



REMARKS

1 Biochemical evaluation

- 1.1 Serum thyroid stimulating hormone (TSH) measurement has the highest sensitivity and specificity in the biochemical evaluation of suspected hyperthyroidism and should be used as an initial screening test. Diagnostic accuracy improves when both a serum TSH and free T4 / total T3 are assessed at the time of the initial evaluation.
- 1.2 Biochemically thyrotoxic:
 - 1.2.1 Suppressed / undetectable serum TSH
 - 1.2.2 Excess serum free T4 / total T3
- 1.3 Subclinical hyperthyroidism:
 - 1.3.1 Low serum TSH
 - 1.3.2 Normal serum free T4 / total T3
- 1.4 Autoantibody tests may be useful to differentiate the causes of hyperthyroidism:
 - 1.4.1 Anti-thyroid peroxidase (anti-TPO) antibody:
 - 1.4.1.1 Elevated in Graves' disease
 - 1.4.1.2 Low/absent in toxic multinodular goiter and toxic adenoma
 - 1.4.2 Thyroid stimulating immunoglobulin (TSI):
 - 1.4.2.1 Elevated in Graves' disease

2 Nuclear medicine (thyroid scintigraphy)

- 2.1 Thyroid scintigraphy facilitates the detection of focal and/or global abnormalities of thyroid gland, correlation of anatomy with function, and detection of aberrant or metastatic functioning thyroid tissue or residual normal tissue after therapy.
- 2.2 Contraindications of thyroid scintigraphy include pregnancy, lactation / breast feeding, recent iodine exposure.
- 2.3 Diagnostic accuracy of thyroid scan using Tc-99m pertechnetate is comparable to that using I-123 in patients with hyperthyroidism and is much cheaper and more widely available.
- 2.4 Thyroid cancer occurs in Graves' disease with an incidence of about 2%. Thyroid nodules larger than 1-1.5 cm should be evaluated before radioactive iodine (RAI) therapy. If a RAI scan is performed, any non-functioning or hypofunctioning nodules should be evaluated with fine needle aspiration (FNA) because they may be malignant.

3 US

- 3.1 US can assess the size, texture and vascularity of the thyroid gland and evaluate the sonographic features of non-palpable nodules.
- 3.2 US guided FNA or biopsy can be performed for nodules with suspicious features.

REFERENCES

1. Bahn RS, Burch HB, Cooper DS, Garber JR, Greenlee MC, Klein I, et al. American Thyroid Association, American Association of Clinical Endocrinologists. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Thyroid*. 2011; 21: 593-646.
2. Cooper DS, Doherty GM, Haugen BR, Kloos RT, Lee SL, Mandel SJ, et al. Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid*. 2009; 19: 1167-1214.
3. Gharib H, Papini E, Paschke R, Duick DS, Valcavi R, Hegedüs L, et al; AACE/AME/ETA Task Force on Thyroid Nodules. American Association of Clinical Endocrinologists, Associazione Medici Endocrinologi, and European Thyroid Association Medical Guidelines for clinical practice for the diagnosis and management of thyroid nodules. *Endocr Pract*. 2010; 16: 468-475.
4. The Royal College of Radiologists. *iRefer: Making the best use of clinical radiology*. 7th ed. London: The Royal College of Radiologists, 2012. Section E05.
5. Stocker DJ, Burch HB. Thyroid cancer yield in patients with Graves' disease. *Minerva Endocrinol*. 2003; 28: 205-212.
6. Abraham-Nordling M, Topping O, Hamberger B, Lundell G, Tallstedt L, Calissendorff J, et al. Graves' disease: a long-term quality-of-life follow up of patients randomized to treatment with antithyroid drugs, radiiodine, or surgery. *Thyroid*. 2005; 15: 1279-1286.
7. American College of Radiology. *ACR-SPR Practice Parameter For The Performance Of Scintigraphy And Uptake Measurements For Benign And Malignant Thyroid Disease*. Revised 2014 (Resolution 33). Reston: American College of Radiology; 2014.
8. Ross DS, Burch HB, Cooper DS, Greenlee MC, Laurburg P, Maia AL, et al. 2016 American thyroid association guidelines for diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. *Thyroid*. 2016; 26: 1343-1421.
9. Verburg FA, Aktolun C, Chiti A, Frangos S, Giovanella L, Hoffmann M, et al. Why the European Association of Nuclear Medicine has declined to endorse the 2015 American Thyroid Association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer. *Eur J Nucl Med Mol Imaging*. 2016; 43: 1001-1005.