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THYROID GLAND NODULES: ECHOGRAPHIC AND PATHOLOGY LAB CORELLATIONS-CHIMERIC IMAGES ON A RARE CASE REPORT

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Abstract: *Thyroid nodules are frequent in general population, but only 5-15 % of them are malignant. Ultrasonography provides important data, which helps the clinician to estimate if a nodule might be malignant. We report the case of 55 years old female with ultrasound presence of two nodules, on the left side* a *large hypoechoic of 1.5 cm thyroid nodule, with irregular margins and a rich intranodular vascularization, while on the right side the nodule was small, hypoechoic, without suspicious features of cancer. The histological examination identified a papillary thyroid microcarcinoma, follicular variant on the right nodule, while the suspicious nodule proved benign, a follicular adenoma.*

Key words: *thyroid nodule, papillary carcinoma thyroid, ultrasonography*.

1. Introduction

Thyroid nodules are a common condition in endocrinology, with a high prevalence that may reach on ultrasound 67% in general adult population [3]. Differentiating between a benign and a malign structure is mandatory for an appropriate course of treatment. Clinical and sonographic features are the key founding for the clinician in order to diagnose and treat proper this condition. Sonographic findings as irregular margins, microcalcifications, hypoechogenity, intranodular vascularization and the absence of a halos are highly suggestive for malignancy [5], [9], [10], [15], [19].

Differential diagnosis for thyroid nodules, in order to identify the nature of them involves both clinical and para-clinical approaches. First approach is the clinical examination with an accurate medical history and anamnesis, followed by paraclinical echographic examination, that can bring into light the first diagnosis for thyroid nodules. Secondly, a biopsy or, if necessary, after surgery pathological examination of the resected piece is the definitory or confirming diagnosis for the initial findings. Rarely, though the initial diagnosis is well balanced in according to the sonographic criteria, the second diagnosis does not confirm the first one and then appears what clinicians like to call chimeric images of malignant and benign thyroid nodules.

Papillary thyroid carcinoma is the most accounting for 96.0% of all total new

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endocrine cancer. It is typically associated on ultrasound with microcalcifications, corresponding histologically to "psammoma bodies" [6], [12].

We report the case of 55 years old female with two thyroid nodules found on ultrasound: the larger nodule with ultrasound characteristics of suspicious features that proved to be benign after the pathology lab, while the smaller one without suggestive ultrasound elements for carcinoma proved to be a papillary microcarcinoma after the pathological examination.

2. Case Report

A 55-year-old female sought consult for assessment and management of a one-year history of dysphagia, irritability, palpitations and sleep disturbance.

The patient had no significant medical history without any pathological or physiological conditions that might be taken into consideration for the case. In addition, she denied having a family history of thyroid disease, exposure to neck irradiation, or any other risk factor for thyroid cancer.

After primary examination, we decided to perform an ultrasound exam and to order the specific hormones panel.

Ultrasonography thyroid exam revealed the presence of two nodules:

a. On the left side, we found a hypoechoic thyroid nodule with the dimensions of 1.37 × 1.5x 0.87 cm. It had irregular margins and a type III Doppler vascularization: intranodular flow with multiple vascular poles chaotically arranged, without significant perinodular vessels.

b. On the right side, we found a small nodule, sized 0.33x 0.35x 0.25cm. The nodule was hypoechoic, without suggestive elements for carcinoma.

The lab results on the standard thyroid hormones panel was the next step in order to determine thyroid function parameters.

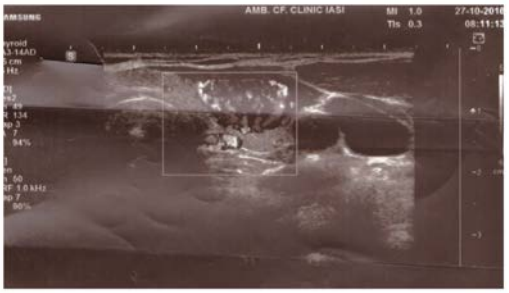

Fig. 1. *Doppler image of left thyroid lobe: the nodule with type III vascularization.*

