

## An association of myasthenia gravis with Hashimoto's thyroiditis in a patient with a multinodular goitre

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Myasthenia gravis, autoimmune thyroid disease, Hashimoto's thyroiditis, hashitoxicosis

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### Abstract

**Introduction:** The association of myasthenia gravis (MG) with other autoimmune diseases including autoimmune thyroid disease (ATD) is well recognised, although rare. The occurrence of both diseases can occur in two ways: either disease preceding the other, or concurrently. The presentation of MG in association with ATD can range from ocular to generalised disease.

**Case Summary:** A 26-year-old Malay female with persistent hyperthyroidism secondary to Hashimoto's thyroiditis in multinodular goitre was diagnosed with generalised MG after 2 years. She presented with right eye ptosis (ocular) and difficulty in swallowing and chewing (bulbar). The diagnosis of MG was confirmed by fatigability testing, electromyography and the presence of AChR antibodies. Her symptoms showed improvement with pyridostigmine (Mestinon) 60 mg 6-hourly. Her antithyroid drug was tapered down according to her thyroid function test. Throughout a year of follow-ups, her hyperthyroidism and fatigability symptoms improved with treatment. She was later counselled for total thyroidectomy and thymectomy.

**Conclusion:** Myasthenia gravis and hyperthyroidism may present with similar symptoms such as dysphagia due to neuromuscular weakness or fatigue. When the diseases occur together, one of the diagnoses may be missed. Therefore, the occurrence of new symptoms in a patient with underlying ATD should trigger the early identification of other autoimmune diseases by primary care doctors.

### Introduction

Both myasthenia gravis (MG) and Hashimoto's thyroiditis are autoimmune diseases. MG is a rare chronic autoimmune disease of the skeletal muscles. It is caused by autoantibodies against the acetylcholine receptors (AChRs) at the neuromuscular junctions. Patients with MG may have evidence of other autoimmune diseases including autoimmune thyroid diseases (ATDs) like Hashimoto's thyroiditis. Similarly, patients with primary ATD are at a higher risk of developing other autoimmune diseases. The relative risk of having other autoimmune diseases was estimated in a previous large cross-sectional study. When a patient with ATD presents with new or nonspecific symptoms, screening for a second autoimmune disorder should be done. Other literature have highlighted the need to exclude MG if ATD patients present with new neuromuscular weakness or fatigue.<sup>2</sup>

### Case summary

We present the case report of a 26-year-old Malay female who was diagnosed with hyperthyroidism in 2013. Subsequently, she was followed up at a polyclinic and treated with carbimazole (40 mg/day) and propranolol (40 mg/day).

In March 2015, she experienced hoarseness of voice and difficulty in swallowing. Initially, the symptoms were attributed to an enlarged goitre. At the same time, she developed right eye ptosis that worsened in the evening. However, she did not complain of diplopia or blurring of vision. The patient presented to us 3 months later for a second opinion as the symptoms worsened. The fatigability symptoms began later as she complained of a loss of voice after prolonged talking. Her symptoms worsened when she had difficulty in chewing as she noticed her muscles of mastication weakened and she had difficulty in swallowing. However, she was still able to

eat and drink. She did not have difficulty in climbing stairs nor squatting. There was also no shortness of breath at rest or on exertion.

General examinations were unremarkable. Clinically, she was euthyroid but there was the presence of a painless, 4 × 4 cm, multilobulated and with no extension. She had right eye partial ptosis. There was no lid lag nor lid retraction. Fatigability testing of the right eye ptosis showed a positive response. Both orbicularis muscles were weak bilaterally. The patient was admitted for further evaluation.

Investigations revealed subclinical hyperthyroidism with a thyroid-stimulating hormone level of 0.007 (normal range: 0.27–4.20 mIU/L) and a free T4 level of 16.7 (normal range: 12–22 pmol/L). Full blood count, renal function test and liver function test were all normal. Immunological testing during admission showed was negative for rheumatoid factor and antinuclear antibody. The antinuclear antibody tests, an antithyroid peroxidase level was 337.2 kIU/L (normal range: <34 kIU/L), an antithyroglobulin level was 1,837 kIU/L (normal range: <115 kIU/L) and an anti-AChR was 0.43 nmol/L (normal range: <0.25 nmol/L). Her electromyography (EMG) on admission showed a decremental response of the right orbicularis oculi of up to 58%. An ultrasound of the neck revealed multiple hyperechoic and hypoechoic nodules on both thyroid glands suggestive of a multinodular. A computerised tomography scan of the neck showed bilateral enlarged thyroid glands with no evidence of thymoma.

