A Case of Dynamic Evolution of Thyrotoxicosis on Follow-up

Cong Qing Miao[1], De Chuan Lu[1], Jing Jing Liu[1], Hui Xu[2] and Xin Long Meng[1]

ABSTRACT

A 55-year female patient presented with subacute thyroiditis (SAT) with a unique dynamic evolution, along with changes in the level of antithyroglobulin antibody, which has been rarely reported. Her thyrotoxicosis gradually worsened over the next three months. Severe hypothyroidism then rapidly developed and did not resolve. For the whole disease course, antithyroglobulin antibody levels were significantly increased, indicating dynamic changes in thyroid function. It has been suggested that the duration of thyrotoxicosis in SAT is highly variable, which is probably related to an underlying autoimmune mechanism. It is therefore, necessary to rule out other causes of thyroiditis.

Key Words: *Thyrotoxicosis, Subacute thyroiditis, Antithyroglobulin antibody.*

INTRODUCTION

Thyrotoxicosis is the clinical state associated with excess thyroid hormone activity, usually due to inappropriately high-circulating thyroid hormones.[1] Subacute thyroiditis (SAT) is one of the common reasons of thyroiditis. A triphasic sequence is commonly observed, in which patients undergo an initial phase of thyrotoxicosis, lasting three to six weeks, followed by a phase of hypothyroidism, which may last several weeks or up to six months. Patients usually return to euthyroidism within 6 to 12 months.[2-4]

The present study describes a 55-year female patient with SAT, who had a unique dynamic evolution of thyroid function, along with changes in the level of antithyroglobulin antibody, which is rarely reported.

CASE REPORT

In August 2017, a 55-year woman received treatment at the Endocrinology Department of Jiangdu People's Hospital of Yangzhou City because of palpitations and weight loss. The patient had experienced palpitations, slight weight loss, and transient neck pain without fever for one month before treatment. Laboratory examinations were as follows: thyroid stimulating hormone (TSH): 0.10 (normal, 0.27-4.20 mIU/L), free T3 (FT3): 8.45 (normal, 3.10-6.80 pmol/L), free T4 (FT4): 30.17 (normal, 12-22 pmol/L), TSH-receptor antibody (TRAb): 0.98 (normal, ≤1.75 IU/L), antithyroglobulin antibody (TGAb): 454.80 (normal, <10.00 IU/mL), and erythrocyte sedimentation rate (ESR): 5 (normal, 0-20 mm/h). Thyroid color ultra-sonography was conducted using a real-time linear array 10-MHz transducer that demonstrated a hypo-echoic pattern and rare blood flow in the bilateral thyroid (Figures 1A and 1B). Radioiodine uptake was 3.8% at 2 h (normal, 4-25%) and 1.3% at 24 h (normal, 18-54%). The patient was treated with propranolol without other special treatment. Thyroid function and TGAb were reexamined after about one month: TSH was <0.10 mIU/L, FT3: 28.26 pmol/L, FT4: >100 pmol/L, and TGAb: 540.80 IU/mL. Thyroid function was clearly abnormal than before, and the patient was hospitalised to clarify the diagnosis.

Except for slight weight loss and palpitations, the patient had no neck pain, fever, or other symptoms at the time of admission, and steroids or glucocorticoids were not given to the patient. The value of ESR increased to 30 mm/h. Radioiodine uptake remained low. Thyroid color ultrasonography demonstrated an enlarged thyroid gland with diffuse hypoechoic pattern and low blood flow (Figures 1C and 1D). The result of thyroid fine needle aspiration cytology (FNAC) was as follows: hyperplastic phagocytes and few inflammatory cells and follicular epithelial cells, but multinuclear giant cells were not observed (Figure 2).

Thyroid function returned to normal about one month after discharge from hospital, but TGAb level continuously increased to 579.40 IU/mL. The value of ESR returned to normal. Thyroid function had changed about 2 months after discharge. Thyroid function was as follows: TSH = 90.32 mIU/L, FT3 = 0.74 pmol/L, and FT4 = 1.54 pmol/L. The patient's TGAb level continuously increased to 669.50 IU/mL. The patient was treated with 50g levothyroxine every day. Thyroid function improved three months after discharge, and TGAb level decreased to 621.60 IU/mL. Levothyroxine dose was then adjusted to 75g every day. Thyroid color ultrasonography demonstrated echo disorder, slightly thickened isthmus, rich blood supply, and the size of the thyroid gland had

Department of Endocrinology[1] / Pathology[2], Yangzhou University Affiliated Jiangdu People's Hospital of Yangzhou City, China