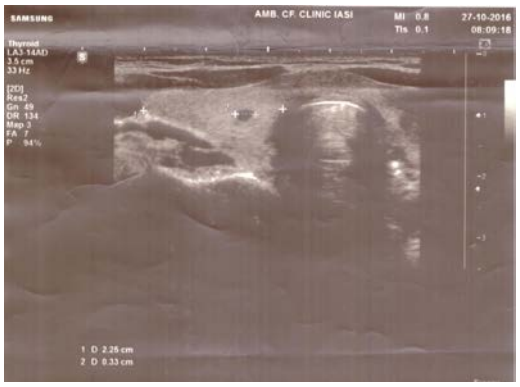

Fig. 2. *Thyroid ultrasonography image of the right thyroid lobe nodule.*

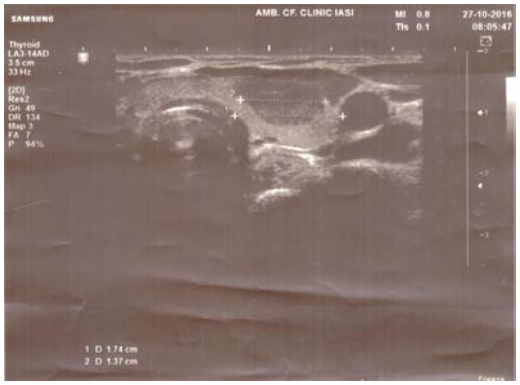

Fig. 3. *Thyroid ultrasonography image of the left thyroid lobe nodule*

The results were:

a. TSH was 1.63 μUI/mL (reference range, 0.4-4 μUI/mL),

b. free thyroxine was 14.6 pmol/L (reference range, 12–22; International System of Units [SI]

The results showed a euthyroid status of the thyroid being the reason that the patient did not received a hormonal treatment.

3. Treatment and Results

After considering all the results and the primary examination, the recommendation was to perform a total thyroidectomy. Also, after the ultrasound examination, we did not find any signs of lateral lymph metastasis (hypoechoic lymph nodes larger than 10 mm, with an increased anteroposterior diameter and internal calcification). In this case, we did not recommend prophylactic lateral lymph node dissection to be performed. Lateral cervical lymph node metastasis is an important indicator for the cancerous disease evolution and prognostics. Found at the initial investigation, these types of papillary thyroid carcinoma cases have an aggressive and high rate of recurrence.

The long-term outcome of prophylactic lymph node dissection for papillary thyroid cancer is still debated. The ATA (American Thyroid Association) guideline recommends this type of intervention for patients with advanced thyroid tumor (T3 and T4) and clinically involved lateral neck nodes (cN1b). In order to avoid surgical complications, prophylactic lateral neck dissection is not recommended in the cases where ultrasonography does not identify signs of metastasis.

The pathological thyroid was removed in a standard thyroidectomy procedure and was send to the path lab in order to determine the after-surgery course of treatment and the nature of the nodules.

The pathological report described a thyroid nodule partially encapsulated with enlarged nuclei, nuclear overlapping, nuclear clearing, without vascular permeation. Immunohistochemistry was performed in order to differentiate a true follicular carcinoma from follicular variant of papillary carcinoma. The tissue was positive for cytokeratin polypeptide 19 (CK19), HBME1 and negative for CD56. The final pathologic conclusion was that the small nodule on the right side was a follicular variant of papillary thyroid microcarcinoma, while the suspicious nodule on the left side was benign, a follicular thyroid adenoma.

Although recent studies consider active surveillance as a new choice for a small minority of papillary microcarcinoma, we think that total thyroidectomy is the best long-term solution. Long-term after-surgery care included substitution treatment for the thyroid hormones with close monitorisation of the hormones panel every 3 months. A special attention will be payed to thyroglobulin and antithyroglobuline antibodies in order to estimate a residual thyroid tissue after total thyroidectomy.

At three months follow-up, the patient is stable under treatment with levothyroxine (L-T4) substitution, and in a high dose in order to inhibit growth tumor by suppressing the TSH. Supraphysiological doses of L-T4 are commonly used to treat thyroid cancer after thyroidectomy in order to decrease the risk of recurrence. The goal of the treatment is to maintain a level of TSH slightly below the lower limit of normal (0.1–0.5 mU/L), as the patient is considered to have a low risk thyroid cancer. The patient did not receive radioactive iodine therapy because the diagnostic criteria were considered to have a low risk of recurrence.

Various studies showed that radioactive iodine therapy does not bring any

improvement in case of microcarcinoma. I-131 guards the recommendation for differentiated thyroid cancers that have spread to lymph nodes or to distant sites. The patient, even though she was more than 45 years old, the primary tumor was less than one centimeter in diameter with no extrathyroidal extension and no nodal metastasis, so it did not meet the criteria for the radioactive iodine therapy.

