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Hot Thyroid Nodule Revealing a Papillary Microcarcinoma: A Case Report

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Abstract **Case Report**

Introduction*:** Autonomously hyperfunctioning thyroid nodules, also known as "hot nodules", are defined by increased uptake of radiotracers compared to the surrounding thyroid parenchyma on scintigraphy. It has been believed that hot nodules have a low rate of malignancy, while an increasing number of thyroid carcinoma cases are being diagnosed in patients with hyperthyroidism. ***Case Presentation*:** A. J, a 50-year-old patient. She presented with signs of hyperthyroidism. Laboratory tests showed peripheral hyperthyroidism with an inhibited TSH of 0.03 µIU/ml and T4L of 37 pmol/L. The scintigraphy revealed a focus of hyper fixation almost completely affecting the right lobe which corresponded to a hot nodule most likely pre-extincted in the remaining parenchyma. The patient was initiated on synthetic antithyroid medication and, after achieving euthyroidism, she was referred to surgery. Right loboishmectomy was performed. The histological study revealed a 0.5 cm intralobular non-encapsulated microcarcinoma papillary on a background of thyroid dystrophy. ***Discussion*:** The initial evaluation of a thyroid nodule begins is the measurement of serum TSH and the performance of a thyroid ultrasound, followed by a thyroid radionuclide scan if the TSH is subnormal. Malignant nodules are usually non-functioning. The prevalence of malignancy associated with a hot nodule range between 1-10.3%. In many cases, thyroid cancer is not known preoperatively but is found incidentally during the postoperative histological examination of the thyroid. Most of these malignancies were of papillary carcinoma and less often follicular or Hurthle histological types, and they are small in size, and the majority are microcarcinomas. ***Conclusion: Further evaluation and characterization of the association between a hot thyroid nodule and malignancy are needed. In the case of our patient, the discovery of papillary carcinoma was incidental and was made during the postoperative histological examination of the thyroid.

Keywords: Hot nodule, hyperfunctioning thyroid nodule, papillary thyroid microcarcinoma, hyperthyroidism, thyroidectomy.

INTRODUCTION

Thyroid nodules are a commonly encountered clinical entity and are usually benign, occurring in approximately 90-95% of cases [1]. Autonomously hyperfunctioning thyroid nodules, also known as "hot nodules", account for 5-10% of all thyroid nodules. These nodules are defined by increased uptake of radiotracers compared to the surrounding thyroid parenchyma on scintigraphy. Hot nodules may be present as a single nodule or as a toxic multi-nodular goiter (TMNG). While traditionally it has been believed that hot nodules have a low rate of malignancy, an increasing number of thyroid carcinoma cases are being diagnosed in patients with Graves' disease, toxic goiter, and functioning thyroid adenoma [2]. Recent studies have challenged the assumed low risk of malignancy in hot nodules, suggesting that the incidence of cancer may have been underestimated. We present the case of a woman with hyperthyroidism due to a hyperfunctioning thyroid nodule who was diagnosed with papillary thyroid microcarcinoma after surgical resection.

CASE PRESENTATION

A. J., a 50-year-old female patient with type 2 diabetes for 8 years and current treatment with oral antidiabetic drugs, was followed up in internal medicine for ANCA-associated vasculitis. She has been presenting for 1 year with signs of hyperthyroidism, such as palpitations, thermophobia, and weight loss.

Upon physical examination, she was found to be tachycardic at 100 BPM, with a palpable thyroid of normal size without any nodules or adenopathies. Laboratory tests showed peripheral hyperthyroidism with inhibited TSH at 0.03 µIU/ml and T4L at 37 pmol/L. Cervical ultrasound showed a normal-sized thyroid with an appearance of chronic thyroiditis, and scintigraphy revealed a hyper fixation focus almost completely affecting the right lobe which corresponded to a hot nodule that was highly likely pre- extinction in the remaining parenchyma (Figure 1). The patient was initiated on synthetic antithyroid medication and, after achieving euthyroidism, she was referred to surgery. Right loboishmectomy was performed and the anatomopathology revealed a 0.5 cm intralobular non-encapsulated microcarcinoma papillary on a background of thyroid dystrophy (Figure 2). The patient was followed with clinical evaluations, including measurement of serum TSH level. In addition, she underwent periodic imaging tests including ultrasonography.

