Iodine 131 ablation of an obstructive lingual thyroid

Zeal Patel [1*], Lester Johnson [1]

1. Department of Radiology,Eastern Virginia Medical School,Norfolk, Virginia, USA

* **Correspondence:** Zeal Patel, M.D.S, Department of Radiology, Eastern Virginia Medical School P.O. Box 1980, Norfolk, VA 23501, USA *(patelzr@evms.edu)*

Radiology Case. 2009 Feb; 3(2):3-6 :: DOI: 10.3941/jrcr.v3i2.70

ABSTRACT

A 48-year-old woman undergoing surgery could not be intubated because of an oropharyngeal mass. CT and MRI revealed a 3 cm possible lingual thyroid mass, confirmed by Iodine-123 SPECT/CT. The patient underwent successful Iodine-131 ablation and has done well on thyroid hormone-replacement therapy. This case also demonstrates how modern cross-sectional imaging like SPECT/CT can appropriately be used in the patient diagnosis and management, and is of additional interest for including pre- and post-therapy MRI documenting efficacy morphologically.

CASE REPORT

CASE REPORT

A 48-year-old white female with a history of multiple medical problems, including hypothyroidism and prolonged shoulder pain, was scheduled to have an elective rotator cuff surgery.

The procedure was delayed secondary to failed intubation due to a mass on the posterior tongue. This prompted further evaluation with contrast enhanced computed tomography (CT), which revealed the mass, possibly a lingual thyroid (Fig. 1). The mass was further evaluated by magnetic resonance imaging (MRI) and measured 3.2 x 2.7 x 2.9 cm, also thought likely to be lingual thyroid (Fig. 2 and Fig. 3). Iodine-123 uptake and thyroid scan specifically confirmed lingual thyroid, with radioiodine accumulation precisely co-localized anatomically to the base of tongue mass by single photon emission computed tomography/CT fusion imaging (SPECT/CT) (Fig. 5). Iodine-123 scan showed no definable uptake in the thyroid bed and total uptake quantitatively in the low normal range, 14.5% at 24 hours.

The patient did have symptoms associated with this mass such as obstructive sleep apnea confirmed by a sleep study. She also experienced occasional dyspnea and dysphagia. The patient was unsure of details about previous surgery for removal of thyroid tissue (no childhood medical records available; no surgical scar on the neck). Reportedly she was on thyroid hormone supplementation since that surgery. She also had a uvulopalatoplasty approximately fifteen years ago which relieved some of her breathing difficulties. In attempts to help shrink the thyroid mass, the patient's thyroid hormone supplementation was increased for a period of 6 months, but she failed lingual thyroid suppression based on persistence of symptoms. The patient was opposed to undergoing surgery to remove the lingual thyroid. After discussion with the patient about her continued symptoms of occasional dyspnea, choking sensation, and sleep apnea, it was decided by the patient's referring endocrinologist, in consultation with otolaryngology (ENT) and nuclear radiology, that the patient would undergo radioiodine ablation therapy. Out of concern for airway compromise during radioiodine therapy, ENT recommended admission for observation during the therapy in case emergency tracheostomy might be required.

The patient's lingual thyroid was treated using 30.4 mCi of Iodine-131 orally. During the two day hospital stay, the patient's airway was examined and followed by ENT. There were no complications such as hoarseness or new/exacerbated airway symptoms. The patient was discharged with adequate follow-up.

The patient is doing well on thyroid hormone replacement therapy. She reports symptomatic improvement.

Her lingual thyroid measured 1.8 x 1.5 x 1.6 cm on follow-up MRI (Fig. 4) two years after ablation, decreased from 3.2 x 2.7 x 2.9 cm on pre-treatment imaging, for approximately 83% diminution in volume.

