

# Thyroid ultrasound testing

## What is ultrasound testing?

Ultrasound imaging is a non-invasive medical test that helps physicians diagnose and treat medical conditions.

A thyroid ultrasound is a painless procedure that uses sound waves to generate images of the thyroid gland and the adjacent structures in the neck. This procedure requires little to no special preparation from the patient.

As has happened for many other specialities of internal medicine, sonography is becoming an extension of the thyroid physical examination for endocrinologists.

## What are the recommendations?

According to the Italian Associazione Medici Endocrinologi (AME) and the American Association of Clinical Endocrinologists (AACE)<sup>1</sup> recommend the following for thyroid ultrasound testing:

- Assessment of thyroid nodules when the physical examination is unclear
- Characterisation of a cervical mass with the aim of differentiating between thyroid vs non-thyroid masses (cysts, lymphadenopathy) and between benign and malignant nodules
- Evaluating changes in thyroid parenchyma as multinodular goitre, Hashimoto's thyroiditis, subacute thyroiditis and Graves' disease
- Detecting postoperative residual or metastases to neck lymph nodes
- Screening high-risk patients for thyroid malignancy ie patients with a history of familial thyroid cancer, multiple endocrine neoplasia (MEN) type II and irradiated neck in childhood
- Therapeutic interventional procedures
- Diagnostic procedures (FNA cytology/biopsy)

The evaluation of nodules and, more generically, of 'cervical masses' is by and large the main field of application of sonography. Ultrasound is currently the imaging modality of choice for evaluating thyroid masses in children and pregnant females and studies highlighting the power of ultrasonography suggested that it would alter the clinical management of nodular thyroid disease in 2 out of 3 patients<sup>2</sup>.

Referrals to endocrinologists for incidentally discovered thyroid nodules have become increasingly common. Thyroid nodules may be noted on chest or neck computed tomography or magnetic resonance imaging (MRI) scans obtained for a myriad of reasons unrelated to thyroid pathology.

Doppler assessment of the carotid arteries, and positron emission tomography imaging may also reveal nodular thyroid disease, as does neck ultrasonography obtained to image parathyroids, cervical lymph nodes or salivary glands. Abnormal imaging studies suggesting thyroid pathology are almost invariably followed by ultrasonography of the thyroid.

The screening of high-risk patients for thyroid malignancy provides another important application of thyroid ultrasound especially considering that although clinically apparent thyroid cancer is relatively uncommon, clinically inapparent or occult thyroid cancer is quite common.

It is also worth noting that the proper management of the patient does never rely on the ultrasound alone, and actually is the integration of the ultrasound imaging with the clinical examination and biochemical tests that allows the clinician to make decisions impacting the treatment of the patient.

For example, in the case of diffuse parenchymal changes, like in thyrotoxicosis or thyroiditis, the sonographic features of these processes may be similar, but they have a different biochemical profile and clinical presentation. Hence, in these conditions, ultrasound findings should be viewed in relation to the clinical and biochemical status of the patient.

## **Hashimoto's thyroiditis**

Hashimoto's thyroiditis is associated with an increased risk of thyroid malignancies like follicular or papillary carcinoma and lymphoma.

Moreover, in patients with Hashimoto's thyroiditis, ultrasound examination may reveal the presence of satellite lymph nodes close to the thyroid which are useful in the diagnosis of the thyroiditis when correlated with ultrasound, clinical and laboratory findings.

These lymph nodes may also correspond to underlying malignant processes such as thyroid cancer and lymphoma, in patients with Hashimoto's thyroiditis and, when in doubt, fine-needle aspiration biopsy may be required to differentiate between benign and malignant cases.

## **References:**

1. Gharib H, Papini E et al. American Association of Clinical Endocrinologists and Associazione Medici Endocrinologi medical guidelines for clinical practice for the diagnosis and management of thyroid nodules. *Endocr Pract.* 2006;12:63-102.
2. Marqusee E, Berson CB et al. Usefulness of ultrasonography in the management of nodular thyroid disease. *Ann intern Med* 133:696-700

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