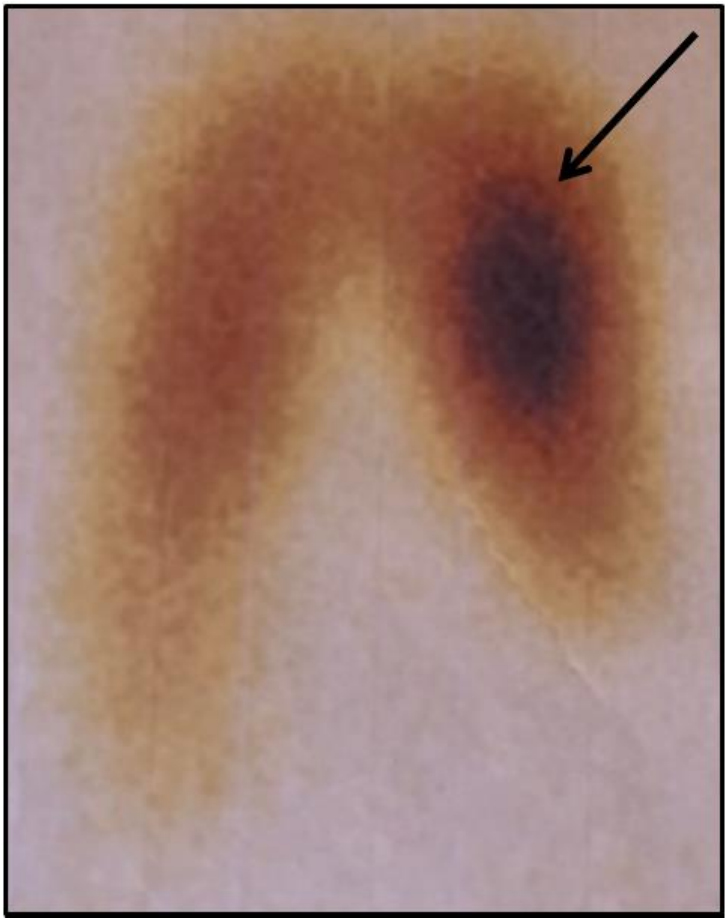

Figure 1: Our patient's scintigraphy: hot nodule

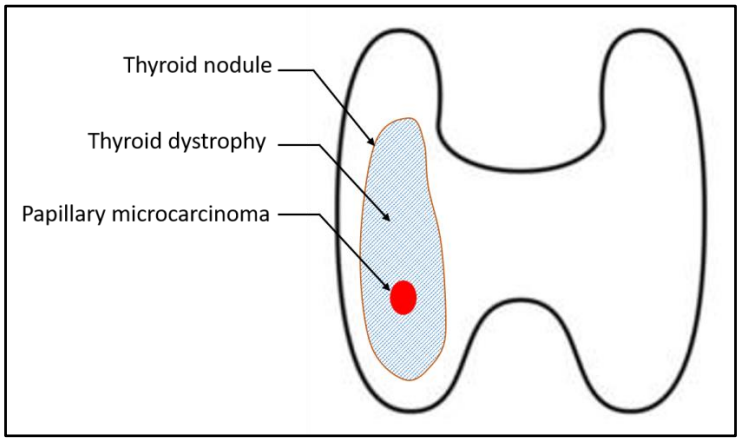

Figure 2: Illustrative schema of the anatomopathology result

DISCUSSION

The initial evaluation of a thyroid nodule begins with the measurement of serum TSH and the performance of a thyroid ultrasound, followed by a thyroid radionuclide scan if the TSH is subnormal. Malignant nodules are usually non- functioning [3]. It is generally thought that hyperfunctioning nodules rarely harbor malignancy [4, 5]. The prevalence of malignancy associated with a hot nodule range between 1-10.3% [2]. In a review of 30 reports of warm or hot thyroid carcinomas published between 1989 and 1996, only 10 were clearly described as located inside the hot nodule [6]. A recent study demonstrated higher-than-expected malignancy rates in hot nodules, with an overall malignancy rate of 8.5% [7]. In a review by Mirfakhraee *et al.*, the prevalence of intra-nodular thyroid malignancy among hyperfunctioning "hot" nodules ranged from 0-12.5%, with a weighted prevalence rate of 3.1%. The incidence of thyroid cancer in patients with autonomous adenomas may be underestimated, as large doses of radioiodine may be used to treat such cases if they do not undergo surgery, which may be sufficient not only to cure the thyrotoxicosis but also cancer [2]. This is likely due to multiple factors, including the cause of hyperthyroidism, the different criteria for choosing surgery as the treatment modality of hyperthyroidism, the extent of thyroidectomy (lobectomy or total thyroidectomy), but most likely due to the extent of histological examination of the removed thyroid tissue and possibly also the geographical variation in the incidence of thyroid cancer in general [2]. In many cases, thyroid cancer is not known preoperatively but is found incidentally during the postoperative histological examination of the thyroid [2]. A study of 60 hyperthyroid patients diagnosed with thyroid cancer [8] reports that only 12 were operated on for suspicion of thyroid cancer preoperatively, whereas in the remaining 48, in whom the indication for thyroidectomy was treatment for thyrotoxicosis, thyroid cancer was incidentally found after surgery. No significant differences were found in clinical characteristics at presentation between coincidentally discovered thyroid cancers and preoperatively known clinical cancers. However, Miccoli *et al.*, reported that the diagnosis of incidental thyroid carcinoma in patients who were operated on for the benign disease was more frequent in euthyroid patients than in patients with hyperthyroidism [9]. Most of these malignancies were of papillary carcinoma and less often follicular or Hurthle histological types. Most carcinomas are small in size [2] and the majorities are microcarcinomas. As in the case of our patient, with a hot nodule without signs pointing to malignancy, treated surgically due to its size and toxicity, with discovery on the histological study of a papillary microcarcinoma of the thyroid within a dystrophic thyroid parenchyma. The identification of the carcinoma within the hot nodule can be technically difficult and requires close interdisciplinary collaboration. Since none of the historical, biochemical, or radiologic characteristics that were assessed seem to predict malignancy in the collected cases of hot nodules, we recommend that hot nodules that are not treated surgically be considered for biopsy if high-risk historical or suspicious sonographic features are present or if these nodules grow over time.

CONCLUSION

Further evaluation and characterization of the association between a hot thyroid nodule and malignancy are needed. Meanwhile, physicians need to be aware and vigilant for the possibility of malignancy in a hyper-functioning thyroid nodule, even in the absence of suspicious sonographic features or a history of radiation exposure. In the case of our patient, the discovery of papillary carcinoma was incidental and was made during the postoperative histological examination of the thyroid.

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