

# Diagnosis of Ectopic Thyroid Gland by $^{99m}\text{Tc}$ Scan : A Case Report

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## ABSTRACT

Ectopic thyroid is an uncommon entity. Its occurrence in children is rare. Most of the patients present with mid neck swelling that may be confused with other midline pathology. Sometimes it may be the only functioning thyroid tissue present in the body as reported in this case. Proper diagnosis is required for the management of the patient. Radionuclide scan and high resolution ultrasonography plays an important role in diagnosis and further management of the patient with ectopic thyroid gland.

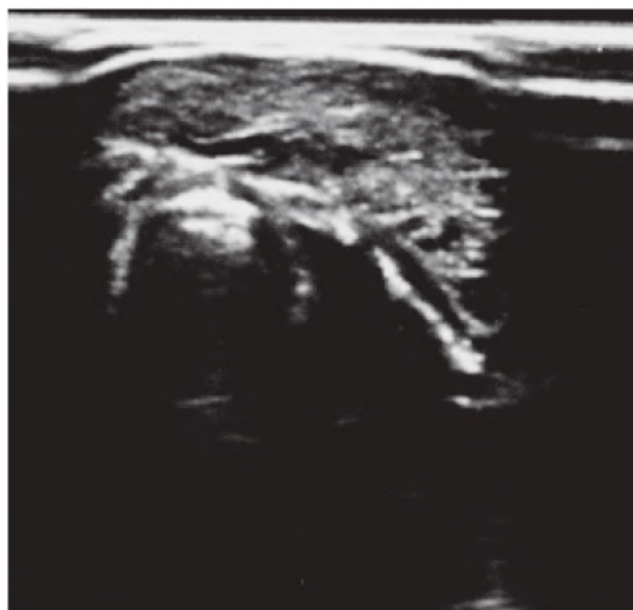
## INTRODUCTION

Ectopic thyroid tissue is a rare developmental anomaly that arises from an abnormal embryological development. Ectopic thyroid tissue can be found anywhere at its embryological pathway from foramen caecum at the base of the tongue to its normal position at pre-tracheal region. It particularly affects young females. Its occurrence in children is very uncommon (1, 2). Its prevalence is about 1 per 100 000 to 300 000 people and 1 per 4000 – 8000 patients with thyroid disease (1, 3). The ectopic thyroid tissue is the only functioning thyroid tissue in 70-90% cases (3-7). It is more common in females. In females the tissue increases in size during puberty or pregnancy due to increased endocrine activity (8). Diagnosis is mainly made by clinical examination and imaging. Among the imaging modalities, radionuclide scan with  $^{99m}\text{Tc}$  or  $^{131}\text{I}$  is the most useful tool in diagnosing the ectopic thyroid tissue as well as the normal positioned gland, specially when it is the only functioning thyroid tissue

present in the body. Here we present a case of ectopic thyroid gland presented as painless mid neck swelling with no other complaints.

## CASE REPORT

A four years old girl came to the Institute of Nuclear Medicine and Allied Sciences Barisal with a swelling at anterior mid neck above the level of thyroid gland (Figure-1). The mother noticed the swelling one month ago. On examination the swelling was non-tender and thyroid gland was not palpable at the thyroid bed. The girl has no sign of thyroid dysfunction. She was apparently healthy. She had no history of remarkable medical illness.

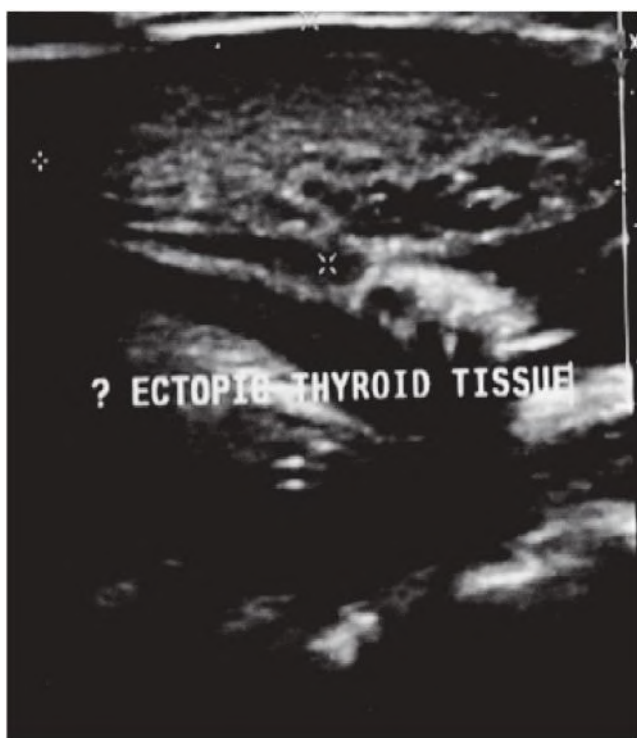


**Figure 1** Ultrasound imaging of neck showing soft Tissue mass above thyroid bed

The girl was euthyroid. Her hormonal study showed serum T3 level was 1.98 ng/ml

(Normal range 0.9-2.2 ng/ml), T4 was 102.50 ng/ml (normal range 45.0-135 ng/ml) and serum TSH level was 1.45  $\mu$ IU/ml (normal range 0.3 – 5.0  $\mu$ IU/ml).

