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A case of thyroid associated ophthalmopathy

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Abstract
Thyroid-associated Ophthalmopathy (TAO) is an ocular condition that frequently manifests with thyroid disfunction, and is the most common extrathyroidal manifestation of Graves' disease. It involves an organ specific autoimmune reaction that can affect the thyroid gland, orbital and periorbital tissue. The condition primarily affects women and it is the commonest cause of unilateral and bilateral axial proptosis in young and middle -aged adults. The clinical presentation may vary from mild disease to severe irreversible sight threatening complications. Here we report a case of 35-years old female who presented to our OPD with complaints of protrusion of both eye, diminution of vision in both eye, pain, redness and unable to move eye in the last 2 months. She was known case of hyperthyroidism in the last one year and on regular antihyperthyroid medication.

Keywords: Thyroid associated ophthalmopathy, graves's disease, autoimmune reaction, hyperthyroidism, axial proptosis

Introduction
Thyroid associated ophthalmopathy (TAO) represents an autoimmune, self-limiting disease that occurs in patients with Graves' disease (90%), Hashimoto thyroiditis (3%), primary hypothyroidism (1%) or in the absence of thyroid abnormalities (6%) [1]. Cross reactivity against antigen(s) in thyroid and orbital tissue is most likely responsible for the autoimmune ophthalmologic reaction [2]. The incidence of TAO is 16 per 100,000 females and 2.9 per 100,000 males with an approximate prevalence of 0.25% with no significant ethnic predisposition [3]. It has a peak of incidence between fourth and sixth decade.

The risk factors for developing TAO are represented by female gender, smokers, family history, life stressors and poorly controlled hypothyroidism following radioactive iodine, whereas male gender, increasing age and a rapid onset of orbitopathy are the predictors of severe thyroid eye disease [4]. Recent studies have shown to have impact on specific gene expression involved in several disease-related pathways, which seems to be reversible with smoking cessation.

Thyroid associated ophthalmopathy involves an organ- specific autoimmune reaction in which an antibody that reacts against thyroid gland cells and orbital fibroblasts. Reactive T lymphocytes that recognize thyroid-orbit common antigens infiltrate the orbit and extraocular muscle perimysium. This is enhanced by circulating and local adhesion molecules stimulated by cytokines. Following infiltration of the orbit with T lymphocytes, the common antigen is recognized by T-cell receptors on CD4+ T lymphocytes (Th). Cytokines secreted by Th lymphocytes activate CD8+ lymphocytes and autoantibody-producing B cells, which strengthens the immune reaction [5]. These cytokines stimulate the synthesis and secretion of glycosaminoglycans (GAGs) by fibroblasts. Due to their water attracting properties, GAGs lead to periorbital edema, proptosis, and swelling of the extraocular muscles [6]. Fibroblast proliferation stimulated by cytokines also plays a role in the expansion of the orbital contents. Orbital fibroblasts include preadipocytes, which turn into adipocytes with hormonal stimulation. These cells have been shown to contribute to the increase in the volume of retroorbital fat tissue [7].

The signs and symptoms of TAO are as varied as its epidemiology and pathophysiology. Symptoms range from tearing, eye pain to double vision, and signs extend from conjunctival injection and chemosis to lid retraction, EOM restriction, strabismus, to sight threatening exposure keratopathy and compressive optic neuropathy [8]. Diagnosis is based on series of investigations including blood levels of Thyroid hormones, MRI Brain including orbits, enhanced CT Brain that shows extra ocular muscle enlargement. Treatment is symptomatic in the acute phase and other modalities like orbital decompression as when required [9].

Case report

A 35 years old female presented in eye OPD with complaints of protrusion of both eye, diminution of vision, pain, redness and unable to move both eye since two months. No complaint of double vision. Patient didn't give any history of fever or any trauma. There were no similar complaints in the past. No similar complaints in the family as well. She was known case of hyperthyroidism in the last one year and on regular antihyperthyroid medication.

On examination, the patient was conscious, oriented, and her vitals and general examination were normal. Her visual acuity was 4/60 in both eyes, bilateral severe proptosis with periorbital edema was noted (Figure 1). There were marked restriction of movement of both eyeball in all gaze. On slit lamp bio-microscopy, anterior segment showed severe congestion and chemosis of conjunctiva in both eyes. Exposure keratitis in inferior quadrant of the cornea in right eye was noted. The pupils were normal and equal in size, the direct and consensual reflex were normal in both eyes. Fundus evaluation of the both eyes were normal, without suggestive signs for dysthyroid optic neuropathy.

The patient was admitted to hospital for further investigations, endocrinologic assessment and management. Initial blood investigations, including blood count, liver biochemistry, glycemia, serum electrolytes, fasting lipid profile, serum creatinine, blood urea nitrogen, erythrocyte sedimentation rate, C reactive protein were normal. The thyroid function test was also performed, T3 and T4 were within normal limit (0.93 ng/ml, 5.20 µg/dl) however, thyroid stimulating hormone (TSH) was markedly low (0.010 µIU/ml). The ultrasound exam of thyroid gland revealed: heterogenous echogenicity, diffusely enlarged thyroid gland with intense increase in vascularity. Suggestive of diffuse thyroiditis.

