Unilateral Graves' disease

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Learning Points

1. Graves' disease can present with tracer uptake confined to a single thyroid lobe; this unilateral variant accounts for fewer than 30 reported cases and is not addressed in current guidelines.
2. Unilateral uptake on scintigraphy is not diagnostic on its own: cervical ultrasonography is required to demonstrate a structurally present contralateral lobe and to exclude thyroid hemiagenesis and a hyperfunctioning nodule, and thyrotropin receptor antibodies are required to establish autoimmune aetiology.
3. The apparently spared lobe is suppressed rather than absent and remains capable of autoimmune stimulation, so hyperthyroidism may recur in it after hemithyroidectomy; total thyroidectomy is therefore worth considering should surgery be chosen; the published experience is too limited to establish it as a formal recommendation.

Case Description

A 45-year-old man presented to the emergency department with dyspnea and chest pain. Electrocardiography showed sinus tachycardia, and cardiac biomarkers were negative. He reported increased stool frequency over the preceding month and unintentional weight loss of 5 kg over two months, without fever, night sweats, or lymphadenopathy.

Thyroid function testing showed a suppressed thyrotropin of 0.0009 mIU/L (reference range 0.4 to 4.0 mIU/L) and an elevated free thyroxine of 5.6 ng/dL (reference range 0.8 to 1.8 ng/dL). Thyrotropin receptor antibodies were positive. Technetium-99m pertechnetate scintigraphy (Figure 1) demonstrated intense, homogeneous tracer accumulation confined to the right lobe, with only faint activity over the isthmus and left lobe. Cervical ultrasonography confirmed a normally located left lobe of preserved volume, excluding thyroid hemiagenesis, and showed no nodule in either lobe. Together with the positive thyrotropin receptor antibodies, these findings established the diagnosis of unilateral Graves' disease. The patient was started on propranolol and thiamazole (methimazole); at 5 months, he was biochemically euthyroid.

Discussion

Unilateral Graves' disease (autoimmune hyperthyroidism in which tracer uptake is confined to one lobe of an anatomically bilobar gland) is rare: a systematic review published in 2025 identified only 27 reported patients, the right lobe being involved in roughly two-thirds of them [1]. The scan alone points away from the diagnosis because markedly unilateral uptake is more often produced by a toxic adenoma, by thyroid hemiagenesis with Graves' disease in the remaining lobe, or by unilateral thyroiditis [1,2]. The diagnosis therefore rests on the combination of cervical ultrasonography demonstrating two structurally normal lobes without a nodule and positive thyrotropin receptor antibodies [1,3]. The distinction matters because the apparently silent lobe is suppressed rather than absent and remains capable of autoimmune stimulation: contralateral recurrence after hemithyroidectomy has been reported, and although the published experience is too small to support a firm recommendation, total thyroidectomy is worth considering if surgery is chosen [1].

Keywords: Graves' disease, thyroid scintigraphy, technetium-99m pertechnetate, thyrotropin receptor antibodies, thyrotoxicosis, thyroid hemiagenesis.

Informed consent

Written informed consent for publication of this case and the accompanying image was obtained from the patient.

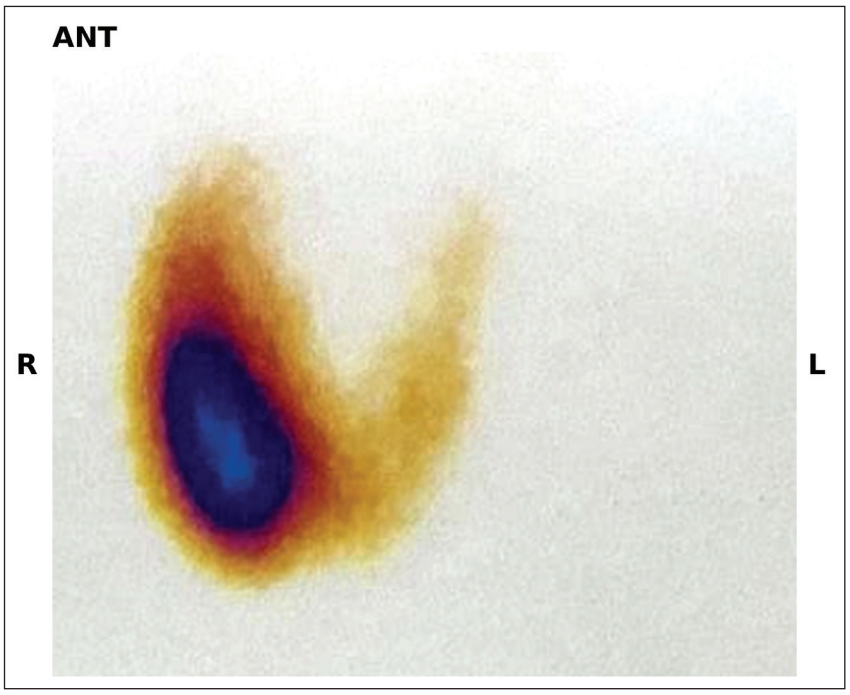


Figure 1. *Anterior technetium-99m pertechnetate thyroid scintigraphy. Intense, homogeneous tracer accumulation is confined to the right lobe; the isthmus and left lobe show only faint background-level activity. The study is displayed in the anterior projection, so the patient's right lobe appears on the left of the image. R, right; L, left.*

Conflicts of interest

The authors declare no conflicts of interest.

