

CASE REPORT

Distinguishing between isthmus thyroglossal duct cyst and goitre on nuclear thyroid scan: A case report

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Abstract

Thyroglossal duct cysts, which are the most frequently encountered congenital cervical anomalies in children, occur due to embryologic remnants of the thyroglossal duct. Although diagnosis may be challenging, clinicians can be aided by imaging and fine-needle aspiration biopsies. We describe the clinical management of a two-year-old boy with a thyroglossal duct cyst mimicking a goitre on a pertechnetate thyroid scan.

Introduction

The thyroid gland develops between the fourth and eighth weeks of intrauterine life. The anlage descends from the foramen caecum at the base of the tongue, through the infra-hyoid visceral space and to the anterior neck. The thyroglossal duct connects the origin and final site of the anlage. This duct should involute at approximately the tenth week of life. However, it may persist as a thyroglossal duct cyst (TGDC).¹

TGDCs are commonly encountered in children, with 50% of children presenting TGDCs in the first decade of life.² TGDCs mostly present as a neck swelling that is mobile with tongue protrusion. It may also contain ectopic thyroid tissue (1.5–62%).³ Clinical features are important in making a diagnosis; however, imaging confirms the diagnosis, localises the thyroid gland and helps in decision making.⁴ Ultrasonography (USS) is an important initial imaging technique for TGDC, especially in children where radiation exposure must be minimal.⁵ Since 2006, pertechnetate thyroid scan (PTS) has been available at this facility and incorporated into clinical management. The latter is especially useful in localising thyroid ectopia. This article serves to illustrate the presentation and use of imaging studies to solve the diagnostic dilemma of a TGDC in the isthmus of the thyroid that simulated a goitre.

Case presentation

The patient was a two-year-old boy with

asymptomatic, progressive midline anterior neck swelling referred for a PTS. He was referred from a secondary health facility due to the diagnostic dilemma in differentiating a suspected TGDC from an enlarged thyroid gland. The PTS scan aimed to determine whether this was the only thyroid gland in the patient since the cystic lesion was within the thyroid gland and the possibility to remove the entire diseased thyroid gland along with the cyst was high based on the preoperative assessment. Thus, the decision to search for ectopic and functional thyroid tissue is important before surgical care.

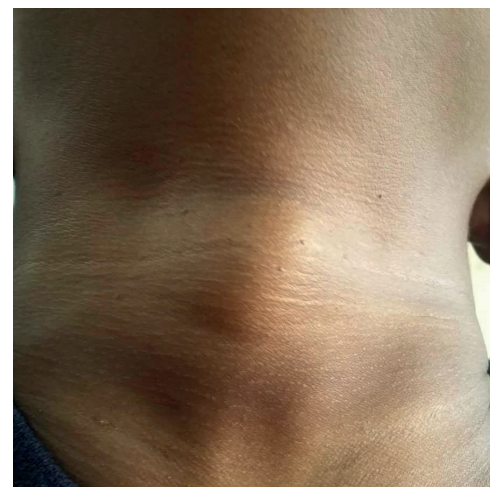


Figure 1. Anterior neck swelling observed at the patient's presentation for the scan.

On clinical examination, the patient had an anterior midline neck mass that moved more prominently with deglutition and not with tongue protrusion. It measured approximately

2 x 1 cm, with no differential warmth or tenderness. The swelling was soft to firm, attached to underlying structures and the overlying skin appeared normal (Figure 1). Fine-needle aspiration cytology (FNAC) was suggestive of a benign lesion.

A PTS showed a focal area of increased uptake in the anterior neck corresponding to both

the neck swelling and thyroid gland, thereby making the distinction between the TGDC and goitre difficult. Uptake was uniform but lower than that of the salivary glands and slightly higher than background activity. No evidence of ectopic thyroid tissue was observed in an expanded field of scan (head to abdomen), thus excluding the likelihood of ectopic thyroid tissue (Figure 2).

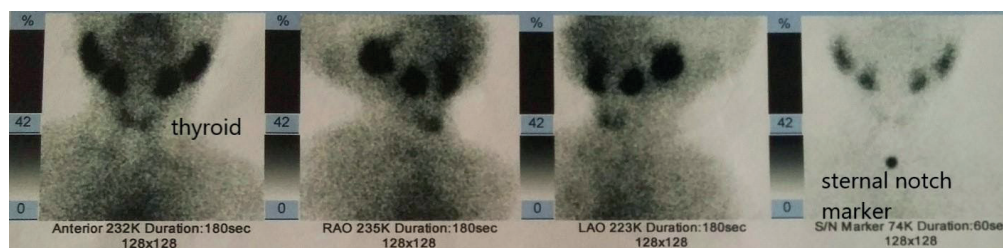


Figure 2. Per technetate thyroid scan showing anterior, right and left anterior oblique views as well as the sternal notch marker.