DISCUSSION

Lingual thyroid gland is a relatively rare clinical entity with incidence ranging from 1:3,000 to 1:100,000 (1, 2). It results from a failure of descent of the gland early in embryogenesis. The pathophysiology is unclear. When symptomatic, patients may present with dysphagia, choking sensation, or dyspnea (3). Perhaps because the condition is uncommon, there are few trials that compare different clinical management strategies for symptomatic lingual thyroid (4). Treatment of choice usually is exogenous thyroid hormone to correct hypothyroidism and to induce shrinkage of the gland (5). Surgical intervention or radio-iodine ablation may be required for selected patients who become symptomatic or have worsening of their initial symptoms while on hormone replacement therapy. Radioactive iodine does ablate other viable thyroid tissue -– a drawback that was not applicable for our patient as confirmed by the thyroid scan. However, about 70% of patients with lingual thyroid do not have a viable cervical thyroid (6). Surgery is, of course, a more invasive therapeutic option. Radioactive iodine ablation may be used less than surgical intervention due to fears of airway compromise secondary to thyroiditis and edema induced by radio-iodine (7). Hence, ablation has been generally reserved for patients who are either unfit for anesthesia or who refuse surgical intervention (8). A 6-year retrospective chart review by Danner, et al. reported successful treatment of two patients with lingual thyroid using radio-ablation (7). Though more retrospective studies are needed, our successful case in addition to other case reports in the literature (9) suggest that radio-iodine ablation of lingual thyroid can be a safe and effective management option which should be considered when formulating a treatment plan with the patient.

Successful applications of SPECT/CT and PET/CT, which use "hybrid" scanners to fuse functional nuclear medicine imaging with anatomic imaging, have been rapidly increasing. The direct correlation between tracer imaging methodologies and cross-sectional anatomy is very helpful in unusual disease manifestations and should be increasingly utilized with the potential to streamline diagnostic work-ups and help identify the most appropriate therapeutic approach. SPECT/CT technology has already proved to be practical for numerous studies, such as localization of ectopic parathyroid adenomas and parathyroid adenomas in patients with hyperparathyroidism who have had previous neck surgery (10). SPECT/CT fusion imaging is fast becoming a valuable oncological tool, and many authors have recommended its routine use because it can beneficially alter clinical decision-making and patient management (11, 12). This case nicely demonstrates clinical advantages of SPECT/CT, and is additionally of interest for including pre- and post-therapy MRI that documented efficacy of therapy morphologically.

TEACHING POINT

Radio-iodine ablation can be a safe and effective management option which should be considered when formulating a treatment plan for a patient with lingual thyroid. The use of hybrid imaging, like SPECT/CT, is especially helpful in the work-up of unusual disease manifestations.

ABBREVIATIONS

CT = Computed tomography
MRI = Magnetic resonance imaging
SPECT/CT = single photon emission computed tomography/CT fusion imaging
ENT = Ear-nose-throat/otolaryngology

REFERENCES

1. Benhammou, A, et al. Ectopic lingual thyroid. B-Ent, 2006. 2(3):121-2.

2. Williams, ED, Toyn CE, Harach HR. The ultimobranchial gland and congenital thyroid abnormalities in man. J Pathol, 1989. 159(2):135-41.

3. Williams JD, et al. Evaluation and management of the lingual thyroid gland. Ann Otol Rhinol Laryngol, 1996. 105(4):312-6.

4. Haddad A, et al. Management of the undescended thyroid. J Otolaryngol, 1986. 15(6):373-6.

5. Scott PM, et al. Lingual thyroid in a young woman. Hong Kong Med J, 1997. 3(1):111.

6. Kamat MR, et al. Lingual thyroid: a review of 12 cases. Br J Surg, 1979. 66(8):537-9.

7. Danner C, Bodenner D, Breau R. Lingual thyroid: iodine 131: a viable treatment modality revisited. Am J Otolaryngol, 2001. 22(4):276-81.

8. Kumar V. et al. Lingual thyroid gland: clinical evaluation and management. Indian J Pediatr, 2004. 71(12):e62-4.

9. Barthel A, Bornstein SR. Images in clinical medicine. Obstructive lingual thyroid. N Engl J Med, 2005. 352(1): p. e1.

10. Papathanassiou D, et al. SPECT/CT in localization of parathyroid adenoma or hyperplasia in patients with previous neck surgery. Clin Nucl Med, 2008. 33(6):394-7.

11. Ingui CJ, Shah NP, Oates ME. Endocrine neoplasm scintigraphy: added value of fusing SPECT/CT images compared with traditional side-by-side analysis. Clin Nucl Med, 2006. 31(11):665-72.

12. Mucientes Rasilla J, et al. SPECT-CT: A new tool for localisation of sentinel lymph nodes in breast cancer patients.. Rev Esp Med Nucl, 2008. 27(3):183-90.

