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## CASE REPORT- AGENESIS OF ISTHMUS OF THYROID GLAND

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### **Abstract:-**

*The thyroid gland is a highly vascular and ductless gland. The gland consist of two lateral lobes and an isthmus connecting them across the middle line thus giving 'H' shaped or butterfly shaped appearance to the gland. A wide range of morphological variation and developmental anomalies of the gland and its neurovascular relations will help the surgeon in better planning of a safe and effective surgery. Key words- isthmus, thyroid gland.*

## **INTRODUCTION:-**

The thyroid gland is brownish-red and highly vascular endocrine gland. It is placed anteriorly in neck, extending from fifth cervical vertebra to first thoracic vertebra. It is ensheated by the pre-tracheal layer of deep cervical fascia. The gland consist of two lateral lobes and an isthmus connecting them across the middle line. The normal size of each lobe of thyroid gland has been described to be 5 cm long, its greatest transverse diameter and antero-posterior diameter extent being 3 cm and 2 cm respectively. The isthmus of gland is measure about 1.25 cm, it is usually placed anterior to the second and third tracheal cartilages<sup>1</sup>.

Thyroid gland is the first endocrine gland to start developing in embryo. It is well known for its developmental anomalies ranging from common to rare. Common anomalies includes persistent of pyramidal lobe and thyroglossal duct cyst. Rare anomalies are agenesis or hemiagenesis of thyroid gland. Agenesis of isthmus alone or aberrant thyroid gland.<sup>2</sup>

The isthmus of Thyroid gland connect the lower parts of the two lobes and is usually anterior to the second to forth tracheal cartilages and is well protected anteriorly by the infrahyoid muscles. Sometimes a fibro-muscular band, the levator glandulae thyroideae descends from the body of hyoid bone to isthmus or pyramidal lobe if present.<sup>3</sup>

## **Case report:-**

During routine undergraduate midline dissection of neckin department of Anatomy at Government Medical College, Chandrapur, in middle aged male cadaver, we encountered an unusual variation. It was agenesis of thyroid gland. Both the lobes are completely separated from each other without any tissue intervening between them. No ectopic tissue were noted along its developmental route i.e. from root of the tongue to the gland's position (fig. 1).

Right lobe was slightly lower than left lobe. The length of right lobe measures 4.6 cm and left lobe 4.8 cm in length. Apex of each lateral lobe of gland was supplied by superior thyroid artery along with external laryngeal nerve and base of each lobe was supplied by inferior thyroid artery along with recurrent laryngeal nerve. No anastomosis were found between superior and inferior thyroid arteries (fig. 2).

## **Discussion :-**

Agenesis of isthmus of thyroid gland is a developmental anomaly. Phylogenetically isthmus was absent in amphibians, birds, and some mammals like monotremes, certain marsupials carnivores and rodents. In rheuses monkey thyroid is normal in position with absent of isthmus. Usually agenesis is difficult to determine unless the patient report for any thyroid illness. Agenesis of isthmus does not cause clinical symptoms by itself and diagnosis is secondary due to the existence of other thyroid pathogenesis. This may be due to mutation of genes associated with thyroid gland.

In our case, agenesis of isthmus is a developmental anomaly, possibly due to high separation of thyroglossal duct resulting into independent thyroid lobes. Marshall documented the variation in the gross structure of thyroid gland in 60 children varying in age from few weeks to 10 years and the absence of isthmus was reported to 10% in his group<sup>4</sup>.

Allan in 1952 reported 2 to 4% incidence of absence of isthmus of thyroid gland in his study. He also observed that a band of connective tissue names levator glandulae thyroideae extended from the apex of right or left lobe or isthmus of thyroid gland to the hyoid bone<sup>5</sup>. The variation in size, shpe and level of the thyroid was reported by Anson in 1996. The isthmus was absent in 6 to 8% of cases in his study<sup>6</sup>. Thyroglossal duct arises from the endodermal epithelium of primitive pharynx at the level of 2<sup>nd</sup> and 3<sup>rd</sup> pharyngeal arch. When it descends downward, its caudal bifurcates and gives origin to the thyroid lobes and the isthmus. At the same time the cephalic end of thyroglossal duct degenerates<sup>7</sup>.

Reports in the literature suggest that chromosome 22 could play a role in the thyroid development<sup>8</sup>. Shailaja shetty et al found that agenesis of isthmus of thyroid gland is rare in human, the incidence varying from 5 to 10%. In case report there was absence of isthmus of thyroid gland in an elderly male cadaver<sup>9</sup>. Ranade et al 2008 reported that absence of isthmus in 35 out of 105 cases (33%) of which 8 were in female<sup>10</sup>.

## **Conclusion:-**

Agenesis of isthmus of thyroid gland is rare in human. In the present case report there was absence of isthmus of thyroid gland in an elderly male cadaver. This agenesis can be explained as an anomaly of embryological development i.e. high division of thyroglossal duct giving rise to two independent thyroid lobes with absence of isthmus. Agenesis of isthmus of thyroid gland can be diagnosed via scintigraphy, ultrasonography, CT, MRI, etc. when suspected, the individual may be directed for differential pathological diagnosis such as autonomous thyroid nodule, thyroiditis, carcinoma, neoplastic metastases, infiltrative disease such as amyloidosis, etc. the knowledge of this variation important for surgeon especially for surgical innervation, physician and radiologists for further course of diagnosis and therapeutic use. During tracheotomy ENT surgeon done this procedure without any fear due agenesis of isthmus of thyroid gland.

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