4. Discussion

Thyroid papillary carcinoma is the most common type of thyroid malignancies (70-80%) and 1% of all types of cancer [3], [8], [13]. World Health Organization defines papillary microcarcinoma as PTC with a maximum size as 10 mm. It has a prevalence of 30-60% of all types of thyroid cancer [7], [9]. Papillary microcarcinoma has an indolent disease course, with a survival rate of 99% on 20 years [8], only 4 -16% of these patients were found with recurrent disease [2].

Some authors proved that tumor size larger than 8 mm is more likely to be associated with metastasis [4], but cancer multicentricity, extrathyroidal extension and lymph node metastasis remain the most reliable predictors for the cancer evolution [11].

Another elements like: male gender, age below 45 years old, extrathyroidal invasion, bilateral thyroid cancer, multifocality, high stiffness on elasto-graphy, BRAF-V600E mutation-positive, hTERT mutation-positive are associated with an advanced pathological stage with lymph node metastasis and distant metastasis [14].

The sonographic evaluation is mandatory in routine clinical practice, features like grey-scale, Doppler and elastography can predict malignancy. A taller than wide nodule with an absent halo, intranodular vascularization and microcalcifications are highly suggestive for malignancy, with a specificity of 93% and a sensivity of 27% [17], [20]. Although all the suspicious elements taken singly can be poorly predictive, the association between them in the same nodule are increasing the specificity and sensitivity.

We presented a rare case that points out that ultrasonography has limitations, a suspicious nodule proved benign, while a smaller one and apparently benign proved to be a papillary microcarcinoma. The accuracy of ultrasound in detecting malignant nodules is high, nearly 80 % in case of solid, hypoechoic nodule, but the majority of all nodules are benign [2], [18].

Studies proved that the diagnostic accuracy of ultrasound is associated with a higher accuracy for larger than 10 mm nodules, while a smaller nodule has a low specificity (37.6%) [16]. Also, microcalcifications that are pathognomonic for papillary thyroid cancer are less frequently in nodules < 10 mm than in larger nodules (36.6 sensitivity and 87.9 specificity vs 51.4% sensitivity and 91.6 specificity) [16] . Although suggestive, microcalcifications are not a constant sign of malignity, being reported in malignant structures in 40.4% cases but also in 22.2% of benign thyroid nodules [12].

In the same thyroid gland, a very small nodule and apparently benign on ultrasound proved to be a papillary microcarcinoma, that being an unexpected and rare result, as ultrasound criteria are strict and high accurate in diagnosing the thyroid nodules. Based on medical literature and our clinical experience, we consider this case a rarity, as malignant elements for a nodule are clearly defined, though not confirmed by the ultrasound as in majority of the cases, but secondly diagnosed and confirmed by the after-surgery pathological report. The subject of chimeric images on rare cases is just a way of naming the proper course of diagnosing

microcarcinomas in thyroid nodules, as in many of these cases only the after surgical pathological report gives the confirmation of a suspect nodule. Ultrasound alone, though is the golden-standard in evaluating the thyroid nodules, can bring these chimeric images that fit to the US standards and criteria for benign or malignant nodules, but it is not a certain diagnostic tool for all the cases.

The clinical experience of the clinician and the biopsy or pathological lab examination is the definitory diagnostic tool that should be the base for the proper course of treatment in rare cases of chimeric images.

5. Conclusions

The process of investigating and diagnosing thyroid nodules is not an easy algorithm. It involves a very good anamnesis, an accurate patient history and the imperious necessity of paraclinic investigations.

Using high advanced imagistic techniques as CT scan or MRI does not bring to many information about the structure of this glad. Ultrasound examination is the golden-standard for discovering abnormalities in the structure of the thyroid gland.

Ultrasound is the main mandatory exam to be performed after any abnormal values in the hormone panel lab work. Many cases, though present without any modification in the lab work but after the complete echography of the thyroid, there are many signs that must be considerate in order to diagnose correctly a thyroid dysfunction or abnormality.

In this particular case, ultrasound alone did not bring an accurate result in the first place but it determined that the thyroid had a very high chance of cancerous disease. The main diagnosis and the course of treatment, even though started from a false premise, after surgery and pathology lab results, showed that even with high accurate ultrasound techniques we cannot determine the true nature of the thyroid nodules based only on imagistic criteria's. Clinical elements like age, masculine gender, neck exposure to irradiations and a rapid development of a thyroid nodule are giving important data for the clinician judgement in order to pursuit the appropriate treatment.

Multidisciplinary and paraclinic diagnosing tools are the best approaching algorithm in order to diagnose and treat thyroid nodules and the abnormalities that occur.

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