Thyroid Agenesis: A Case Report with Review of Literature

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ABSTRACT
The thyroid gland, a highly vascular endocrine gland, is composed of two lateral lobes connected by a narrow median isthmus thus giving an ‘H’-shaped appearance to the gland. Congenital thyroid abnormalities mostly include unilateral lobular agenesis, with or without involving the isthmus. We are reporting a case rudimentary right lobe with absence of isthmus. The knowledge of various developmental anomalies of the gland and variations in neurovascular relations will help the surgeon in better planning of a safe and effective surgery.

Keywords: Thyroid, Agenesis, Isthmus.

INTRODUCTION
Thyroid hemiagenesis is a rare anomaly. It was first reported in 1895 by Marshall1 who found the right lobe to be absent in one of the 60 childhood thyroid glands examined specifically to determine the type and frequency of anomalies of this gland. Hemiagenesis of the left lobe detected at surgery was reported from India by Das2 in 1962. In the literature, most of the patients reported to have thyroid hemiagenesis had accompanying thyroid disorders because the absence of one thyroid lobe usually does not cause clinical symptoms by itself. The true prevalence of thyroid hemiagenesis is not known, but it is estimated to be 0.02% in normal children.3 Thyroidal hemiagenesis is predominantly seen in females and left lobe is absent in most of the cases.4

CASE REPORT
During routine dissection of thyroid in male cadaver showed absence of the isthmus with rudimentary right lobe and slightly large left lobe (Fig. 1). The right lobe was rudimentary measuring 1 cm in length (Fig. 2) and 1 cm in width whereas left lobe was measuring 7 cm in length and 3.8 cm in width. Apex is directed toward the oblique line of thyroid cartilage and related to superior thyroid artery and external laryngeal nerve, the base is extended up to fifth, sixth tracheal rings, the base is related to inferior thyroid artery and recurrent laryngeal nerve. The location of thyroid gland was normal but the right lobe was rudimentary and the isthmus was absent. Normally isthmus connects the lobes lower part, it is about 1.25 cm transversely and vertically and is usually anterior to the second and third tracheal cartilages, though often higher, in the present case it is absent. Left lobe was supplied by the superior and inferior thyroid artery whereas as on right side only inferior thyroid artery was seen.

DISCUSSION
The size and shape of the thyroid gland is subject to much variation, as stated by Wood Jones. Literature is replete with a large number of variations of the gland. Thyroid hemiagenesis is a rare congenital anomaly with absence of a lobe or a lobe and the isthmus. Embryologically, it develops in the midline from the pharyngeal floor at the foramen cecum.5 The thyroid gland appears as an epithelial proliferation in the floor of the pharynx between trabeculum impar and the copula at a point later indicated by foramen cecum. Subsequently, thyroid gland descends in front of
the pharyngeal gut as bilobed diverticulum. During this migration, the thyroid remains connected to the tongue by a narrow canal, the thyroglossal duct, this duct normally disappears. Rarely, a high separation of thyroglossal duct can engender two independent thyroid lobes and pyramidal lobes with the absence of isthmus. Further developments, the thyroid gland descends in front of the hyoid bone and the laryngeal cartilages. It reaches its final position in front of the trachea in the 7th week. By then it has acquired a small median isthmus and two lateral lobes. The exact cause of hemiagenesis is not clear. It is thought to result from failure of the cells to migrate laterally resulting in agenesis of a part of the thyroid but it may result from disturbance of lobulation process either due to environmental or genetic insult and few authors have reported role of chromosome 22 in thyroid lobar agenesis.

The prevalence of the hemiagenesis of thyroid is ranged between 0.05 and 0.2% in most of the studies and is more prevalent in females and in most of the series left lobe is absent. Most of the descriptions in the literature are based on the screening of the thyroid by ultrasound in patients coming or thyroid abnormalities or screening in the iodine deficiency areas. Gursoy A et al in their study found that the prevalence of hemiagenesis of thyroid lobe was 0.25% in patients who presented with various thyroid disorders whereas its prevalence in normal population was only 0.025% and it was the left lobe which was absent in all cases, as in our cases there is absence of isthmus along with rudimentary right lobe. Many workers claim that the absence of isthmus is quite rare in humans, and in adult animals, the isthmus is either present or absent. According to the studies by Braun et al the isthmus was missing in four cases of the 58 cadavers they studied. Won and Chung have reported that in 3% of the cases studied, the isthmus was absent and the lateral lobes of the thyroid were separated, though the absence of isthmus had been reported between 3 and 10%. Pastor et al stated that absence of an isthmus can be associated with other types of dysorganogenesis, such as the absence of a lobe or the presence of ectopic thyroid tissue as in our case the right lobe was rudimentary. Literature search showed that most common dysorganogenesis in cadaver is absence of isthmus followed by hemiagenesis of one of the thyroid lobe whereas the studied carried out in symptomatic or in normal population had showed that most common anomaly is absence of left lobe (80%) followed by absence of isthmus.

Per se, the morphological difference in the evolutionary origin should not result in any changes in thyroid function but studies has shown that the prevalence of hemiagenesis is more common in symptomatic patients than the normal population. Usually agenesis of isthmus is difficult to determine unless the patients refer for other thyroid diseases; though can be diagnosed via scintigraphy, ultrasonography, CT and MRI but all these investigations have their advantages and disadvantages. We have presented this case because though absence of isthmus have no impact on the thyroid function but if isthmus absence is diagnosed or suspected the individual must be screened for autonomous thyroid nodule; thyroiditis; primary carcinoma; neoplastic metastases and infiltrative diseases, such as amyloidosis.

**CONCLUSION**

Thyroid hemiagenesis is an uncommon presentation that is frequently asymptomatic and detected incidentally when imaging for another condition. Awareness of its existence can help prevent unnecessary interventions associated with incorrect assumptions in patient care and better understanding of anatomy of such cases may help the surgeon in proper dissection.

**REFERENCES**


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