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Hashimoto's Thyroiditis and Papillary Thyroid Carcinoma in a Pregnant Patient: Case Report

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Abstract

Background: Papillary thyroid cancer (PTC) is classified as well-differentiated cancer of the thyroid gland, it is a common form of thyroid cancer. Hashimoto's thyroiditis (HT) is an autoimmune affection associated with a chronic inflammation, established as an influencing factor in PTC determining an immune response that leads to uncontrolled cell proliferation and that may be stimulated by pregnancy hormones.

Aim: To investigate chronic thyroid inflammation in HT may be an influencing factor in PTC especially in specific hormonal state like pregnancy.

Case: A 32-years-old pregnant patient with history of benign thyroid nodule during her first pregnancy that went without complication, HT was confirmed biologically after delivery of her first child due to hypothyroidism symptoms. She presented after that a rapidly massive increase of the thyroid gland size. The ultrasound result confirmed the pejorative progression of the thyroid nodule. Meanwhile a 12 Week 2nd pregnancy was discovered biologically. The patient underwent a total thyroidectomy in 19th Week of pregnancy and the diagnosis of a PTC was histologically confirmed. Radioiodine treatment was postponed after birth delivery, in the meantime she received suppressive dose of Levothyroxine treatment.

Result: The patient was satisfied due to reduction of cervical mass after surgery, the resolution of hypothyroidism symptoms, and choosing the safest treatment option for her second pregnancy.

Conclusion: this case discussed the possible links between chronic inflammatory ground in HT, the occurrence of PTC and the effect of pregnancy on these entities. It also highlights the importance of ultrasound imaging in screening pejorative lesions.

Keywords: Papillary Thyroid Carcinoma, Hashimoto's Thyroiditis, Pregnancy.

1. Introduction

Hashimoto's thyroiditis (HT) is considered the most frequent autoimmune disease, and the most prevalent

endocrine affection. It is less common in men than in women and is usually diagnosed in patients aged from 30 to 50 years old [1].

Hirabayashi R, et al., 1965 were the first authors to describe the association between Hashimoto's thyroiditis and Papillary thyroid carcinoma (PTC) in 1955. From that time on, the coexistence between these two affections have been reported by various authors [2].

These two disorders may have an appealing relation because of chronic inflammation that may lead to a neoplastic disease. Some investigations have shown that patients with HT have a higher risk of development of a PTC while others have a decreased risk [3].

During pregnancy, the hypothesis of HT predisposing patients to the development PTC remains controversial.

It is still not clear whether HT is induced by the tissue response to cancer, or if HT induces the development of PTC, or if they are just concomitant incidental findings.

A-32-year-old pregnant woman who had a previous history of benign thyroid nodule and HT, was diagnosed with papillary thyroid carcinoma during follow-up. In this report case, we discuss the possible impact of pregnancy hormones on the occurrence of thyroid cancer, diagnostic assessment, and therapeutic arsenals.

2. Case report

A 32-year-old woman who had no family history of thyroid cancer but had a family history of thyroiditis and goiter (sister, mother, cousins) was diagnosed in her first pregnancy with an hyperechogenic euthyroid nodule measuring 9x11mm classified TIRADS 3 with a thyroid stimulating hormone level at 2.45 mUI/ml, the pregnancy and delivery went without complication. Four months after giving birth to her first child, the patient developed symptoms of hypothyroidism such as weight gain and fatigue, the thyroid-stimulating hormone (TSH) level was 6.9 µUi/ml (0.25–5 µUI/ml) and serum antiperoxidase antibodies was high > 1000 UI /ml. The diagnosis of Hashimoto Thyroiditis (HT) was established and the patient received 50 µg per day of levothyroxine.

During follow-up, the patient noticed a rapid augmentation of thyroid size with a very prominent cervical tumefaction , examination revealed stage III goiter (World Health Organization classification) (Figure 1). Meanwhile a second 12-week pregnancy was confirmed biologically based on high levels of BhCG. The thyroid ultrasound imaging revealed a suspicious thyroid nodule measuring 63x56mm with irregular margins, a marked hypo-echogenicity and microcalcifications classified TIRADS 5.

Figure 1: Rapid increase in thyroid size during patient's second pregnancy

The importance of fine needle aspiration biopsy (FNAB) was well explained to the patient in this case, unfortunately she refused to undergo the test because of aichmophobia. In the 19th week of pregnancy she underwent a complete thyroidectomy, the anatomopathological result was compatible with a bi-focal papillary thyroid carcinoma (PTC) of the right lobe T2NxMx with capsule tumor invasion without vascular invasion, the histological results found also a microcarcinoma of the left lobe without any capsule tumor or vascular invasion.

The Patient was a candidate of therapeutic radioiodine 100 millicurie (mCi), however she didn't receive the cure due to its possible teratogenic effect on the fetus.

Both department of gynecology and nuclear medicine considered that medical termination of pregnancy was not optional and that the patient can receive the cure of therapeutic radioiodine in post-partum.

The patient is followed up in our department and receives 200 µg per day of levothyroxine, TSH level was (< 0.1mUI/ml). The patient's pregnancy went without complications and she will receive therapeutic radioiodine in post-partum.

3. Discussion

Papillary thyroid cancer (PTC) with Hashimoto's thyroiditis (HT) pathogenesis remains unknown. Many hypotheses mention that HT causes a chronic inflammation ground that leads to a structural destruction of the thyroid gland, high levels of TSH stimulates in long term the thyroid tissue which may cause the outcome of malignancy. It was also demonstrated in HT that Lymphocyte T organ-specific suppressor dysfunction may cause the apparition of malignant tissue. In terms of Molecular Biology studies, it was found that Tumor protein P53, Rearranged During Transfection RET genes, and B cell lymphoma 2 were significantly correlated the incidence of thyroid malignant tumors [4].

