Ectopic Infrahyoid Thyroid with Coexisting Orthotopic Thyroid Gland

Clinical History:
A 37-year-old euthyroid female with a history of Hodgkin’s lymphoma within the orthotopic thyroid gland previously treated via subtotal thyroidectomy and thyroid replacement therapy presented for routine oncologic follow-up. Surveillance computed tomography (CT) and whole-body positron emission tomography-computed tomography (PET-CT) revealed an incidental ectopic midline infrahyoid thyroid.

Imaging Findings:
A contrast-enhanced CT of the neck demonstrated a residual small right thyroid lobe and an absent left thyroid lobe, consistent with the history of subtotal thyroidectomy. Images revealed well-circumscribed, nodular, avidly and homogeneously enhancing tissue at the level of the larynx, between the sternohyoid muscles, anterior to the laryngeal prominence of the thyroid cartilage and adherent to the embryological course of the thyroglossal duct (Figure 1). The attenuation value of this region of interest was 170 Hounsfield units (HU), similar to that of residual orthotopic thyroid tissue (Figure 3). On non-contrast CT obtained for whole body PET-CT, this tissue was hyperdense with a HU similar to residual orthotopic thyroid. Additionally it was not avid on fluorodeoxyglucose (FDG) PET-CT, thereby excluding thyroid neoplasm. Given the patient’s history, these findings are suggestive of co-existing midline infrahyoid thyroid ectopia.

Discussion:
Ectopic thyroid is a rare congenital anomaly (1 per 100,000-300,000 [1]) in which tissue is found in an atypical location due to failed embryologic migration. During development, thyroid follicular cells form a diverticulum from the foramen caecum. This diverticulum descends as the medial thyroid anlage, generating the thyroglossal duct. Thyroid parafollicular cells develop from the lateral neck and fuse in the midline with the anlage. Ectopic thyroid can be found anywhere along these migratory tracks [2, 3]. In many cases of ectopia, the thyroglossal duct remains patent, allowing the inferior aspect of the duct to persist, forming the pyramidal lobe, typically found deep to the medial border of the strap muscles [4].

Ectopic thyroid is most commonly found in the lingual region, with an infrahyoid location being rare [5]. Although patients may be hypothyroid, many are asymptomatic [2]. Patients can present with submandibular swelling.
indicative of failed migration of the lateral anlage [2, 6]. Symptomatic patients must be further evaluated with function
tests and/or ultrasound. Additionally, CT and magnetic resonance imaging (MRI) can be used to specify the location
of the ectopia for surgical planning [2]. Nevertheless, a technetium-99m (Tc-99m) pertechnetate scan is the best
imaging tool for evaluating functional ectopic tissue [2, 7]. Of note, thyroid pathology, including thyroid cancer
metastases, can be found in ectopic tissue and may present as a nodule or mass [8].

Tc99m pertechnetate scan demonstrates avid pharmaceutical uptake. Ultrasound will show a well-defined hyper-
isoechoic mass with a fine echo pattern similar to normal thyroid gland. It may also demonstrate an empty thyroid
bed. It is often used to diagnose thyroglossal duct cysts [2, 7, 9]. On non-enhanced CT, ectopic thyroid gland is
hyperdense, similar to orthotopic thyroid. On contrast-enhanced CT ectopic tissue will demonstrate homogenous
enhancement. On MRI ectopic tissue demonstrates intrinsic T1 isointensity or mild hyperintensity, as well as T2
hyperintensity and homogenous enhancement on post-contrast T1 weighted imaging [2, 9].

Treatment is based on the patient’s symptoms. Mass effect is alleviated with surgery. Medical therapy can slow an
enlarging ectopia and treat hypothyroidism [2]. Appropriate surveillance is needed.

Ectopic thyroid tissue is a rare congenital anomaly, and it may be noted as an incidental finding. Presence of ectopia
does not exclude coexisting orthotopic thyroid, nor does the presence of orthotopic thyroid exclude ectopia.
Therefore, imaging is crucial to diagnosis and subsequent management.

**Differential Diagnosis List:** Midline infrahyoid thyroid ectopia with coexisting orthotopic thyroid gland., thyroglossal
duct cyst, epidermoid or dermoid cyst, venous vascular malformation

**Final Diagnosis:** Midline infrahyoid thyroid ectopia with coexisting orthotopic thyroid gland.

**References:**

ultrasound. Ultrasound 22:192-198 (PMID: 27433219)
Feller KU, Mavros A, Gaertner HJ (2000) Ectopic submandibular thyroid tissue with a coexisting active and normally
23 (PMID: 11077386)
Zander DA, Smoker WR (2014) Imaging of ectopic thyroid tissue and thyroglossal duct cysts. Radiographics 34:37-
50 (PMID: 24428281)
Description: Note the well-circumscribed, nodular, homogenously enhancing tissue at the level of the larynx, between the sternohyoid muscles, anterior to the laryngeal prominence, and within the infrahyoid portion of the neck, suggestive of ectopic thyroid tissue. Origin: Department of Radiology, SUNY Upstate Medical University Hospital, Syracuse, NY.
Description: Note the avidly enhancing tissue inferior to the hyoid bone, anterior to the laryngeal prominence of the thyroid cartilage, suggestive of ectopic thyroid tissue (purple arrow). Origin: Department of Radiology, SUNY Upstate Medical University Hospital, Syracuse NY.
Description: Note the residual orthotopic thyroid tissue (green arrow) within the right thyroid lobe after patient’s thyroidectomy. Note the attenuation value of 174 HU. Origin: Department of Radiology, SUNY Upstate Medical University Hospital, Syracuse NY.
**Figure 4**

*Description:* Note that there is no uptake within the infrahyoid ectopic tissue (red arrow), thereby ruling out thyroid neoplasm within this ectopia. *Origin:* Department of Radiology, SUNY Upstate Medical University Hospital, Syracuse NY.