· Case report ·

Thyroid eye disease with tendon involvement

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Abstract

• AIM: To report an atypical CT scan finding of thyroid eye disease.
• METHODS: A 64 years old Chinese lady presented with diplopia for 3 months without blurring of vision. She had been diagnosed as thyrotoxicosis with multinodular goitre 14 years back and thyroidectomy was done 14 years ago. Eye examination revealed both eye hypotropia with restricted up gaze movement. There was presence of red desaturation on her left eye with grade I relative afferent pupillary defect. Hormone profile showed normal triiodothyronine (T3), tetraiodothyronine (T4) and thyroid stimulating hormone (TSH). TSH receptor antibody was high which was consistent with Graves' disease. Magnetic resonance imaging (MRI) showed diffused enlargement of both inferior rectus muscle with tendon involvement.
• RESULTS: Few cycle of intravenous methylprednisolone followed by oral prednisolone were given but left eye vision deteriorated in spite of medical treatment. Left eye orbital decompression was done and her left eye visual acuity was improved after the surgery.
• CONCLUSION: Extraocular muscle enlargement with tendon involvement does not exclude possibility of thyroid associated orbitopathy (TAO).
• KEYWORDS: thyroid eye disease; thyroid associated orbitopathy; CT scan; tendon
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INTRODUCTION

Thyroid associated orbitopathy (TAO) is an organ specific autoimmune disease normally associated with Graves' disease. Typically it is characterised by an active inflammatory phase followed by fibrotic phase. Graves' disease may manifest by thyroid enlargement, exophthalmos, diplopia, and pretibial myxoedema. The pathophysiology of TAO remains unclear. The presence of autoantibodies to thyroid stimulating hormone(TSH)receptor result in inflammation and oedema of the orbital tissues which cause exophthalmos, lid signs and optic nerve compression.

MATERIALS AND METHODS

Materials A 64 years old Chinese lady presented with diplopia for 3 months duration without blurring of vision. The patient's relatives noted the patient's eye become protruding and she always lift up her chin when talking to them. Past history revealed that she had been diagnosed as thyrotoxicosis with multinodular goiter and thyroidectomy was done 14 years ago. The patient was euthyroid since the surgery and not on any medical treatment after the surgery.

Methods General examination revealed normal blood pressure and heart rate. There were no signs of thyroid dermatological manifestation or tremor noted. A thyroidectomy scar was present on anterior aspect of her neck. Eye examination showed both eye hypotropia with mild proptosis (Figure 1). There was left eye red desaturation with grade I relative afferent pupillary defect noted. Extraocular movement showed no movement on up gaze but normal for medial, lateral and down gaze.

Thyroid hormone profile revealed normal triiodothyronine (T3), tetraiodothyronine (T4) and TSH. TSH receptor antibody was high which was consistent with Graves' disease. Thyroglobulin and antimicrosomal antibody were normal. Magnetic resonance imaging (MRI) showed diffuse hypertrophy of both inferior rectus muscle with tendon involvement which had caused elevation of the optic nerve and impingement at the optic foramen (Figure 2, 3).

RESULTS

She was diagnosed as bilateral TAO with optic nerve compression. She was managed with few cycle of intravenous methylprednisolone followed by oral prednisolone. There was slight improvement of her extraocular movement after medical treatment but unfortunately her left eye vision deteriorated from 6/12 to 6/36. Surgical orbital decompression was done on her left eye. Finally her vision was improved to 6/24 and red desaturation was improved from 5/10 to 8/10.

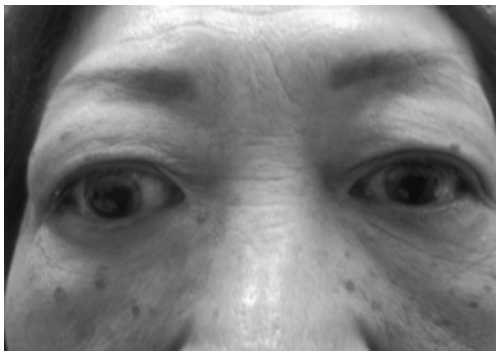

Figure 1 Bilateral hypotropia.

Figure 2 Sagittal view of orbit showing enlargement of extraocular muscle.

Figure 3 Tendon/muscle ratio 0.50.

DISCUSSION

Thyroid eye disease or TAO is a chronic inflammatory disease of the eye which always presents with proptosis, restrictive myopathy and some lid signs such as lid lag, lid swelling and lid retraction. It also can present with few intraocular signs which include congestion, glaucoma and optic nerve compression.

The pathogenesis of TAO still remains unclear and poorly understood. The presence of autoantibodies to TSH receptor results in inflammation and oedema of the orbital tissues which cause exophthalmos, lid signs and optic nerve compression. There are a variety of orbital diseases that cause enlargement of extraocular muscle. It includes Graves' disease or TAO, idiopathic orbital inflammation (pseudotumour), neoplasia and arteriovenous malformation or fistula. The diagnosis of TAO is clinical and based on the triad of characteristic eye findings, thyroid dysfunction, and imaging studies. Several classifications are used to grade severity of thyroid eye disease which includes EUGOGO classification. EUGOGO classification provides management of TAO based on its severity [1]. When there is presence of optic nerve compression, intravenous methylprednisolone is effective in 83% of patients [2]. The prevalence of TAO in primarily euthyroid and hypothyroid patients ranges between 1.6%-8.6% [3-4]. Diagnosis of euthyroid TAO is often more difficult because it depends on the clinical examination and lacks of objective standard. In case of euthyroid or hypothyroidism, thyroid antibodies may assist in confirming the diagnosis. Positive TSH receptor antibody (TRAB) confirmed the diagnosis of TAO in 69% of euthyoid and hypothyroid patients [5]. Kumiko *et al*[6], also reported that TRAB was a more sensitive marker in detecting euthyoid TAO.