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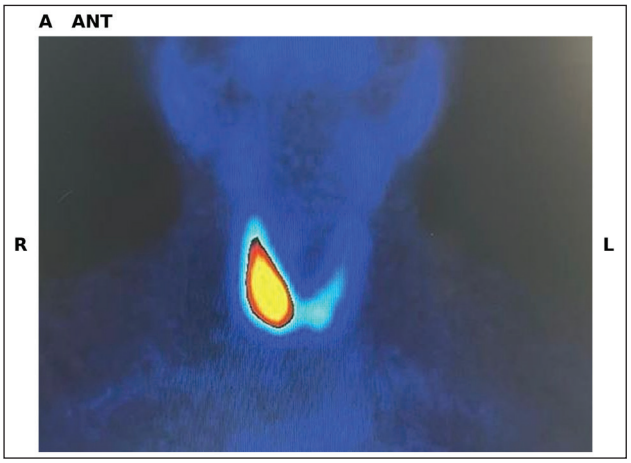
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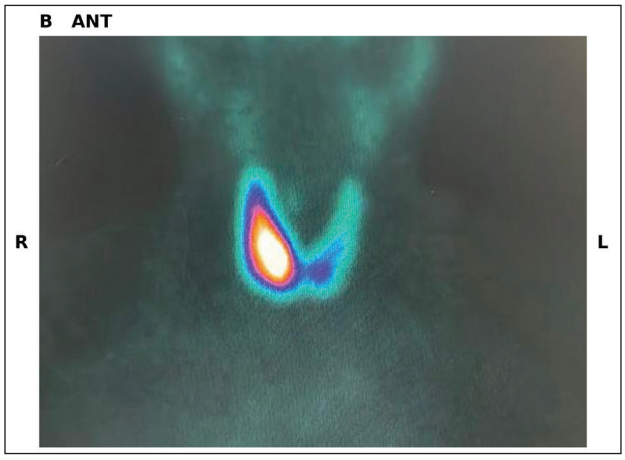
Additional thyroid scintigraphy images

These images were obtained from the same technetium-99m pertechnetate thyroid scintigraphy already reported in the manuscript.

No image has been altered other than by cropping and uniform resizing. Images are displayed in the anterior projection, so the patient's right lobe appears on the left of each panel. R, right; L, left.



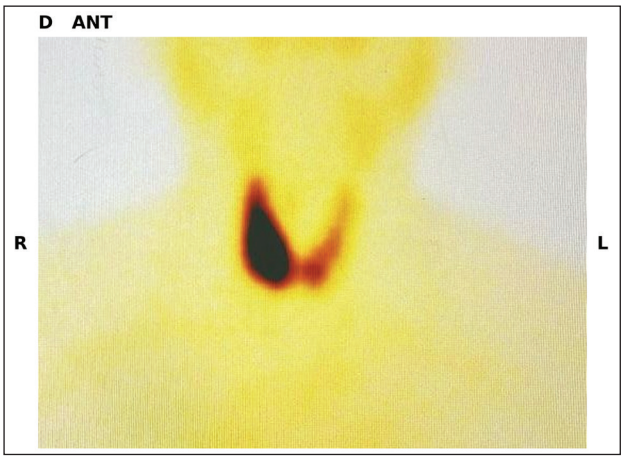
Panel A. *Anterior view, rainbow (blue-background) colour scale. Tracer is seen in the salivary glands and nasal mucosa, with intense accumulation in the right thyroid lobe and minimal activity in the left lobe.*



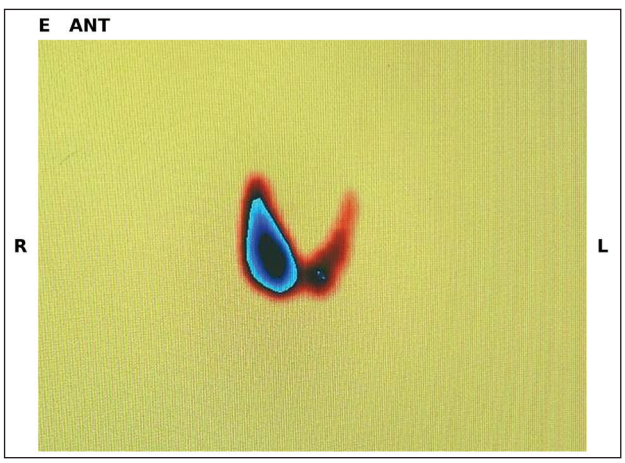
Panel B. *Rainbow colour scale over a different background window.*



Panel C. *Inverted greyscale.*



Panel D. *Inverted hot-metal colour scale.*



Panel E. *The right lobe reaches the top of the scale while the left lobe and isthmus remain at very low intensity.*