

## A Descriptive Study of Morphological Variations of Thyroid Gland in Adult Human Cadavers in Siddhartha Medical College, Vijayawada

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### Abstract

**Introduction:** Developmentally, the first endocrine gland in the embryo is the thyroid gland.<sup>1</sup> It is highly vascular endocrine gland composed of two lateral lobes connected by a narrow median isthmus giving an 'H' shaped appearance to the gland. A wide range of multiple morphological variations and developmental anomalies of the thyroid gland have been reported in the literature.

**Materials and Methods:** This study was done on 50 specimens studied and collected from the cadavers which are allotted for the dissection of 1<sup>st</sup> MBBS & BDS students at Siddhartha Medical College, Vijayawada, Krishna district, Andhra Pradesh. Human thyroid glands collected from both sexes (Male 33, female 17) age ranging from 18 to 80 years. Fresh specimens containing thyroid gland were collected from March 2011 to July 2019 at the department of Anatomy, Siddhartha Medical College, Vijayawada. The collected specimens were fixed in 10% formal saline solution. A dissection was carried out to expose the Thyroid glands. The thyroid glands were examined for the following variations such as, Absence of isthmus, Presence of pyramidal lobe, Presence of levator glanduli thyroideae, Presence of accessory thyroid tissue.

**Results:** Our study included 33 male (66%) & 17 female (34%). The morphological variations observed in the present study out of 50 specimens are; Absence of isthmus was seen in 5 specimens (10%) of which, 3 were male & 2 were female (Figure 1). Presence of pyramidal lobe was seen in 23 specimens (46%) of which, 18 were male & 5 were female (Figure 2). Presence of levator glanduli thyroideae was seen in 20 specimens (40%) of which, 15 were male & 5 were female (Figure 2). Two male specimens (4 %) of specimens had accessory thyroid tissue (Figure 3).

**Conclusion:** Usually agenesis of isthmus is difficult to determine unless the patients present for other thyroid pathologies. Agenesis of isthmus can be diagnosed via scintigraphy, ultrasonography, computed tomography and magnetic resonance imaging. When the absence of isthmus is suspected, the individual may be directed for a differential pathological diagnosis such as autonomous thyroid nodule, thyroiditis, primary carcinoma, neoplastic metastasis & infiltrative diseases such as amyloidosis.

**Key Words:** human thyroid glands, amyloidosis, pyramidal lobe, levator glanduli thyroidea

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### I. Introduction

Developmentally, the first endocrine gland in the embryo is the thyroid gland.<sup>1</sup> It is highly vascular endocrine gland composed of two lateral lobes connected by a narrow median isthmus giving an 'H' shaped appearance to the gland. A wide range of multiple morphological variations and developmental anomalies of the thyroid gland have been reported in the literature.<sup>2</sup>

Thyroid gland surgery is one of the most common surgeries in head and neck region.<sup>3</sup> The thorough knowledge of anatomical variations of the thyroid gland is important as it is relevant in

Different types of thyroidectomy and tracheotomy. The risk of damage to parathyroid gland, recurrent laryngeal nerve and hematoma due to vascular damage can be minimized by the knowledge of anatomical variation of the thyroid gland.<sup>4</sup> The anomalies of the development of thyroid gland distort the morphology of the gland and cause chemical functional disorders and various thyroid illnesses. In our case studies, we found multiple morphological variations of the thyroid gland in cadavers as absent isthmus, presence of pyramidal lobe and accessory thyroid lobe, narrow isthmus with levator glandulae thyroideae.<sup>5</sup>

In the present case, we highlight on important anatomical variations of the thyroid gland that will help the surgeons in better planning of safe and effective surgeries without complications.

## II. Materials And Methods

This study was done on 50 specimens studied and collected from the cadavers which are allotted for the dissection of 1<sup>st</sup> MBBS & BDS students at Siddhartha Medical College, Vijayawada, Krishna district, Andhra Pradesh. Human thyroid glands collected from both sexes (Male 33, female 17) age ranging from 18 to 80 years. Fresh specimens containing thyroid gland were collected from March 2011 to July 2019 at the department of Anatomy, Siddhartha Medical College, Vijayawada.

