

Thyroid-Associated Ophthalmopathy with Initial Presentation Mimicking Bilateral Internuclear Ophthalmoplegia

Tsui-Kang Hsu^{*1,4,5}, Jorn-Hon Liu^{1,3}, An-Guor Wang^{2,3} and May-Yung Yen^{2,3}

¹Department of Ophthalmology, Cheng Hsin General Hospital, Taiwan

²Department of Ophthalmology, Taipei Veterans General Hospital, Taiwan

³School of Medicine, National Yang-Ming University, Taiwan

⁴Institute of Public health, National Taiwan University, Taiwan

⁵Department of Life Science, National Chung Cheng University, Taiwan

***Corresponding Author:** Tsui-Kang Hsu, Department of Ophthalmology, Cheng Hsin General Hospital, Taipei, Taiwan.

Received: September 27, 2015; **Published:** October 08, 2015

Abstract

Thyroid-associated ophthalmopathy (TAO) is an autoimmune disorder which is characterized by lymphocytes infiltration of the extraocular muscles and orbital tissues. The characteristic clinical signs include one or more of the following: eyelid retraction, lid lag, proptosis, exposure keratitis, restrictive extraocular myopathy, and compressive optic neuropathy. The extraocular myopathy usually causes hypotropia or/and esotropia. We presented a case of thyroid-associated ophthalmopathy with the initial presentation mimicking bilateral internuclear ophthalmoplegia (INO). Brain MRI did not find a lesion on the medial longitudinal fasciculus (MLF). Hyperthyroidism was noted. The abnormal extraocular movements recovered after anti-hyperthyroidism and prednisolone medication.

Keywords: *Thyroid-associated ophthalmopathy; Hyperthyroidism; Internuclear ophthalmoplegia; Myasthenia Gravis; Multiple Sclerosis*

Introduction

Thyroid-associated ophthalmopathy (TAO) is an autoimmune disorder. The disease may present with typical congestive, inflammatory signs of the eyes and orbit. The clinical characteristics of TAO include some of the following: eyelid retraction, lid lag, proptosis, corneal involvement, restrictive extraocular myopathy, and compressive optic neuropathy. Cellular infiltration of interstitial tissues by lymphocytes, plasma cells, macrophages, and mast cells contributes to muscular fiber fibrosis and the development of restrictive myopathy, diplopia and cosmetic consequences. Hypotropia or/and esotropia are the most common presentation of strabismus in TAO [1].

Internuclear ophthalmoplegia (INO) is caused by a lesion in the medial longitudinal fasciculus (MLF) in the dorsomedial brainstem tegmentum of either the pons or the midbrain [2]. It is characterized by impaired horizontal eye movements with weak adduction of the affected eye, and abduction nystagmus of the contralateral eye. Bilateral internuclear ophthalmoplegia is highly suggestive of multiple sclerosis (MS), presents in up to one third of all MS patients [2].

Here, we report a case of thyroid-associated ophthalmopathy with the initial presentation mimicking bilateral internuclear ophthalmoplegia.

Case Report

A 22-year-old female suffered from diplopia for 4 days. She denied any systemic disease in the past. Her father was a victim of hyperthyroidism under medical treatment. Neuro-ophthalmological examination revealed that the best corrected visual acuity (BCVA) was 20/20 in each eye. There was 5 prism diopter (PD) of exotropia on primary gaze and more than 40 PD of exotropia on right and left gaze.

Citation: Tsui-Kang Hsu., *et al.* "Thyroid-Associated Ophthalmopathy with Initial Presentation Mimicking Bilateral Internuclear Ophthalmoplegia". *EC Ophthalmology* 2.4 (2015): 141-144.

Version movement revealed bilateral limitation of adduction (Figure 1). However, there was no abduction nystagmus in both eyes. Convergence was normal. The pupil reflex was normal in both eyes. Physical examination was otherwise normal except tachycardia (heart rate: 125 beat/min). Tensilon test was negative. Neurological consultation showed normal neurological examination. Multiple sclerosis associated bilateral internuclear ophthalmoplegia was suspected.



Figure 1: The extraocular movements showed bilateral adduction weakness.

Laboratory data including blood routine, blood sugar, and electrolytes were all within normal limit. Autoimmune tests including anti-nuclear antibodies (ANAs), rheumatoid factor (RA), C3, C4, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) were also normal. Because of family history of hyperthyroidism and increased pulse rate, thyroid function was tested, which revealed T3 over 600 ng/dl (normal range: 82-179 ng/dl), T4 22.8 µg/dl (normal range: 4.5-12.5 µg/dl), Free T4 over 6.0 ng/dl (normal range: 0.8-1.9ng/dl), and thyroid stimulating hormone (TSH) 0.007µIU/ml (normal range: 0.4-4.0 µIU/ml). All were indicative of hyperthyroidism. Thyroid auto antibodies including anti-thyroid peroxidase antibodies (aTPO), anti-thyroglobulin antibodies (aTG), and TSH receptor antibodies were within normal range. Acetylcholine receptor antibody (AchRAb) was 0.21 nmoles/L (normal range: < 0.5 nmoles/L). MRI of brain was normal. Orbital MRI did not show significant enlargement of extraocular muscles (Figure 2). Thyroid sonography revealed enlarged thyroid gland with generalized heterogenous echogenicity.