High resolution ultrasonography showed no thyroid tissue at the thyroid bed, the palpable mass at the mid neck corresponds to uniform soft tissue lesion situated just antero-right to midline, measuring about 24 mm x 9 mm (Figure -2) - suggestive of ectopic thyroid tissue.



**Figure 2 Ectopic thyroid tissue on Ultrasound Scan.**

Radionuclide thyroid scan was done with  $^{99m}\text{Tc}$  pertechnetate. Scan showed single focus of increased radiotracer uptake at mid neck that corresponds to the swelling. No radiotracer uptake was seen at thyroid bed (Figure 3). That suggests the mid neck swelling is the functioning ectopic thyroid tissue. FNAC was not done as it was confirmed by radionuclide scan. The girl was euthyroid and asymptomatic so, no treatment was given. The mother was advised to follow up for any change of the size of the mass and the physical condition of the girl.



**Figure 3 Focal uptake of radiotracer on midline neck swelling without tracer accumulation in thyroid bed.**

## DISCUSSION

Ectopic thyroid gland is defined when thyroid tissue is located outside its normal anatomical position at anterior neck in between second to fourth tracheal cartilage. Thyroid gland develops from the outgrowth of the pharyngeal endoderm at the 24th day of gestation. It migrates from its origin at foramen caecum in the base of the tongue to its normal position at anterior neck at seventh week of gestation. The path of descend is called thyroglossal duct (9). Ectopic thyroid gland results from the incomplete migration so can be found anywhere along the path of obliterated thyroglossal duct. Lingual thyroid is the most common type of ectopic thyroid (90% cases) (8). Other sites are suprahyoid, infrahyoid, laryngeal, sub-mandibular, lateral aberrant etc. Benign thyroid follicles can be found in the cervical lymph nodes. Rare sites of ectopic thyroid tissues area trachea, parotid gland, laterally to carotid arteries, and the jugular veins, mediastinum, heart, lung, oesophagus, duodenum, pancreas, gall bladder, mesentery of the small intestine, adrenal gland uterus, ovary and iris (11). Ectopic thyroid tissue may co-exist with normally located thyroid gland and sometimes only the ectopic thyroid tissue is present

with absence of normally placed thyroid gland (10).

The ectopic thyroid gland can be found at any age group (11). Sign symptoms of ectopic thyroid gland depend on the location of the ectopic thyroid tissue. In case of lingual thyroid, patient may be asymptomatic if the tissue is small. If the tissue is large, the patient may present with dysphagia, dysphonia, foreign body sensation, cough, snoring, sleep apnea etc. The patient may present with swelling at mid neck, sub-mandibular or lateral neck. Intrathoracic ectopic thyroid tissue may be present with cough, dyspnea, haemoptysis, dysphagia.

“Struma ovary” is a rare condition, where thyroid tissue is present in ovary producing ovarian teratoma. The thyroid tissue comprises more than 50% of the total tissue of the tumour. Struma ovary comprises 1% of all ovarian tumours and 2-3% of all ovarian teratomas (12-14).

The patient may be euthyroid or hypothyroid. The thyroid hormone production is low in ectopic thyroid tissue, so may lead to sub-clinical hypothyroid to clinical hypothyroidism. In cases of ectopic thyroid gland, clinical hypothyroidism ranges from 24%- 60%. Hyperthyroidism is very rare in ectopic thyroid tissue, it may occur in cases of struma ovary in 5-15% of cases (13). Ectopic thyroid tissue may be affected by any disease that affects the normal thyroid gland. The incidence of malignancy is low (11).

Diagnosis of the ectopic thyroid tissue can be confirmed by history, clinical examination biochemical study and different imaging procedures. Imaging procedures specially high resolution ultrasonography and <sup>99m</sup>Tc or <sup>131</sup>I scintigraphy plays a significant role in evaluation of neck swelling. High resolution ultrasonography can detect the normally situated thyroid gland as well as the nature of the soft tissue mass at neck, whether it is uniform or irregular, solid or cystic. <sup>99m</sup>Tc scan has high sensitivity in detecting normal functioning thyroid tissue. Other

imaging modalities like plain X-ray, computed Tomography (CT) scan and magnetic resonance imaging (MRI) are also helpful for exact localization of the mass when surgery is needed. Fine needle aspiration cytology is done to detect malignancy in the ectopic tissue.

After the diagnosis is established the treatment plan is done according to the patients symptoms, position of the ectopic thyroid tissue, biochemical and histological nature of the mass. If the patient is euthyroid and the mass causes no symptoms, no treatment is required. The patient is observed periodically for any change in the size of the mass and physical condition of the patient for symptoms of hypothyroidism. If the patient is hypothyroid, replacement therapy is started immediately. The treatment archives a good response with adequate dose of levothyroxine. Surgery is indicated in cases of large lingual thyroid causing symptoms of dyspnoea, dysphagia etc. If histology shows malignant transformation (well differentiated tumour) then surgical excision is done and postoperative radioiodine ablation is indicated. Surgical excision and postoperative radioiodine ablation has excellent prognosis in well differentiated carcinoma.

## CONCLUSION

Ectopic thyroid tissue is an important differential diagnosis of mid neck swelling. Most often the patients are asymptomatic and the swelling is the only functioning thyroid tissue in the body. Careful clinical examination, thyroid function tests and different imaging modalities help to diagnose the ectopic thyroid tissue. High resolution USG and radionuclide imaging with <sup>99m</sup>Tc or <sup>131</sup>I plays an important role in establishing the diagnosis and localizing the ectopic thyroid tissue.

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