

Thyroid scintigraphy and hybrid SPECT/CT in a rare case of dual ectopic thyroid.

Sanchay Jain, Suruchi Jain, Deepa Singh

Authors' affiliation:

Sanchay Jain: Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhopal, India.

Suruchi Jain: Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhopal, India.

Deepa Singh: Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhopal, India.

Corresponding author:

Suruchi Jain, Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhopal, 462020 India.

Telephone: 91-7049033961, Fax: unavailable

Email: suruchi.nuclearmed@aiimsbhopal.edu.in

First author

Sanchay Jain, Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, India.

Telephone: 91-9406951440, Fax: unavailable

Email: drsanchayjain@gmail.com , Currently in-training: Yes (Senior Resident)

Word Count: 1130

Financial disclosures: None.

Running title: SPECT/CT in dual ectopic thyroid

Abstract:

Dual ectopic thyroid (DET) is a rare disorder occurring as a result of aberrant embryonic development characterized by simultaneous presence of thyroid tissue at two ectopic sites. ^{99m}Tc-Pertechnetate thyroid scintigraphy remains gold standard in confirming ectopic thyroid tissue. This case highlights the importance of thyroid scintigraphy and Single Photon Emission Computed Tomography with Computed Tomography (SPECT/CT) in evaluation of ectopic thyroid tissue and DET that manifested itself during patients' pregnancy.

Key words:

Thyroid scintigraphy, SPECT/CT, Dual ectopic thyroid.

Introduction

Ectopic thyroid tissue (ETT) is a rare disorder of embryonic development of thyroid gland (1). In particular, simultaneous presence of two ectopic thyroid tissues – dual ectopic thyroid (DET) is even rarer, with only a few reported cases. ^{99m}Tc-Perchnetate thyroid scintigraphy is gold standard in evaluating ETT (2). The authors present an interesting case of DET that manifested first during pregnancy, and reinforce the importance of thyroid scintigraphy and SPECT/CT in its evaluation vis-à-vis conventional methods such as clinical examination and ultrasound.

Case Report

A 24-year-old female presented with painless midline tongue swelling, which she noticed during her pregnancy that resulted in birth of a healthy child about one year ago. However, this swelling was not accompanied by obstruction or any other symptoms. On clinical examination, a midline swelling was visible at the base of tongue. She was initially evaluated with neck ultrasonography (US) which showed a vascular hypoechoic solid-cystic soft tissue mass in lingual region in the midline measuring ~1.9 X 1.5 cm. The thyroid gland was not visualized in the neck on US. Her serum thyroid stimulating hormone (TSH) concentration was raised (20 μ IU/ml), but serum total T3 and total T4 concentrations were within normal range. The patient was then referred for thyroid scintigraphy to confirm the clinical suspicion of lingual thyroid gland. After intravenous injection with 185 MBq (5mCi) of ^{99m}Tc-Perchnetate, perfusion and static images of head, neck and mediastinal regions were acquired followed by SPECT/CT acquisition. Anterior perfusion images revealed a focus of mildly increased tracer flow in the region of mouth (Figure 1). Subsequent planar images showed tracer uptake in the midline in oral cavity and submental region (Figure 2), which on SPECT/CT images localized to two distinct foci of tracer uptake in the midline at the base

of tongue and in the floor of mouth (submental-suprahyoid) region (Figure 3). No focal tracer uptake was noted in the neck or mediastinum. The patient reported that her infant has been healthy and achieving age-appropriate milestones. Patient was advised appropriate radiation safety precautions, especially in regard to breastfeeding. Following this, the patient was started on thyroxine replacement.

Discussion

The estimated prevalence of ETT is about 1 per 100,000-300,000 people and 1 per 4,000-8,000 patients with thyroid disorders. DET is even rarer with fewer than 100 cases reported in English literature. About half of the patients with DET are euthyroid, while remaining are hypothyroid (3). As seen in this patient, the ETT may become apparent and detected during the times of increased physiological demand of thyroid hormones like pregnancy, puberty, and adolescence (1). The sensitivity of scintigraphy to detect ETT is higher than US alone, which is also evident in this case as US could only characterize the clinically evident lingual swelling, but could not detect ETT in floor of the mouth (4). Thyroid scintigraphy and SPECT/CT can also help to distinguish ETT from other midline cervical masses (such as thyroglossal duct cysts, etc.), which may help prevent unnecessary surgery (3). In addition to its rarity, this case highlights the importance of thyroid scintigraphy and SPECT/CT in identifying and localizing ETT in a clinically diagnosed case of ectopic lingual thyroid, which in turn was a case of DET.

Conclusion

Dual ectopic thyroid is a very rare entity. ^{99m}Tc-pertechnetate thyroid scintigraphy and SPECT/CT is very valuable in evaluation of ETT and DET which is attributable to its high sensitivity and

specificity for detecting thyroid tissue. Addition of SPECT/CT to planar imaging further enhances its value by helping in precise anatomical localization and detection of small sized ectopic thyroid tissue which may otherwise be missed on clinical examination or morphological imaging modalities like ultrasonography alone.

Disclosure:

There are no financial disclosures or conflicts of interest.

References:

1. Guerra G, Cinelli M, Mesolella M, et al. Morphological, diagnostic and surgical features of ectopic thyroid gland: a review of literature. *Int J Surg.* 2014;12(Suppl 1):S3-S11.
2. Matta-Coelho C, Donato S, Carvalho M, Vilar H. Dual ectopic thyroid gland. *BMJ Case Rep.* 2018;2018:bcr2018225506.
3. Noussios G, Anagnostis P, Goulis DG, Lappas D, Natsis K. Ectopic thyroid tissue: anatomical, clinical, and surgical implications of a rare entity. *Eur J Endocrinol.* 2011;165:375-382.
4. Karakoc-Aydiner E, Turan S, Akpınar I, et al. Pitfalls in the diagnosis of thyroid dysgenesis by thyroid ultrasonography and scintigraphy. *Eur J Endocrinol.* 2012;166 :43-48.