FIGURES

Figure 1: 48-year-old white female with obstructive lingual thyroid. CT scan showing the pre-treatment lingual thyroid with rounded hyperdense mass at midline near base of tongue measuring 3.2 x 2.7 cm transverse, associated with narrowing of the oropharyngeal lumen to 4 mm AP. Dynamic CT with 2.5 mm thick axial sections after administration of i.v. contrast (120 ml Omnipaque 350).

Figure 2: 48-year-old white female with obstructive lingual thyroid. MRI showing the pre-treatment lingual thyroid. Sagittal postcontrast T1 weighted spin echo image (after i.v. 20 cc Omniscan). Mass measures 3.2 x 2.7 x 2.9 cm at base of tongue at level of foramen cecum, and is T1 hypointense (also hypointense on T2 weighted images, not shown).

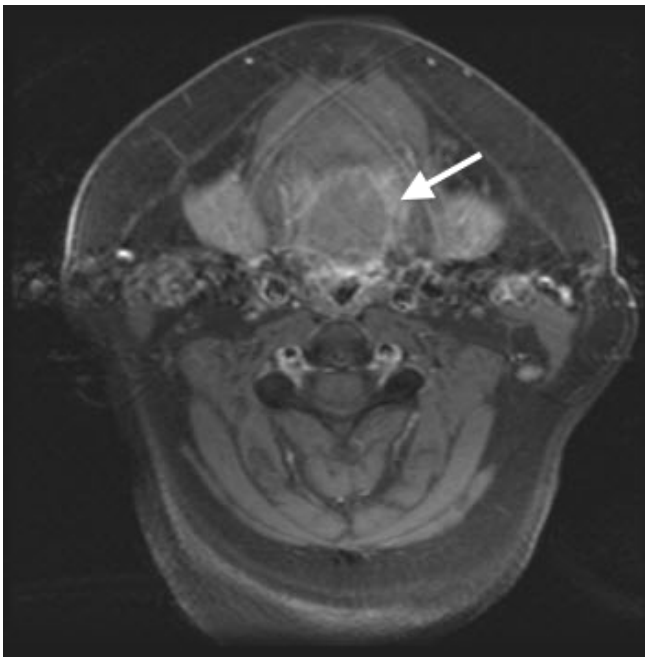

Figure 3: Axial T1 weighted spin echo images performed with fat saturation after i.v. administration of 20 ml Omniscan (gadolinium). Mass measures 3.2 x 2.7 x 2.9 cm at base of tongue at level of foramen cecum, hypointense with fairly uniform mild to moderate enhancement on T1 weighted fat saturated spin echo images (also hypointense on T2 weighted images, not shown).

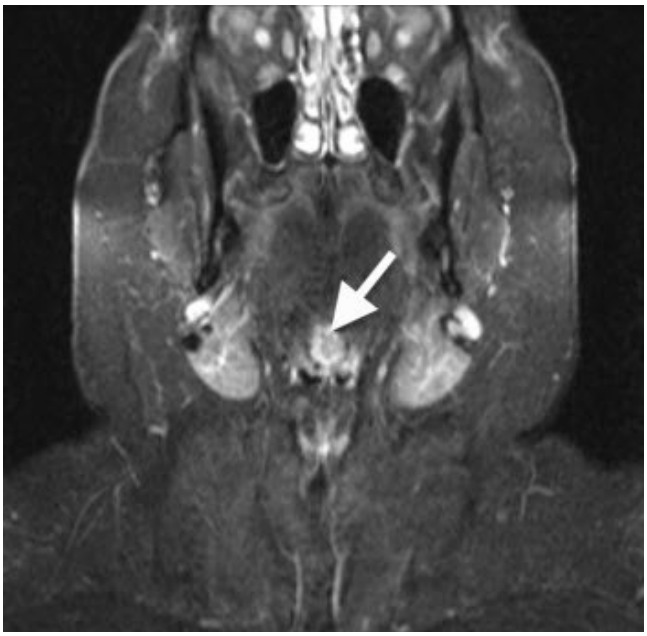

Figure 4: 48-year-old white female with obstructive lingual thyroid. Follow up MRI (approximately 25 months after therapy) showing the post-treatment lingual thyroid. Previously described mass now measures 1.8 x 1.5 x 1.6 cm. T1 weighted spin echo images performed with fat saturation in coronal plane after i.v. administration of gadolinium.