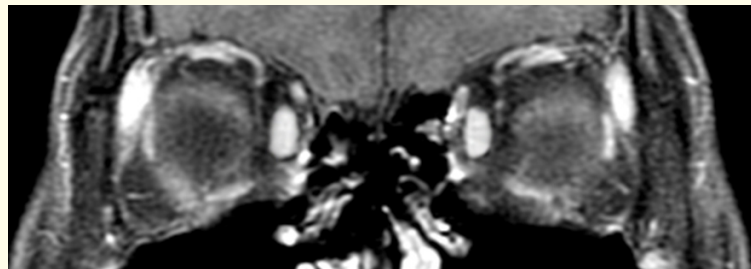


Figure 2: Orbital MRI did not show significant enlargement of extraocular muscles.

She was referred to the endocrinologist and was treated with oral prednisolone, carbimazole and Inderal. The limitation of adduction improved gradually. Six months later, there was only mild adduction weakness of the right eye. The eye was orthophoric on primary gaze. The residual deviation was 5 PD exotropia on left gaze. No more diplopia was noted.

Discussion

Thyroid-associated ophthalmopathy is an organ-specific autoimmune disorder. It occurs more frequently in women. Enlargement of extraocular muscles is mainly caused by increased glycosaminoglycan production by orbital fibroblasts [3]. The most commonly involved extraocular muscles are the inferior rectus (IR) and medial rectus (MR) leading to hypotropia or esotropia [1].

The classical course of TAO is an active inflammatory “wet” phase followed by a regressing fibrotic “dry” phase [4]. The squint manifestation in the early inflammatory stage is seldom mentioned. In early stage of TAO, the inflammation of extraocular muscles may weaken the muscle power. Our patient was in “very early” stage of thyroid eye manifestation. Exotropia in primary gaze and adduction weakness mimicking bilateral INO were possibly caused by the weakened bilateral medial rectus muscles.

Exotropia is exceedingly unusual in TAO. Chen et al reported a case of TAO associated with exotropia [5]. The patient was found to have TAO co-existing with myasthenia gravis (MG). Shorr, *et al.* [6]. Reported that in 50 TAO patients, 16 had ocular motility problem before orbital decompression. Thirteen had esotropia alone or hypotropia alone, two had exotropia with hypotropia, but only one had exotropia alone before surgery. Exotropia had been reported in TAO patients concomitant with MG [7]. But none of TAO without MG had exotropia. About 0.2% of autoimmune thyroid disease patients have MG and about 4-5% of patients with MG have autoimmune thyroid disease [5]. Although our patient had normal AchRab level and negative tensilon test, TAO concomitant with MG cannot be ruled out because only 88% of validated MG have positive AchRab antibody [8]. MG usually response well to steroid.

INO is caused by lesions within the medial longitudinal fasciculus in the region between the third and sixth nerve nuclei [2,9]. The clinical features of INO include weakness or palsy of adduction on attempted horizontal gaze and horizontal nystagmus of the abducting eye. The dysconjugate movement of the two eyes during horizontal gaze results in an interruption in binocular fusion that can lead to visual confusion, oscillopsia, diplopia, reading fatigue, and loss of stereopsis. There are many potential causes of internuclear ophthalmoplegia. Approximately 70 % of INO are due to multiple sclerosis or cerebrovascular disease [2]. Other possible etiology of INO are infection, trauma, tumor, drug intoxications, nutritional disorders (Wernicke's encephalopathy and pernicious anemia), and pseudointernuclear ophthalmoplegia of myasthenia gravis and Fisher's syndrome. Bilateral INO is considered pathognomonic for MS because there is a strong predilection for the demyelinating lesions of MS to affect the MLF [10]. However, in our case, we didn't detect any demyelinating signal on image of MRI. The patient had no abducting nystagmus or any brainstem signs to support INO.

Thyroid eye disease sometimes gives us the atypical presentation. Exotropia and INO-like ocular motility maybe the initial presentation of TAO. However, TAO concomitant with MG may be the cause. The ophthalmologists should keep in mind to make an early diagnosis and give the early management.

Bibliography

1. Schotthoefer EO and Wallace DK. “Strabismus associated with thyroid eye disease”. *Current Opinion Ophthalmology* 18.5 (2007): 361-365.
2. Keane JR. “Internuclear ophthalmoplegia: unusual causes in 114 of 410 patients”. *Archives of Neurology* 62.5 (2005): 714-717.
3. Mourits MP, *et al.* “Clinical activity score as a guide in the management of patients with Grave's ophthalmopathy”. *Clinical Endocrinology* 47.1 (1997): 9-14.
4. Mayer EJ, *et al.* “Signal intensity, clinical activity and cross-sectional areas on MRI scans in thyroid eye disease”. *European Journal of Radiology* 56.1 (2005): 20-24.
5. Chen CS, *et al.* “Double vision in a patient with thyroid disease: what's the big deal?” *Survey of Ophthalmology* 52.4 (2007): 434-438.
6. Shorr N, *et al.* “Ocular motility problems after orbital decompression for dysthyroid ophthalmopathy”. *Ophthalmology* 89.4 (1982): 323-328.

7. Vargas ME, et al. "Exotropia as a sign of myasthenia gravis in dysthyroid ophthalmopathy". *British Journal of Ophthalmology* 77.12 (1993): 822-823.
8. Vincent A and Newsom-Davis J. "Acetylcholine receptor antibody as a diagnostic test for MG: results in 153 validated cases and 2967 diagnostic assays". *Journal of Neurology Neurosurgery Psychiatry* 48.12 (1985): 1246-1252.
9. Kaufman DI and Fratkin J. "Multiple sclerosis and the eye". *Ophthalmic Clinics of NA* 5 (1992): 513-531.
10. Smith JW and Cogan DG. "Internuclear Ophthalmoplegia, A review of fifty-eight cases". *Archives of Ophthalmology* 61.5 (1959): 687-694.

Volume 2 Issue 4 October 2015

© All rights are reserved by Tsui-Kang Hsu., et al.