Transient T3 toxicosis associated with Hashimoto's disease

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ABSTRACT

In its early course, Hashimoto's disease may present as thyrotoxicosis (Hashitoxicosis). This usually manifests as elevated free T4 and suppressed thyroid-stimulating hormone (TSH). We report the unusual occurrence of an elevated T3 level in a patient with Hashimoto's disease. A 27-year-old woman presented with an incidental finding of elevated free T3 levels, normal free T4 levels, and low TSH levels, which were confirmed with follow-up testing. Her only medication was a birth control pill. There was no family history of thyroid disease. Physical examination was normal. She tested positive for thyroid peroxidase and thyroglobulin antibodies. Thyroid heterogeneity was noted on ultrasound. Two months later, her TSH, free T3, and free T4 were normal and remained normal on subsequent testing. No treatment was administered due to spontaneous resolution of her T3 toxicosis. This case highlights a novel presentation of T3 toxicosis in the setting of Hashimoto's disease with spontaneous resolution.

KEYWORDS Hashimoto's disease; Hashitoxicosis; hyperthyroidism; hypothyroidism; thyroid disease; toxicosis

Hashimoto thyroiditis is most commonly associated with hypothyroidism.¹ Antibodies to thyroid antigens (usually thyroperoxidase and thyroglobulin) are found in a majority of patients.² Rarely, thyrotoxicosis can result from Hashimoto's disease. This can be seen early in the course of the disease and manifests with an elevated free T4 and a suppressed thyroid-stimulating hormone (TSH) level (Hashitoxicosis). This hyperthyroid phase usually results from increased synthesis and release of thyroid hormone. Hashitoxicosis is seen in about 5% of cases of Hashimoto's thyroiditis.¹ Although it usually subsides over time, a small proportion of patients will have waxing and waning of thyroid hormone levels. Some with Hashitoxicosis may need antithyroid treatment pending such resolution.

CASE DESCRIPTION

A 27-year-old woman had evidence of T3 toxicosis 4 to 5 months prior to presentation. No symptoms of weight loss or gain, heat or cold intolerance, palpitations, hair loss, polyuria, or polyphagia were noted. There were no ocular complaints or a family history of thyroid disease. An oral contraceptive was the patient's only medication. The patient

denied taking any over-the-counter supplements. Her physical exam was entirely normal, with no palpable thyroid abnormalities. Her laboratory determinations measured using the Roche Cobas 6000 revealed an elevated free T3 (4.22 pg/mL, normal range 2.3–4.2 pg/mL), a normal free T4 (1.62 pg/mL, normal range 0.93–1.7 pg/mL), and a suppressed TSH (0.01 U/mL, normal range 0.27–4.2 U/mL). A thyroid ultrasound showed a heterogeneous appearance of the thyroid gland without discrete nodules or masses. The patient's thyroid antibodies were found to be positive with an elevated thyroid peroxidase (664 IU/mL, normal being <9 IU/mL) and an elevated thyroglobulin antibody (2 IU/mL, normal being <1 IU/mL). A thyroid-stimulating immunoglobulin level was not obtained because there was a low suspicion of Graves' disease and because her T3 toxicosis had resolved spontaneously when she was seen. No treatment was initiated due to the resolution of symptoms. Two subsequent tests, done 2 to 3 months later, revealed normal TSH values along with normal free T3 and free T4 levels. The patient continued to be asymptomatic.

DISCUSSION

Our patient presented with high levels of free T3 and normal levels of free T4, along with suppressed levels

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of TSH, consistent with T3 toxicosis. The patient tested positive for elevated thyroid peroxidase and thyroglobulin antibodies, confirming Hashimoto's thyroiditis. Prior cases of Hashitoxicosis have been associated with high free T4 levels and suppressed TSH and have responded to antithyroid medications. T3 toxicosis is usually associated with thyroid nodules. In our patient, heterogeneous echogenicity of the thyroid gland was noted on ultrasound.

We found two cases in the literature reporting T3 toxicosis with Hashimoto's disease.^{3,4} One case showed progression of T3 toxicosis to hypothyroidism within 7 months.³ Another demonstrated Hashitoxicosis induced by excess beta-human chorionic gonadotropin due to a hydatiform mole.⁴ Moreover, T3 production in Graves' disease is extraordinarily rare, with studies finding T3 toxicosis occurring in around 5% of cases.⁵ It should be noted the free T3 in our case was slightly above reference range, and the free T4 was near the upper limit of the reference range. The repeat TSH did remain suppressed, so it is less likely that the elevation in free T3 was spurious. Studies using an accurate, but less available, method of liquid chromatography–tandem mass spectrometry have shown variability in the reference ranges for free T3 and free T4 immunoassays.⁶ Regardless, the possibility that autonomous T3 production may occur in

the presence of thyroid heterogeneity in Hashimoto's is an intriguing and novel possibility in Hashitoxicosis.

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1. Unnikrishnan A. Hashitoxicosis: a clinical perspective. *Thyroid Res Pract* 2013;10(Suppl 1):5–6. doi:10.4103/0973-0354.106803.
2. Caturegli P, De Remigis A, Rose NR. Hashimoto thyroiditis: clinical and diagnostic criteria. *Autoimmun Rev*.2014;13(4-5):391–397. doi:10.1016/j.autrev.2014.01.007.
3. Mallya RK, Isaacs AJ, Bayliss R. Hashimoto's thyroiditis presenting as T3 toxicosis. *Br Med J*. 1978;2(6151):1535–1536.
4. Yoo JY, Moon HJ, Park CY, et al. A case of Hashimoto's thyroiditis with transient T₃-thyrotoxicosis induced by hydatidiform mole. *J Korean Soc Endocrinol*. 2005;20(3):294–298. doi:10.3803/jkes.2005.20.3.294.
5. Figge J, Leinung M, Goodman AD, et al. The clinical evaluation of patients with subclinical hyperthyroidism and free triiodothyronine (free T3) toxicosis. *Am J Med*. 1994;96(3):229–234.
6. Welsh KJ, Soldin SJ. Diagnosis of endocrine disease: how reliable are free thyroid and total T3 hormone assays? *Eur J Endocrinol*. 2016;175(6):R255–R263. doi:10.1530/EJE-16-0193.