Correspondence: Dr. Cong Qing Miao, Department of Endocrinology, Yangzhou University Affiliated Jiangdu People's Hospital of Yangzhou City, No. 9, Dongfanghong Road, Jiangdu District, Yangzhou City, Jiangsu Province 225200, China
E-mail: miaocongqing@126.com

Received: October 23, 2018; Accepted: February 26, 2019

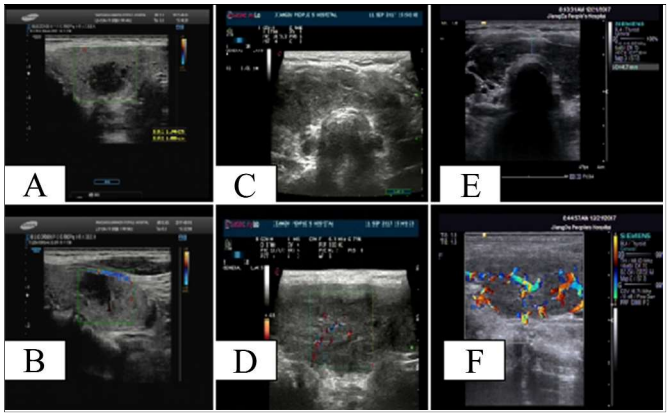

Figure 1: Thyroid color ultrasonography scan demonstrating hypoechoic pattern in the bilateral thyroid (A) and rare blood flow in the hypoechoic areas (B) on August 10, 2017, diffuse hypoechoic pattern (C) and low blood flow (D) on September 11, 2017, and echo disorder, slightly thickened isthmus (E), and rich blood supply (F) on December 21, 2017.

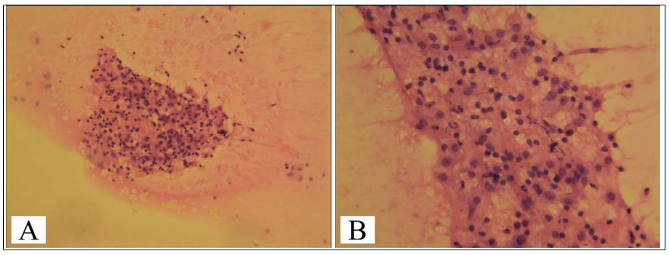

Figure 2: Thyroid fine needle aspiration cytology demonstrating hyperplasia phagocytes and a small number of inflammatory cells, namely, follicular epithelial cells (A) HE stain, ×200; (B) HE stain, ×400).

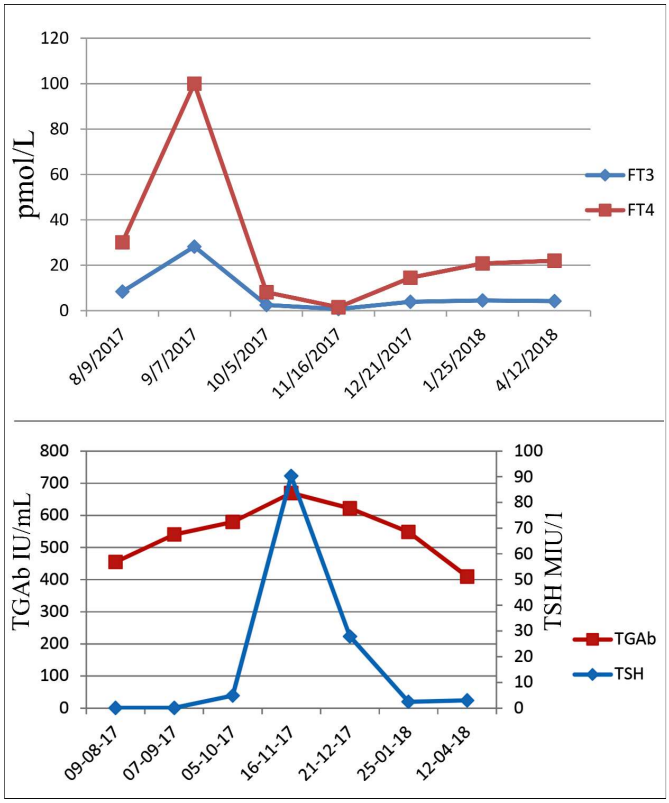

Figure 3: The dynamic evolution and follow-up process of thyroid function and TGAb levels. FT3: free T3, FT4: free T4. TGAb: antithyroglobulin antibody. The values of more than 100 and less than 0.1 were transformed into 100 and 0.1, respectively, to facilitate graphical.

returned to normal (Figures 1E and 1F). In the following months of follow-up, thyroid function gradually returned to normal, and TGAb levels decreased.