TAO typically can be differentiated from idiopathic orbital inflammation in CT scan or MRI. MRI provides valuable information in diagnosis and management of the disease [7]. In TAO, extraocular muscle is enlarged with tendon sparing while idiopathic orbital inflammation shows enlargement of the muscle including the tendon. Inferior rectus muscle is the most common muscle involved followed by medial, superior and lateral rectus muscle in TAO. There is no muscle group preference in idiopathic orbital inflammation. A retrospective study was done to evaluate the configuration of extraocular muscle and tendon enlargement in patients with TAO and it showed that 6.4% demonstrated tendon involvement on CT scan and MRI. A ratio of tendon to muscle with greater than 0.5 considered as tendon involvement [8]. However, there is a possibility that myositis coexisted with TAO in some cases but affected tendons in TAO never have the same degree of thickening seen in myositis [9]. Idiopathic orbital inflammatory disease is typically seen as focal or diffuse enlargement of extraocular muscle in CT scan but Patrinely JR *et al*[10], showed that tendons of extraocular muscles in orbital inflammatory disease might be involved or spared as well. They found only 47% tendon involvement in orbital

inflammatory disease. Possibility of TAO is unable to rule out if imaging showed extraocular muscle enlargement with tendon involvement. In conclusion, extraocular muscle enlargement with tendon involvement does not exclude possibility of TAO. A complete history taking and physical examination with laboratory support is essential in making out the diagnosis.

REFERENCES

1 Luigi Bartalena, Lelio Baldeschi, Alison Dickinson, Anja Eckstein, Pat Kendall-Taylor, Claudio Marcocci, Maarten Mourits, Petros Perros, Kostas Boboridis, Antonella Boschi, Nicola Curro, Chantal Daumerie, George J Kahaly, Gerasimos E Krassas, Carol M Lane, John H Lazarus, Michele Marino, Marco Nardi, Christopher Neoh, Jacques Orgiazzi, Simon Pearce, Aldo Pinchera, Susanne Pitz, Mario Salvi, Paolo Sivelli, Matthias Stahl, Georg von Arx, Wilmar M Wiersinga. Consensus statement of the European Group on Graves'orbitopathy (EUGOGO) on management of GO. *European Journal of Endocrinology* 2008;158(3):273-285

2 Tambe K, Bhargava J, Tripathi A, Gregory M, Burns J, Sampath R. The role of intravenous methylprednisolone immunosuppression in the management of active thyroid eye disease. *Orbit* 2010; 29(5):227-231

3 Bartley GB, Fatourechi V, Kadrmas EF, Jacobsen SJ, Ilstrup DM, Garrity JA, Gorman CA. Clinical features of Graves' ophthalmopathy in an incidence cohort. *Am J Ophthalmol* 1996;121(3):284-290

4 Khoo DH, Eng PH, Ho SC, Tai ES, Morgenthaler NG, Seah LL, Fong KS, Chee SP, Choo CT, Aw SE. Graves' ophthalmopathy in the absence of elevated free thyroxine and triiodothyronine levels: prevalence, natural history, and thyrotropin receptor antibody levels. *Thyroid* 2000; 10(12):1093-1100

5 A K Eckstein, C Losch, D Glowacka, M Schott, K Mann, J Esser, N G Morgenthaler. Euthyroid and primarily hypothyroid patients develop milder and significantly more asymmetrical graves ophthalmopathy. *Br J Ophthalmol* 2009;93(8):1052

6 Kazuo K, Fujikado T, Ohmi G. Value of thyroid stimulating antibody in the diagnosis of thyroid associated ophthalomopathy of euthyroid patients. *Br J Ophthalmol* 1997;81(12):1080-1083

7 Dodds, N I. Atcha, A W. Birchall, D. Jackson, A. Use of high-resolution MRI of the optic nerve in Graves' ophthalmopathy. *Br J Radiology* 2009;82(979):541-544

8 Guy J. Ben Simon, Hasan M. Syed, Raymond Douglas, John D McCann, Robert A. Goldberg. Extraocular muscle enlargement with tendon involvement in thyroid-associated orbitopathy. *Am J Ophthalmol* 2004;137(6):1145-1147

9 Rothfus WE, Curtin HD. Extraocular muscle enlargement; a CT review. *Radiology* 1984;151(3):677-681

10 Patrinely JR,Osborn AG,Anderson RL,Whiting AS. Computed tomographic features of nonthyroid extraocular muscle enlargement. *Ophthalmology* 1989;96(7): 1038-1047

甲状腺相关性眼病伴眼外肌肌腱受累 1 例

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摘要

目的:报告 1 例甲状腺相关性眼病的非典型 CT 扫描表现。

方法:一位 64 岁的中国女性出现复视 3mo,无视力模糊。14a 前她曾患甲状腺功能亢进症伴多结节甲状腺肿并行甲状腺切除术。眼科检查发现双眼下斜视并向上注视受限。左眼 red desaturation 并Ⅰ级相对性瞳孔传入障碍。T3,T4 和促甲状腺激素(thyroid stimulating hormone,TSH)正常。TSH 受体、抗体水平高,与 Graves' 病一致。磁共振成像(magnetic resonance imaging,MRI)显示双下直肌弥漫性增大,肌腱受累。

结果:给予几周期静脉注射甲基强的松龙继之以口服强的松后视力无提高,反之继续下降。行左眼眼眶减压术,术后其左眼视力有所改善。

结论:有肌腱受累的眼外肌增大不能排除甲状腺相关性眼眶病(thyroid assciated orbitopathy, TAO)的可能。

关键词:甲状腺眼病;甲状腺相关性眼眶病;CT 扫描;肌腱