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AGENESIS OF THYROID GLAND ISTHMUS - A CASE REPORT

General Surgery

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ABSTRACT

Thyroid gland is the largest and highly vascular endocrine gland situated in the anterior part of lower neck. It is a H shaped gland with two lateral lobes connected by a narrow isthmus. A wide range of variations have been reported in both its morphology and development. We report a case of incidental intraoperative finding of isthmus agenesis from KATURI MEDICAL COLLEGE, Chinakondrupadu, Andhra Pradesh.

KEYWORDS

Isthmus, Agenesis, Ultrasound, Multinodular goiter

INTRODUCTION:

The thyroid gland is reddish brown, and a highly vascular endocrine gland located at the anterior region of the neck. It is placed between the fifth cervical and first thoracic vertebrae. The gland consists of two lobes connected by an isthmus which is protected by infrahyoid muscles. The isthmus is localized at the level of the second and third tracheal rings. The gland tissue is about 25 grams in weight and produces hormones triiodothyronine, tetraiodothyronine, which play important roles in normal metabolic activity of the human body. Thyroid gland itself has chances of developmental anomalies. Hemi-agenesis of thyroid and thyroid isthmus agenesis has been rarely seen.1 The incidence varies in literature from 3-10% but still the true figure is unknown.2-4 However the combination of thyroid isthmus agenesis with multinodular goiter is very rare as we have encountered the case during our clinical practice.

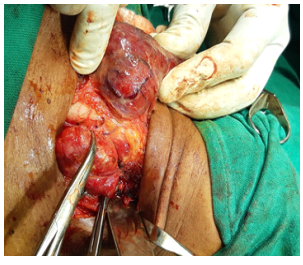
CASE PRESENTATION:

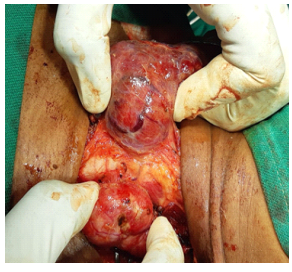
In 2017 a 35-year-old female patient came to general surgery op of Katuri medical college with a chief complaint of swelling in the front of lower part of the neck for a duration of 4 years. During first physical examination there was a enlargement in the right and left lobes of the gland with nodular surface without regional lymphadenopathy. The high-resolution ultrasound showed the thyroid with enlargement of the right and left lobes with multiple nodules and a prominent right sided nodule of size 2.7cm x 2.5cm and a left sided nodule of 2.1cm x 2.7cm nodule with areas of cystic degeneration. No comment was made regarding the absence of isthmus. After the scan a fine-needle aspiration cytology was done, and results showed papilliferous cells without malignant features. Immunohistochemical study for cytokeratin-19 marker was negative. Thyroid isthmus agenesis was found during the access to the gland along with the nodular enlargement of both lobes of thyroid and a total thyroidectomy was performed. Histologic examination yielded to the diagnosis of nodular goiter.

DISCUSSION:

Mostly the descriptions about congenital thyroid abnormalities in the literature are related with hemiagenesis which include one lobe and sometimes the isthmus. Thus, congenital thyroid anomalies can involve one or both lobes and the isthmus may be present or not. Over 50000 thyroid patients' operations at Mayo Clinic for 40 years, only five cases of hemiagenesis were described [1]. Mirkosch et al [2] for 9 years studied 71 500 patients who underwent thyroid investigation, 10 of them showed isthmus hemiagenesis. Others surgical studies reported an incidence nearby one in 2000 [1,3]. Melnick [1] and Mikosch [2] on two reviews of available world literature found, respectively a total of 94 and 256 cases of thyroid hemiagenesis but among these cases the isthmus was absent in only 50% of the patients where the isthmus was specifically mentioned. There are a variety of diseases associated with thyroid partial agenesis and most of them are cases of hyperthyroidism or hypothyroidism in iodine deficient area and also nontoxic nodular goiter [1,2,4,5].

Figure 1:
After neck surgical exploration absence of the thyroid isthmus (missed on USG) was seen with intact both lobes





Mutation of genes has been involved in thyroid morpho- genesis [5] but failure of the isthmus fusion in the midline may be the principal cause of an isolate isthmus agenesis. The key investigation to diagnose isthmus agenesis is still ultrasonography but the presence of other pathological conditions diverts the attention and misleads the diagnosis. The use of both computed tomography (CT) and magnetic resonance imaging does not offer best results than ultrasonography. It can be performed easily and quickly, with less cost and no radiation risk as seen at CT. Furthermore, considering the performance of these three diagnostic methods to identify the morphology of thyroid, the results are equivalent. Fine needle aspiration biopsies and IHC serves as an aid in evaluating asymptomatic patients with nodular goiter. They guide the treatment decisions, but when conditions such as isthmus agenesis is present it is important to differentiate between benign and malignant lesions considering the surgical procedure and possibility of impairment of thyroid function

Conclusion:

Isolated agenesis of the isthmus with intact lobes and associated with nontoxic multinodular nodular goiter is an unusual condition and imaging can misdiagnose the condition due to its rarity. Due to its rare nature, isthmus agenesis should be kept in mind for safe surgery to avoid complications during neck operations.

Competing interests:

The authors declare that they have no competing interests.

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