The collected specimens were fixed in 10% formal saline solution. A dissection was carried out to expose the Thyroid glands. The thyroid glands were examined for the following variations such as,

1. Absence of isthmus
2. Presence of pyramidal lobe
3. Presence of levator glanduli thyroidae
4. Presence of accessory thyroid tissue

## III. Results

Our study included 33 male (66%) & 17 female (34%).

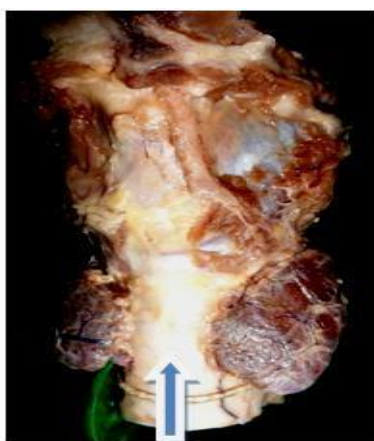
The morphological variations observed in the present study out of 50 specimens are;

- Absence of isthmus was seen in 5 specimens (10%) of which, 3 were male & 2 were female (Figure 1).
- Presence of pyramidal lobe was seen in 23 specimens (46%) of which, 18 were male & 5 were female (Figure 2).
- Presence of levator glanduli thyroidae was seen in 20 specimens (40%) of which, 15 were male & 5 were female (Figure 2).
- Two male specimens (4 %) of specimens had accessory thyroid tissue (Figure 3).

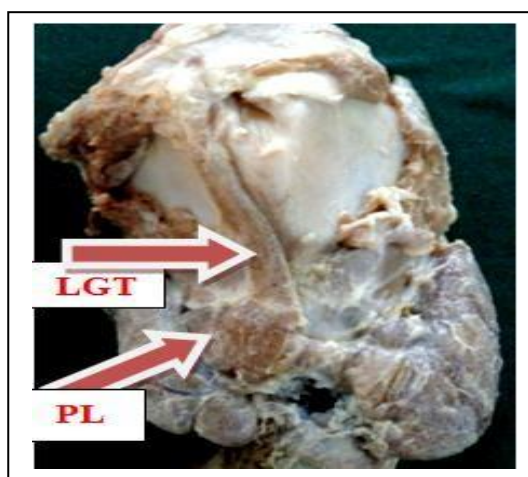
The incidence of thyroid gland variations are shown in Table 1.

| S.No | Type of variation                      | No of cadavers | Percentage |
|------|--|----------------|------------|
| 1    | Absence of isthmus                     | 5              | 10%        |
| 2    | Presence of Pyramidal lobe             | 23             | 46%        |
| 3    | Presence of levator Glanduli thyroidae | 20             | 40%        |
| 4    | Presence of accessory thyroid tissue   | 2              | 4%         |

**Table 1:** Percentage of thyroid gland variations out of 50 specimens



**Figure 1:** Showing absence of isthmus



**Figure 2:** Showing PL - pyramidal lobe & LGT - levator glanduli thyroideae



**Figure 3:** Showing accessory thyroid tissue

#### **IV. Discussion**

Agenesis of isthmus of thyroid gland is rare in humans, the incidence varying from 5% to 10%.<sup>7</sup> In our study incidence of absence of isthmus is in 10% (5 specimens), out of which 3 were male specimens & 2 were female specimens. This observation can be compared with studies done by Marshall et al.<sup>6</sup>, & Veena Kulkarni et al., Prakash et al, Daksha Dixit, Hussein Muktyaz, Abu Sadat Ahmed found 10%, 8.57%, 14%, 12.5%, 18.8% respectively. Incidence of absence of isthmus was higher in studies conducted by Saheli Zannath Sultana et al. & Ranade et al.<sup>7</sup> where it was 31.66% & 33% respectively. This incidence was just 2.22% in the study done by O Tanriover in Bangladesh .

