus or one of the lobe of thyroid, or often from the left. Sometimes, it may present with no connection with the thyroid, or may be divided into two or more parts. It may vary from short stump to a process reaching the hyoid bone i.e levator glandulae thyroideae [2].

Normal measurements given in Gray's anatomy [1] is -  
Each lobe 5cm long  
Greatest transverse diameter 3cm  
Greatest anterior posterior diameter- 2cm  
Isthmus measures 1.25cm transversely and vertically

Levator Glandulae Thyroideae is not a remnant of thyroglossal duct. It contains striated muscle fibers supplied by the external laryngeal nerve [3]. Levator Glandulae Thyroideae is common on the left side [4]

Kadasne in 2011, has classified anomalies of thyroid gland into four groups [5]. The first group is of pyramidal lobe which is subdivided into - a) detached from the gland, b) too small, c) too large - reaching the hyoid bone. d) it can be on the right side of isthmus. Our case presents the pyramidal lobe is attached to the right lobe on the right side of isthmus.

## Incidence:

During 1954, in Surgery and Anatomical text books, Christopher and Hollinshed, mentioned the incidence of pyramidal lobe to be 43% to 80% [6,7].

Dische & Berg did a study using radio isotope scan in which 22 out of 66 patients with thyroid disease, and 8 out of 27 normal control showed pyramidal lobe with Levator Glandulae Thyroideae [8].

Izenstark J L et al studied pyramidal lobe in thyroid imaging in 130 patients. In this study, 107 females between age group of 9 to 76 years, showed 38 pyramidal lobes; while 23 males of 12- 60years age group, presented with 8 such lobes. Hence, 46 pyramidal lobes (35%) were recorded ( 7 doubtful) between the age group of 14 to 67 [9].

Braun et al studied 60 cadavers to note the clinical anatomy of the pyramidal lobe and its importance in thyroid surgery. Here, 32 out of 58 (55%) showed pyramidal lobes (Male > female) with median length 40mm: 29mm. Accessory thyroid gland was present in one of the specimens. The occurrence of pyramidal lobe from isthmus were as follows : Left side in 16, right side in 7 and midline 9 cases. In two cases, it originated from the left lobe. Additional 23 scintigraphic images were studied but only three showed enlargement of isthmus. So, he opined that scintigraphic imaging is better used for functional than morphological studies [10].

In 2008, Sultana et al studied 60 postmortem thyroid tissue blocks, 48 males and 12 females cadavers of different age group . The incidence of Pyramidal lobe was observed to be 52.1% in male and 41.7% in female . Left sided preponderance was more. The bases of pyramidal lobe in 56.66% cases were attached to the upper border of isthmus with or without encroachment of the adjacent part of left lobe. Length varied from 1.8 to 35 mm and breadth 1.3 to 19 mm. LGT was present in 73.33%. Single pyramidal lobe was found in 26.66% [11].

Two different studies done in Bangladeshi people in the year 2009 showed the following findings:

A S M Nuruinnabi et al found incidence to be 41.67 % (25/60), left sided was 56%, LGT in 20%(12/60). Another study by M Begum et al observed 16 pyramidal lobes in 60 cadavers. Left side was more than right side. LGT was found in 9 out of 60 cases [12,13].

R Zivic et al analysed 100 consecutive primary thyroid operations with additional pathological examination of specimens [14]. They found pyramidal lobe in 61% (lobe of Lovette) with female predominance ( 61.96% : 50%); Midline 49.18% maximum, Length varies from 8-40%; Median length- 20.13mm. During the study, they found various literature mentioning prevalence of PL in cadavers, that are listed below-

- i) Marshall (1895) - 43%
- ii) Sobotta (1915) - 45%
- iii) Gardnr (1966) - 40%
- iv) Kitagawa (1993) - 48.6%
- v) Harjeet (2004) - 28.9%

Hence, most of the literature showed the incidence of the pyramidal lobe to be more on the left side, and with male predominance. But the present case is a female cadaver and is showing the pyramidal lobe on the right side. The isthmus is also present as a variant in this case .

