

Ultrasonography in thyroiditis

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Undoubtedly, amongst the thyroid gland diffuse diseases (diffuse goiter, Graves' disease, viral thyroiditis, autoimmune thyroiditis, etc.), lymphocytic thyroiditis (or Hashimoto's thyroiditis) is the most frequent, with higher incidence in women than in men, in a 9:1 ratio.

Several reasons have been attributed to the increase in the diagnosis of lymphocytic thyroiditis in the Brazilian female population.

One of these reasons, frequently discussed in the media, is the excessive consumption of iodine-enriched salt (by law, extra iodine is added to salt), which for three or four years, may lead genetically predisposed individuals to develop autoimmune thyroiditis. Besides, it is known that in tropical countries like Brazil, the food uses to be high in salt. Considering this fact, the mandatory addition of iodine to salt (at a range of 40 to 100 mg of iodine/kg of salt) was changed by Anvisa in 2003, to 20–60 mg of iodine/kg of salt.

At the same time, an increasing demand for thyroid ultrasound (US) has been observed, so presently this method is included in the routine screening for women. Additionally, ultrasound equipment technological developments allow the identification of minimal alterations of the thyroid gland.

As a result of the above mentioned factors, subtle alterations can be found in the thyroid parenchyma, allowing the early diagnosis of diseases. However, misinterpretation of these findings may generate problems in the management of the disease, besides anxiety for the patient.

In the case of autoimmune thyroiditis, ultrasound may or not demonstrate textural alterations. If so, from a subtle, diffuse textural alteration to a marked hypoechogenicity of the gland may be evidenced, remember-

ing that in 90% of times hypoechogenic glands result from autoimmune diseases, the greatest part of them represented by thyroiditis or Graves' disease. In cases of marked hypoechogenicity and hyperechogenic fibrotic tissue crossing the parenchyma, there is no doubt, it is a classic case of thyroiditis and the diagnosis is concluded.

However, heterogeneous textural patterns are included in this array of sonographic alterations. I am referring to the thyroid parenchyma intermixed with focal alterations mimicking nodules, a common finding in thyroiditis and that frequently leave us in doubt about its interpretation. Some tips to avoid this pitfall are: observe whether these hypoechogenic areas are present throughout the whole parenchyma (following a symmetrical pattern of distribution); observe whether there is no prominent hypoechogenic area; observe whether there is not a nodule conformation in the several cuts performed on a same dubious lesion. These findings are compatible with pseudonodular areas, false nodules meaning lymphocytic infiltrate typical of thyroiditis.

If the doubt persists, another resource can be utilized: the color Doppler mapping. In cases where a true nodule is not characterized, the color Doppler mapping demonstrates the absent deviation of vessels in that region of the thyroid parenchyma.

In case the study indicates a non-characterization of a true nodule, it is recommended that these hypoechogenic alterations are described as an "ill-defined hypoechogenic area" or a similar terminology, avoiding the term "nodule". This prudent measure is important since a physician faced with a sonographic report asserting the existence of a nodule, will be induced to proceed with the diagnostic investigation.

On the contrary, if any nodule is identified in the gland affected by thyroiditis, it must be more deeply studied by means of fine needle aspiration biopsy. Several authors have demonstrated an increased risk for

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carcinoma in patients with thyroiditis because of the intense mitosis and cellular proliferation in this gland stimulated by TSH (*thyroid stimulating hormone*) and due to the lymphocytic infiltrate (leading to the cellular death).

Additionally, the follow-up of patients with thyroiditis is important, considering that, as already proven, thyroid lymphoma, although rare, may be preceded by chronic thyroiditis.

US Color Doppler can provide valuable information. However, the care in the performance of this examination should be doubled in relation ultrasound B-mode scan. The technique, the transducer and equipment set-up are essential factors for the accuracy of thyroid US. Equipment sensitivity and knowledge on the technique (particularly the pressure of the transducer on the skin that must be minimal) should be added to these variables in the case of the color Doppler method. According to the Radiological Society of North America (RSNA) recommendations, the color Doppler mapping must be performed with a sensitive equipment and the operator must be especially trained for this purpose, otherwise it would rather not to utilize this method since the benefit to the patient could be dubious⁽¹⁾.

At color Doppler, thyroiditis usually presents more vascularized than the typical pattern of the thyroid gland. From a mild to quite accentuated increase in

vascularization may be observed. This data is particularly interesting in the evaluation of glands with minimal or dubious textural alteration, allowing the definition of the diagnosis according to the degree of the thyroid gland vascularization.

Another information provided by the US color Doppler is the spectral analysis of the thyroid arteries which in thyroiditis presents blood flow velocities within normality limits (not surpassing 40 cm/s); this does not occur in the Graves' disease (usually the blood flow velocity is > 50 cm/s in non-treated cases or in those with inadequate response to treatment), allowing the differential diagnosis between these two diseases when B-mode scan and/or color Doppler mapping present overlapping findings.

At the study completion, it is convenient to perform cervical lymph nodes scan. In cases of thyroiditis, round and hypoechoic level VI lymph nodes have been observed. This finding is especially significant, since level VI lymph nodes are specifically responsible for the drainage of tumors of larynx, thyroid and other structures. So, while the identification of lymph nodes in this region is reported, it is necessary to describe their characteristics, defining their pattern (suspect or reactional).

Reference

1. Management of thyroid nodules detected at US: Society of Radiologists in US Consensus Conference Statement. *Radiology* 2005;237:94-800.