Figure 1

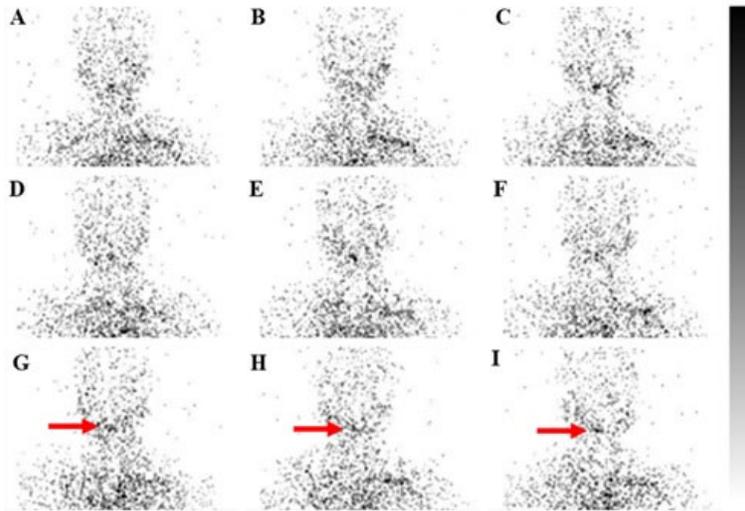


Figure 1 legend:

Anterior perfusion images of head, neck and mediastinal region (A-I) show a focus of mildly increased tracer flow in the region of oral cavity (red arrows in G-I).

Figure 2

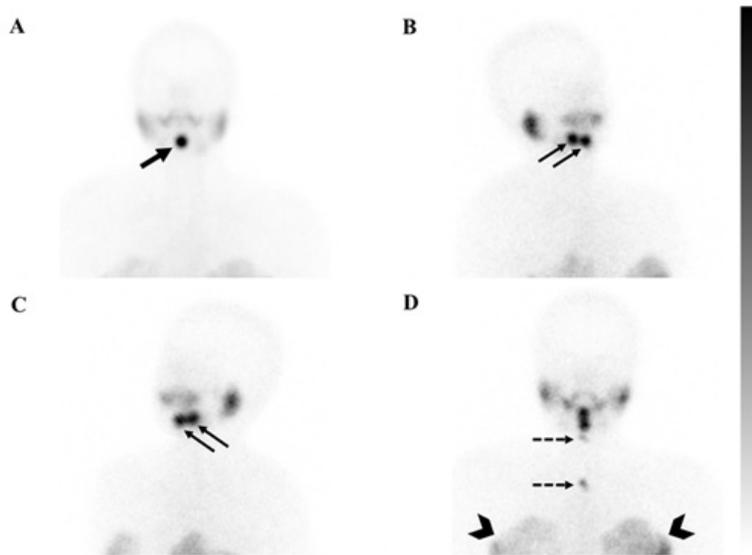


Figure 2 legend:

Planar images acquired at 20 minutes post tracer injection show two distinct foci of tracer uptake in the oral cavity and submental region (arrows in oblique views, B and C). These foci superimposed in the anterior image (arrow in A). Anterior view acquired with further neck extension (D) shows two distinct foci of tracer uptake (Upper and lower dashed arrows represent markers placed at the chin and suprasternal notch, respectively). Thyroid is not visualized in the neck in its normal location. Notably, tracer distribution seen in the thoracic region is suggestive of tracer uptake in both the breasts (arrowheads in D).

Figure 3

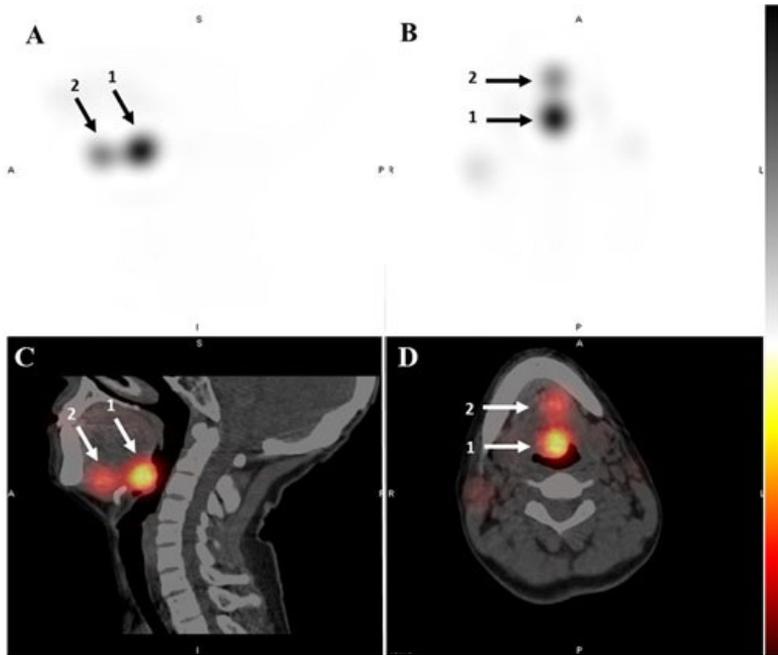


Figure 3 legend:

Sagittal and transaxial SPECT (A and B) and hybrid SPECT/CT (C and D) images. Increased tracer uptake is seen in the soft tissue density noted at the base of tongue in the midline (arrows marked as 1 in A-D), and a smaller ill-defined focus of increased tracer uptake in floor of the mouth in the suprahyoid-submental region (arrows marked as 2 in A-D).