Importance of pyramidal lobe in thyroid surgery [10, 14, 15]:

a) During total thyroidectomy for Graves's disease it is crucial to look for, identify and remove pyramidal lobe as this can be a cause of recurrent hyperthyroidism following an incomplete resection of the gland.

b) The site of origin of thyroid cancer /contain intraglandular metastasis / multifocal disease especially in cases of papillary carcinoma.

c) It may harbour Delphain Lymph node which is a frequent site of metastasis from a cancer in the body of the thyroid gland.

d) To decrease the possibility of recurrence of benign disease.

e) To probably render about 90% of patients with differentiated thyroid carcinoma permanently free of disease, considering the high percentage of multifocality of these tumours.

f) to improve adjuvant radio iodine treatment in differentiated thyroid cancer.

g) preservation of pyramidal lobe is essential in C cell hyperplasia of thyroid gland as pyramidal lobe and isthmus does not contain C cells.

### Conclusion

Thyroid and parathyroid surgery has evolved since the time of Kocher, the father of modern surgery. Now, it represents one of the most common operations in head and neck. A thorough knowledge of the neck base anatomy, attention to surgical details and fluency in related endocrinology are important correlates of successful thyroid and parathyroid surgery. The pyramidal lobe is a normal component of the thyroid gland of varying positions and size, and with pathological changes in benign and malignant diseases. It should always be examined during thyroid surgery and, mandatorily removed in total and subtotal thyroidectomies.

### Acknowledgement

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### 5. References

- [1] Standring S . Development of the pectoral girdle and upper limb In : Gray's Anatomy. David Johnson( edr) . 40th Edn Churchill Livingstone Elsevier,Spain. 2008; pp 905- 6.
- [2] Singh I , Pal G P. The Pharyngeal Arches In : Human Embryology. 8th ed. Macmillan Publishers India Ltd. 2007 ; pp 113.
- [3] Dutta AK. Thyroid Gland In: Eessentials of Human Anatomy , Head and Neck PartII 3rd ed , Current Books International, Calcutta,2001; 172-175
- [4] Romanes G.J.The deep dissection of neck : Cunningham's Manual of Practical Anatomy , vol 3. Head and Neck and Brain.15th ed Oxford University Press 1986;65-67
- [5] Kadasne D K : Development of Thyroid Gland in: Kadasne's Text Book of Embryology.1st edn Jaypee Brothers Medical Publishers(P)Ltd, New Delhi. 2011; 138-140
- [6] Christopher , F: A Textbook of Surgery , 4th ed W.B. Sarendens Co ,Philadelphia,1954;274
- [7] Hollinshead W.H : Anatomy for Surgeons : Vol 1 Paul B Hoeber, Inc., Newyork, Philadelphia. 1954; 274
- [8] Dische S, Berg P.K. : An investigation of the thyroglossal tract using the radioisotope scan . Clin . radiol . 14 :298 , 1963. July 2009;7 ( 2):94 – 100.
- [9] J.L. Izenstark , A.L. Forsaith & N.H. Horwitz.The Pyramidal lobe in thyroid imaging : J of medicine , 1969; 10 :519 – 521.
- [10] Braun EM, Windisch G, Wolf G, Hauskitner L, Anderhuber F. The Pyramidal lobe: clinical anatomy and its importance in thyroid surgery. Surg Radiol Anat. 2007 Feb; 29(1) : 21-7.
- [11] 11)Sultana S, Mannan S,Ahmed M, RahmanM, Khan M, Khalil M. An anatomical study of pyramidal lobe of the thyroid gland in Bangladeshi people. Mymensing Med J. 2008 Jan ,17(1) :pp8-13.
- [12] ASM Nuruinnabi, A Alim, S Mehbub, S Kishwara, M Begum, M Khatun, S Ara. Morphological and Histological study of the Pyramidal lobe of the thyroid gland in Bangladeshi People. A postmortem study. Bangladesh J. of Anatomy. 2009; 7 :94-100.
- [13] Begum M, Khatun M, S Kishwara, Ahmed R, Naushaba J. A postmortem study of Pyramidal Lobe the Thyroid Gland in Bangladeshi people. Journal of Dhaka Medical College,2009;182):120-123.
- [14] Zivic R, Radovanovic R, Vekic B, Markovic I, Dzodic R, ZivljjevicV. Surgical anatomy of the pyramidal lobe and its significance in thyroid surgery. SAJS. August. 2011; 49: 110-114.
- [15] www.thyroidcancer.com/importance-of -the-pyramidal-lobe.html; 7June,2010.