Hussein Muktyaz et al.<sup>8</sup> found 43% & 41% respectively. This incidence was high in studies conducted by O. Tanriover et al. & Ranade et al. where it was 57.8% & 58% respectively. This incidence was low i.e. 35.71% in a study done by Prakash et al., where as it was just 7.31% in a study done by Daksha Dixit et al.

In our study incidence of presence of levator glanduli thyroideae is 40% (20 specimens) out of which 15 were male & 5 were female specimens. This observation can be compared with the similar study done by Ranade et al. where it was 49.5%, it was low in studies done by Prakash et al. & Veena Kulkarni where it was 32.85% & 30% respectively, This incidence was too low to extent of 19.6% & 7.31% in studies conducted by Hussein Muktyaz et al. & Veena Kulkarni et al.<sup>9</sup>

The incidence of presence of Accessory thyroid tissue in our study is 4% which can be compared with the studies done by Ranade et al.<sup>10</sup>, Hussein Muktyaz where it was 1% & 3.57% respectively. It was nil in study conducted by Prakash et al.<sup>11</sup>

## V. Conclusion

In order to perform safe & effective surgery as well as diagnosis of thyroid disorders, knowledge of normal anatomy & morphological variations of the thyroid gland are essential.

Usually agenesis of isthmus is difficult to determine unless the patients present for other thyroid pathologies. Agenesis of isthmus can be diagnosed via scintigraphy, ultrasonography, computed tomography and magnetic resonance imaging. When the absence of isthmus is suspected, the individual may be directed for a differential pathological diagnosis such as autonomous thyroid nodule, thyroiditis, primary carcinoma, neoplastic metastasis & infiltrative diseases such as amyloidosis.

Agenesis of isthmus can be associated with other types of dysorganogenesis, such as the absence of a lobe or presence of ectopic thyroid tissue & hence in clinical practice when such a condition is diagnosed, it is necessary to perform a differential diagnosis against other pathologies such as autonomous thyroid nodule, thyroiditis and so on.

While planning for thyroidectomy one should be prepared to find variations like ectopic thyroid nodules around normally located thyroid gland.

## References

- [1]. Moore KL, Persaud TVN. The pharyngeal apparatus. Chap-10. The developing human clinically oriented embryology. 7th edn. Saunders 2003:215-7.
- [2]. Larsen WJ. Development of head, the neck and the eyes and ears. Chap-12. Human embryology. 2nd edn. Hong Kong: Churchill Livingstone Inc 1997:p.371.
- [3]. Standring S. Neck. Chap-28. Gray's anatomy. The anatomical basis of clinical practice. 40th edn. Spain: Elsevier 2008: p.462.
- [4]. McMinn RMH. Head and Neck and Spine. Chap-6. Last's anatomy regional and applied. 9th edn. Singapore: Churchill Livingstone 1994:430-1.
- [5]. Larochelle D, Arcand P, Belzile M, et al. Ectopic thyroid tissue--a review of the literature. J Otolaryngol 1979;8(6):523-30.
- [6]. Pastor VJF, Gil VJA, De Paz Fernandez FJ, et al. Agenesis of the thyroid isthmus. Eur J Anat 2006;10(2):83-4.
- [7]. Harjeet A, Sahni D, Jit I, et al. Shape, measurements and weight of the thyroid gland in northwest Indians. Surg Radiol Anat 2004;26(2):91-5.
- [8]. Gangbo E, Lacombe D, Alberti EM, et al. Trisomy 22 with thyroid isthmus agenesis and absent gall bladder. Genet Couns 2004;15(3):311-5.
- [9]. Marshall CF. Variations in the form of the thyroid gland in man. J Anat Physiol 1895;29(Pt 2):234-9.
- [10]. Ranade AV, Rai R, Pai MM, et al. Anatomical variation of the thyroid gland: possible surgical implications. Singapore Med J 2008;49(10):831-4.
- [11]. Braun E, Windisch G, Wolf G, et al. The pyramidal lobe: clinical anatomy and its importance in thyroid surgery. Surg Radiol Anat 2007;29(1):21-7.

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