DISCUSSION

The diagnosis of SAT is based on clinical symptoms of thyrotoxicosis, elevated ESR values, reduced or absent radioiodine uptake, and typical ultrasound features. The characteristic ultrasound features of SAT include enlargement of the thyroid gland, focal hypoechoic zones with indefinite borders, and lack or low flow on color Doppler in these areas.[1] Thyroid cytological examination shows the presence of multicellular giant cells. Mild hypothyroidism may occur during the recovery period, and severe and long-term hypothyroidism is rare. This patient had transient neck pain, low radioiodine uptake, and negative TRAb. Thyroid cytological examination showed hyperplastic phagocytes, a small number of inflammatory cells and follicular epithelial cells, but multinuclear giant cells were not found, which makes it difficult to establish a diagnosis of SAT. These atypical pathological changes are probably related to the duration of SAT, which had been over two months at the time of FNAC examination. Typical ultrasonography features, dynamic evolution of the thyroid size from gradual enlargement to normal, and the blood flow from being low to high, support the diagnosis of SAT (Figure 1). However, this disease evolution is not common. Thyrotoxicosis in the patient gradually worsened within a span of three months, and ESR level was normal in the early stage and slightly increased in the later stage. After four months, severe hypothyroidism rapidly developed, and hypothyroidism was not resolved for over two months. Most patients with SAT have negative antibodies. Erdem *et al*. reported that 20% of SAT patients test positive for TGAb, whereas 4% of patients are positive for TPOAb.[2] During the whole disease course, TGAb levels remained increased, which reflects the dynamic changes in thyroid function (Figure 3) and is probably related to an underlying autoimmune mechanism.

Hashimoto's thyroiditis (HT) is an autoimmune condition that is characterised by lymphocyte infiltration and the formation of Askanazy (Hürthle) cells. The goiter is usually painless, although there have been reports of patients with prolonged, painful HT. In the active stage, ESR may be slightly elevated, and transient thyrotoxicosis and low radioiodine uptake may occur.[3] Serum TGAb and TPOAb titers significantly increase, and most of these persist for a long time, which makes these patients prone to permanent hypothyroidism.[4] Thyroid ultrasound examination shows goiter, uneven echo, multiple low echo areas or thyroid nodules, and the presence of reticular and funicular strong echo in the interior is a characteristic change of the disease. The present patient's thyroid function evolution and the

significant increase in TGAb levels are similar to HT, but the duration of high titer antibodies lasts for a short time. Thyroid color ultrasonography demonstrated hypoechoic pattern and low blood flow, which do not accord with HT. Thyroid cytological examination showed no lymphocyte infiltration and Hürthle cells, which is distinct from HT.

Subacute lymphocytic thyroiditis, also called painless thyroiditis (PT), is a kind of autoimmune thyroiditis, whose evolution is similar to SAT. The pathology of PT shows focal lymphocyte infiltration, which is less severe than HT. At the early stage, our patient had progressive thyrotoxicosis, along with an increase in TGAb levels, and then turned into severe hypothyroidism with gradually decreasing antibody titers, which shows a similar course to that of PT, but the results of pathology showed nonconformity.

The findings of this case suggest that the evolution of thyrotoxicosis in SAT may be more heterogeneous than initially described; and is probably related to an autoimmune mechanism. It is important to understand the common classification of thyrotoxicosis and observe the dynamic evolution of thyroid function, antibodies, and ultrasonography so as to avoid misdiagnosis and mistreatment.

Acknowledgment: We thank LetPub (www.letpub.com) for its linguistic assistance during the penning of this manuscript.

REFERENCES

1. Tokuda Y, Kasagi K, Iida Y, Yamamoto K, Hatabu H, Hidaka A, *et al*. Sonography of subacute thyroiditis: changes in the findings during the course of the disease. *J Clin Ultrasound* 1990; **18**:21-6.
2. Erdem N, Erdogan M, Ozbek M, Karadeniz M, Cetinkalp S, Ozgen AG, *et al*. Demographic and clinical features of patients with subacute thyroiditis: Results of 169 patients from a single university center in Turkey. *J Endocrinol Investig* 2007; **30**:546.
3. Rotondi M, Capelli V, Locantore P, Pontecorvi A, Chiovato L. Painful Hashimoto's thyroiditis: myth or reality? *J Endocrinol Invest* 2017; **40**:815-8.
4. Caturegli P, De Remigis A, Rose NR. Hashimoto thyroiditis: Clinical and diagnostic criteria. *Autoimmun Rev* 2014; **13**:391-7.