Generalised MG was diagnosed based on right eye ptosis (ocular) and difficulty in swallowing and chewing (bulbar) supported by her fatigability testing, EMG and the presence of AChR antibodies. Her symptoms improved after she was started on pyridostigmine (Mestinon) 60 mg 6-hourly. Her carbimazole was tapered down according to her thyroid function test.

Throughout a year of follow-ups, her hyperthyroidism and fatigability symptoms improved with treatment. Later, she was counselled for total thyroidectomy and thymectomy.

### Discussion

The association of MG with ATD is well recognised in previous reports. can occur in two ways: either disease preceding the other, or concurrently.<sup>3,4</sup> Most patients with ATD develop

their first manifestation of MG within 2 years of the onset of thyroid disease. The presentation of MG in association with ATD can range from ocular to generalised disease.<sup>4,6</sup>

In general, hyperthyroidism can be caused by Graves' disease, a solitary toxic nodule or a toxic nodular goitre. However, this thyrotoxic state also can occur in certain inflammatory conditions like Hashimoto's thyroiditis. The presence of biochemical hyperthyroidism in patients with Hashimoto's thyroiditis is referred to as hashitoxicosis.<sup>7</sup> This phenomenon is believed to be due to the release of thyroid hormones during inflammatory-mediated damage of thyroid glands.<sup>7</sup> Hashitoxicosis is differentiated from Graves' hyperthyroidism by its transient course and absence of thyroid ophthalmopathy.

The possible cause for her hyperthyroidism had not been investigated in previous follow-ups. Positive tests for thyroperoxidase and thyroglobulin autoantibodies with ultrasound features of a multinodular goitre indicates the co-existence of ATD with the goitre.<sup>7</sup> The persistent mild biochemical hyperthyroidism in this case may be, in theory, also related to thyrotoxicosis due to some nodular hyperfunction. There is a high incidence of Hashimoto's disease in nodular goitre.<sup>8</sup> Chehade et al. reported that the prevalence of Hashimoto's thyroiditis diagnosed in the nodular goitre by the presence of serological findings was 31.97% compared with the 35.46% that was based on cytological criteria.<sup>8</sup>

She presented with right eye ptosis and difficulty in swallowing. When eye ptosis occurs in the ATD patient, (6) the coexistence of MG should be noted. However, dysphagia can occur in both diseases even as a rare presentation. (9) The possible causes of dysphagia in hyperthyroidism include mechanical compression by enlarged thyroid gland or neuromuscular dysfunction of bulbar muscle.

Her symptoms showed improvement with pyridostigmine therapy. This enabled the antithyroid drug to be reduced further according to her thyroid status. Her latest carbimazole dosage was 30 mg/day. She was planned for total thyroidectomy and thymectomy early next year. In MG, thymectomy is a standard treatment, especially in generalised cases. In young onset MG without thymoma, this surgery is commonly selected due to predominant histopathological findings of hyperplasia in

the thymus and it can possibly result in the production of anti-acetylcholine receptor antibodies in this group.<sup>10</sup>

In conclusion, we present a case of MG which coexists with chronic autoimmune thyroiditis in and a multinodular goitre. The symptoms can possibly overlap; thus, this can easily be missed in primary care. The occurrence of new neuromuscular weakness or fatigue in patients

with underlying ATD should therefore trigger screening for a secondary autoimmune disease, especially MG.

**Consent:** Written informed consent was obtained from the patient for the publication of this report.

**Declaration:** We declare that we have no competing interests.

#### How does this paper make a difference to general practice?

- The association of ATD with myasthenia gravis is well reported but rarely encountered in primary care.
- Diagnosis can easily be missed if the association is ignored or not known.
- Symptoms of neuromuscular weakness or fatigue like dysphagia can overlap between hyperthyroidism and MG. Thus, early identification by primary care doctors is of utmost importance.

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