Multiple biomolecular investigations confirmed the existence of mutation of the oncogenes RET/PTC and genetic modification for PTC and HT patients without having a clinical manifestation [5].

During pregnancy, the physiology thyroid tissue undergoes multiple changes. The thyroid gland increases by 30% of its initial size and it has been suggested that an elevated level of pregnancy hormones B-hCG , which has a high resemblance with TSH, stimulates the development of previously existing thyroid nodules and stimulates the occurrence of newly formed nodules as well as malignant thyroid tumor tissue that may develop into a thyroid carcinoma during pregnancy [6]. Our patient was 12 weeks second pregnancy when she presented a massive augmentation of thyroid volume with a preexisting HT.

Over the period from 1950 to now, several authors have reported a possible association of HT with differentiated thyroid cancer [7]. Even though the multiple incidence rates, different environmental, genetic factors, and numerous histological profiles of Hashimoto's thyroiditis were involved and used in diverse investigations.

In a meta-analysis, Singh B, et al., 1999 demonstrated that patient with HT were more affected by PTC than in patients with other thyroid disorders. Furthermore, patients with thyroid cancer had a higher incidence rate of association between PTC and HT than other types of thyroid cancinomas [8]. These findings, suggest indirectly, that subjects with HT might present a higher vulnerability and an increased risk towards the development of PTC.

The ultrasonographic appearance of malignant nodules is similar in patients with HT to malignant nodules in patients without chronic inflammation. Though, widespread lesions like microcalcifications, and hypoechoic non-mass-like lesions are excluded in this entity [9]. In this case report, the ultrasound imaging has showed a nodule suspect of malignancy, hypoechogenic, with irregular edges measuring

63x56mm with microcalcifications classified TIRADS 5.

The first diagnostic tool for a cytologic evaluation of thyroid nodules is FNAB. Its accuracy in detecting malignancy depends on the type of thyroid tumor. It has been proved that FNAB is 90% more accurate in medullary cancer or undifferentiated cancer and 80% accurate for papillary tumors. However, for follicular tumors, the accuracy of FNAB decreases to 40% [10]. Despite several attempts to convince our patient to undergo the FNAB biopsy, she refused due to aichmophobia.

The conservative approach is the most optimal approach of thyroid cancer management discovered during gestation. If surgery is indicated and the patient refuses or does not intend to have surgery during pregnancy, it would be reasonable to postpone the intervention until postpartum. However, if the patient chooses to have surgery for a total thyroidectomy during pregnancy, she should be aware of the transient state of hypothyroidism that may occur. It is well advocated that 19 to 22 weeks gestation would be the optimal time for surgery, in addition, it has been shown that if surgery is performed before 24 week of gestation the additional concerns related to fetal viability are reduced [11]. Our patient underwent a total thyroidectomy in her 19th week of pregnancy and the post-operative evolution went without complications.

The anatomopathological result in our patient was compatible with a bi-focal papillary thyroid carcinoma of the right lobe T2NxMx with capsule tumor invasion and without vascular invasion, the histological results found also a microcarcinoma of the left lobe without any capsule tumor or vascular invasion.

The second most commonly used post-operative adjuvant therapy after a radical thyroidectomy for non-pregnant patient with well-differentiated thyroid carcinoma is radioactive iodine I-131. Its administration has a role in eradicating persistent tumoral thyroid cells or metastatic distant lesions. The Patient was a candidate of therapeutic radioiodine 100 mCi, however she didn't receive the cure because of the potential side effects of this treatment on pregnancy.

Both department of gynecology and nuclear medicine considered that medical termination of pregnancy was not optional and that the patient can receive the cure of therapeutic radioiodine in post-partum.

Oral post-operative administration of supraphysiologic doses of levothyroxine is used to suppress endogenous production of TSH having an important deprivation of growth promoting influence. Targets of TSH should be defined according to risk range. Our patient received supraphysiologic and suppressive dose of levothyroxine 200 µg per day with TSH levels <0,1mUI/ml.

The pregnancy went without complications and the patient will be a candidate of therapeutic radioiodine in post-partum.

In terms of follow-up, it is planned according to the extent of the surgery performed and the stage of the disease. All patients should undergo serum assay for thyroglobulin, thyroglobulin antibodies, TSH, free thyroxine fT4 and neck ultrasound [12].

Regarding the pregnancy-related changes on thyroid cancer, it was shown in a cohort study, that the prognosis of thyroid differentiated cancer still similar between pregnant and non-pregnant patients of same age. Two groups were compared: first group: 61 pregnant women with thyroid carcinoma and second group: 528 non-pregnant women, both groups had the same age. There was no difference statistically significant between the two groups in terms of tumor size, tumor type, time to treatment, presence of metastases, recurrence rate, and mortality [13].

Conclusion:

The case of our young pregnant patient who had a history of a benign euthyroid nodule and HT showed up a rapid progression of cervical mass and was early diagnosed with papillary thyroid carcinoma using

an ultrasound imaging which leads to the interest of this radiological tool especially in a suspicion of malignancy. This case illustrates the valuable role of ultrasound characteristics in early diagnosis of malignant thyroid affections, it shows also that pregnancy and chronic inflammation of thyroid tissue may be a field leading to malignant affections.

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