

Hyperechoic Presentation of Air in Thyroid – Esophagus Fistula

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1. Clinical Image

An 83-year-old woman with primary hypothyroidism and multinodular goiter had maintained euthyroid status for many years under Eltroxin supplementation. Patient was asymptomatic, however during routine follow-up, ultrasonography of the thyroid revealed numerous hyperechoic ‘jelly-like’ pseudo-calcifications at the right thyroid (Figure 1A). Fine needle aspiration cytology to rule-out cancer reported only a few macrophage cells. Further survey via computed tomography of the neck without contrast identified the right lobe of thyroid gland to contain hypointense air components indicative of fistula formation to the esophagus (Figure 1B). By location, air-filled lateral cervical lesions inferior to the pyriform sinuses are typically associated with Killian-Jamieson diverticulum or pyriform sinus fistula with tract formation related to superimposed infection; the latter is usually accompanied by symptoms of thyroiditis and, as this patient was asymptomatic, Killian-Jamieson diverticulum is preferred.

Ultrasonography is the generally preferred method for initial thyroid evaluation in the clinical setting, with special attention being paid to the possible presence of thyroid microcalcifications, due to its strong association with thyroid carcinoma [1, 2]. However, occasional ultrasound artifacts may invariably interfere with image production. While hyperechoic lesions are generally indicative of solid lesions such as bone or calcified structures, air has extremely low acoustic impedance relative to body tissues [3], and the extent of reflection between the air-tissue interface results in the phenomenon known as impedance mismatch. This causes air to possess a wide range of possible presentations when detected within fistula formations, whether it be hypoechoic tubular lesions, hyperechoic foci, or even echogenic lines [4].

As our case has proven, when dealing with the thyroid gland, clinicians should bear in mind the possibility of both air and calcified lesions appearing as hyperechoic speckles under sonographic examinations due to the unique nature of impedance mismatch.



Figure 1A: Thyroid sonography depicting multiple hyperechoic pseudo-calcifications

Figure 1B: Axial neck CT with presence of air indicating fistula to esophagus (arrow)

Figure 1C: Coronal neck CT shows lateral cervical lesion to be inferior to pyriform sinus

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