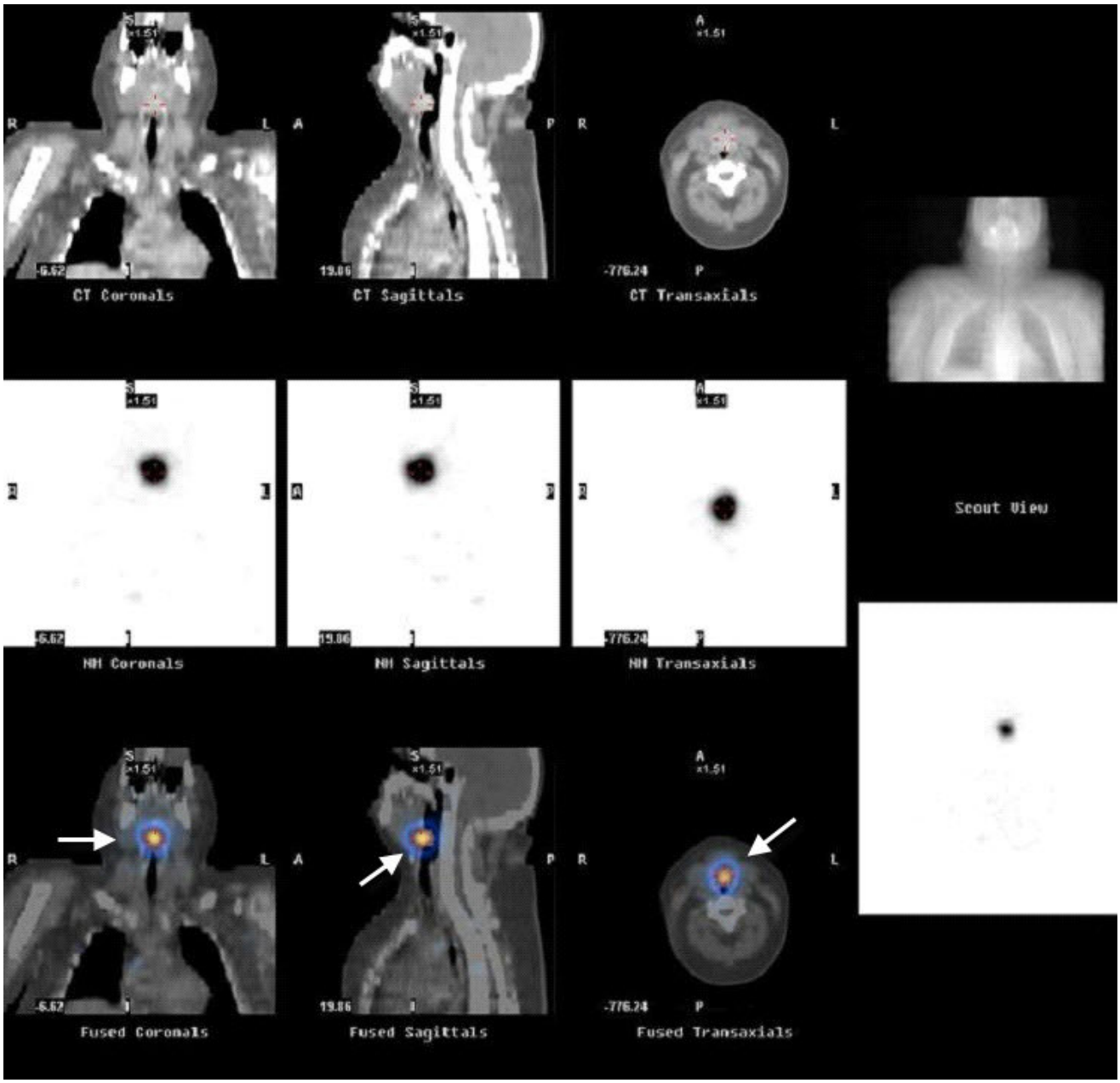

Figure 5: 48-year-old white female with obstructive lingual thyroid. SPECT-CT showing the pre-treatment lingual thyroid. Focal radioiodine uptake evident on SPECT localizes on fused SPECT/CT images to the midline base of tongue mass, confirming lingual thyroid. SPECT/CT images were performed approximately 24 hours after ingestion of 285 microcuries (10.5 MBq) 123Iodine using GE Hawkeye Infinia SPECT/CT camera.

KEYWORDS

lingual thyroid, radioactive iodine 131 ablation, SPECT, single photon emission computed tomography, MRI, magnetic resonance imaging, SPECT/CT, CT, computed tomography, 131Iodine, 131I