



INTRODUCTION

- Hyperthyroidism is diagnosed when there is elevation of serum free T3 and/or T4 accompanied by typical symptoms and signs. Biochemical evidence without clinical manifestations is referred to as subclinical hyperthyroidism. [9](#)
- Common causes of hyperthyroidism include Graves' disease, toxic multinodular goitre, functioning thyroid adenoma and thyroiditis. [10](#)
- The role of imaging in hyperthyroidism is to help establish the cause and this is usually done with a thyroid scintigraphy scan.
- Elevated T3 and T4 is usually accompanied by low levels of TSH. However, rarely hyperthyroidism is driven by high TSH levels in which case a TSH-secreting pituitary adenoma should be excluded.

- Typical cases of Graves' disease such as those with a diffuse goitre, ophthalmopathy and serological evidence may be treated without any prior imaging although scintigraphy may help confirm the diagnosis and exclude other causes.

THYROID SCINTIGRAPHY

- Usually performed with technetium-99m pertechnetate or radioiodine. [1,6,8](#)
- Advantages of technetium-99m pertechnetate: [1,6,8](#)
 - Lower radiation dose
 - Better image quality
 - Less waiting time after administration
 - Wider availability
 - Lower cost
 - Images can be obtained while the patient is taking anti-thyroid medications.
- Advantages of radioiodine: [2,3,7,8](#)
 - Has lower levels of vascular background activity which is useful when assessing retrosternal masses.
 - Has some advantages in the evaluation of thyroid nodules, although these are rarely of clinical significance.
 - Oral administration
- Scintigraphy is particularly useful for distinguishing Graves' disease from conditions such as subacute, silent and postpartum thyroiditis and factitious hyperthyroidism. [4,5](#)
- It is also useful for demonstrating toxic adenomas. [3](#)

REFERENCES

1. Meller J, Becker W. **The continuing importance of thyroid scintigraphy in the era of high-resolution ultrasound.** Eur J Nucl Med Mol Imaging 2002;29:425-38. (Review article)
2. Kusic Z, Becker DV, Saenger EL, et al. **Comparison of technetium-99m and iodine-123 imaging of thyroid nodules: Correlation with pathologic findings.** Journal of Nuclear Medicine 1990;31:393-9. (Level III evidence)
3. Intenzo CM, dePapp AE, Jabbour S, et al. **Scintigraphic manifestations of thyrotoxicosis.** Radiographics 2003;23:857-69. (Review article)
4. Price DC. **Radioisotopic evaluation of the thyroid and the parathyroids.** Radiol Clin of North Am 1993;31:991-1015. (Review article)
5. Meier DA, Kaplan MM. **Radioiodine uptake and thyroid scintigraphy.** Endocrinol Metab Clin North Am 2001;30:291-313. (Review article)
6. Summaria V, Salvatori M, Rufini V, et al. **Diagnostic imaging in thyrotoxicosis.** Rays 1999;24:273-300. (Review article)
7. Naik KS, Bury RF. **Review: Imaging the thyroid.** Clinical Radiology 1998;53:630-9. (Review article)
8. Smith JR, Oates E. **Radionuclide imaging of the thyroid gland: patterns, pearls, and pitfalls.** Clin Nucl Med 2004;29:181-93. (Review article)

Website

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