Subsequently, high-definition thyroid USS showed well-delineated normal thyroid tissue in the anatomical position as well as its size, outline and echogenicity along with a coexisting oval-shaped cystic mass of mixed intensity in the right para-median region. The cystic mass measured 14 x 10 x 15 mm, had a volume of 1.2 ml in the anterior neck, was attached to the thyroid isthmus and displaced the right thyroid lobe inferiorly, and was of normal colour flow Doppler interrogation, thereby confirming the potential for a TGDC.

Thereafter, the patient received a Sistrunk procedure. At surgery, there was an independent, tough, intact membrane containing serous fluid at the isthmus of the thyroid displacing the right lobe inferolaterally (Figure 3). It measured 24 x 2 mm and there were no enlarged lymph nodes in the surrounding tissues. The histological report confirmed a TGDC. The patient was discharged on the second postoperative day without any complications. At the follow-up clinic, a postoperative thyroid function test was within normal limits.

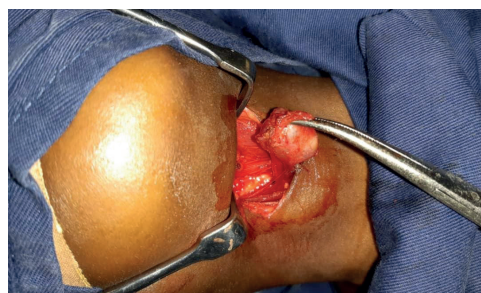


Figure 3. Intraoperative appearance of the isthmic thyroglossal duct cyst.

Discussion

In this case, the clinical presentation was that of an intra-thyroid benign cystic lesion with no cervical lymphadenopathy. Although TGDC is rarely associated with malignancy, papillary thyroid and squamous cell carcinoma have been reported in approximately 1% of patients with TGDCs.⁶ In this case, FNAC was suggestive of a benign lesion. In the management of TGDC, FNAC is reported as being safe and cost-effective in differentiating benign from malignant lesions.⁷

In the process of making a correct diagnosis of suspected TGDC, one must ascertain the presence of the thyroid gland and ensure that the only thyroid tissue is not within the cyst to be removed. This would prevent one from unnecessarily subjecting a child to life-long thyroid hormone replacement therapy due to iatrogenic hypothyroidism.⁸ Radiological and nuclear thyroid imaging localise eutopic and ectopic thyroid tissue, thereby complementing each other in clinical diagnosis. In this case, PTS helped to detect viable thyroid glands and the TGDC. The subsequent distinction between the TGDC and goitre was difficult since the increased uptake on PTS corresponded to both visible neck swelling and the thyroid gland. Thus, differential diagnoses included ectopic thyroid, TGDC, or TGDC with viable thyroid tissue. The suboptimal uptake of radioactivity by the neck mass further supported the latter differential.

Clinical challenges experienced in the management of this patient were resolved by the complementary imaging of PTS and USS. Neck USS showed a complex relationship of the TGDC and adjacent normal thyroid tissue, which is responsible for the superimposition of focal cervical uptake on PTS. This arrangement explains the non-movement of the cyst with tongue protrusion. Although TGDCs are typically located in the infra-hyoid area, other presentations include intra-laryngeal extension, intra-lingual cyst and lateral neck swelling.²

In thyroid ectopia, the entirety or part of the thyroid gland may be located in unexpected sites other than the anterior neck, which is considered a form of thyroid dysgenesis.¹ In this case, thyroid ectopia was excluded via additional nuclear imaging from the floor of the mouth to the supra-pubic region, with no ectopic thyroid being detected. The common locations of ectopia include the base of the tongue, trachea, submandibular, lateral neck and palatine tonsils, heart, thymus, oesophagus, stomach, duodenum, gallbladder and adrenals.⁹

Although isthmic TGDCs are rare, intra-thyroidal cysts have been reported.¹⁰ To our knowledge, this instance is an exceptionally

rare case report of intra-thyroidal TGDC in Nigeria. In the present case, we did not find the thyroglossal duct tract. Nevertheless, the patient had an isthmusectomy and Sistrunk's procedure to prevent the recurrence of the TGDC.

Conclusion

The clinical and radiological features of TGDCs are important for diagnosis. However, complementary imaging studies are essential for intra-thyroid TGDCs. This report adds to the published literature on cases of TGDCs.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Patients' consent for the use of images and content for publication

Patient's caregiver provided written informed consent for use of images as well as consent for publication.

What is new in this case report compared to the previous literature?

- This case report provides additional evidence to the literature regarding intra-thyroid thyroglossal duct cysts.

What is the implication to patients?

Clinicians managing patients with a suspicion of thyroglossal duct cyst would keep in mind the possibility, though rare, of its being intrathyroid.

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