Orbital CT scan, showed enhancement of the extraocular muscle sheaths, medial rectus muscle enlargement and stranding of surrounding orbital fat, typical findings for the active inflammatory phase (Figure 2). Following the endocrinologic assessment, ultrasound of thyroid gland, orbital CT scan and ophthalmic examination, the diagnosis of severe Thyroid associated ophthalmopathy was established.

The patient was hospitalized for two weeks. A protocol with intravenous injection methylprednisolone 1 g/day for 3 days was given followed by oral prednisolone 50 mg OD for 3 days, tapered later for 1 month. Topical broad-spectrum antibiotics were instilled in both eyes. Preservative-free lubricants were used in order to relief the symptoms of corneal exposure and a mydriatic was administered 3 times per day in order to avoid the formation of posterior synechiae. Patching of both eyes during night was also performed. On improving sign and symptoms with VA 6/24 BE, patient was discharged.

A regular follow-up at 2 and 4 weeks was recommended. At the 2 weeks follow-up (Figure 3), the patient showed an improvement of proptosis, no sign and symptoms and visual acuity improved to 6/12 in both eyes. At the 4 weeks follow-up (Figure 4), on the ophthalmologic examination, normal eyeball with improvement in movement in all gaze and corneal opacity in inferior quadrant in right eye was noted.

Discussion

Thyroid associated ophthalmopathy is an autoimmune disorder with clinical signs which are characteristic and include a combination of eyelid retraction, lid lag, proptosis, restrictive extraocular myopathy and optic neuropathy. There are many classifications that elaborates the course of the disease in regard to symptoms, signs and prognosis. They are NOSPECS classification by American Thyroid Association, VISA classification for severity of the disease, EUGOGO classification for severity grading, CAS (clinical activity scoring) for grading TED [10].

EUGOGO has classified thyroid orbitopathy based on severity [11]. Sight threatening disease requires urgent intervention. Patients with moderate to severe thyroid eye disease have sufficient impact on daily life to justify the risks of immunosuppressive (if active) or surgical intervention (if inactive). Mild thyroid eye disease only needs supportive management.

EUGOGO (severity classification)

Sight threatening thyroid eye disease

- Dysthyroid optic neuropathy and/or
- Corneal breakdown

Moderate to severe thyroid eye disease

- Lid retraction 2 mm
- Moderate to severe soft tissue involvement
- Exophthalmos 3 mm above normal for age and gender
- Inconstant or constant diplopia

Mild thyroid eye disease

- Mild lid retraction <2mm
- Mild soft tissue involvement
- Exophthalmos 3 mm above normal for race and gender
- Transient or no diplopia
- Corneal exposure responsive to lubricants

The treatment for TAO should be a multidisciplinary approach involving an ophthalmologist, an endocrinologist, a radiologist and a general physician. The principal aim should be thyroid function control as this is associated with reduction in the severity of the disease. It has a biphasic evolution, which was described by Rundle: an active, dynamic phase, which has a mean duration of 6-18 months [1] and an inactive, static phase [3]. In the dynamic phase, the immunomodulatory treatment and external beam radiotherapy are recommended in order to cease inflammation, while in the static phase, reconstructive surgery can be attempted [1].

A recent study concerning the trends in the treatment of active thyroid associated ophthalmopathy concludes that aggressive therapies such as oral or IV glucocorticoids, Rituximab and/ or Tocilizumab and orbital radiotherapy are used in the severe forms [12]. IV glucocorticoids in association with mycophenolate mofetil represent the first line therapy, while the oral prednisone or prednisolone with Azathioprine or Cyclosporine, Rituximab, Tocilizumab, and orbital radiation with oral or IV glucocorticoids are the second line therapy [13]. Topical steroids are prescribed in order to manage the symptoms of ocular inflammation consisting of dryness and hyperaemia. Likewise, the ocular surface lubricating therapies are an important tool in the treatment of the exposure keratopathy [12].

The severe exposure keratopathy represents an urgence, thus decompression surgery could be indicated. In the active phase, local treatment such as tarsorrhaphies, corneal patches, or gluing can be used in order to avoid corneal perforation or to treat the corneal breakdown, while in the inactive phase, decompression, ophthalmic plastic, and strabismus surgery can be an important tool for the repair of residual damage (exophthalmos, lid retractions, eyelid, and periorbital puffiness, strabismus) [13].

Additional therapies have been proposed and are in varying stages of study for efficacy in TAO. A retrospective review demonstrated an improvement in both CAS score and motility restriction with methotrexate therapy, prospective data have not been presented. TNF-α is known to be up-regulated in TAO, several studies have evaluated the use of TNF-α antagonists. Cyclic peptides maybe another promising avenue for future therapy. Further, IL15, IL-17 are up-regulated in patients' tears in active disease compared with inactive disease. A targeted therapy to these may have a role in the management of TAO [14].

Fig 1: Both eye proptosis RE> LE and Exposure Keratitis in RE

Fig 2: CT scan Orbits- showing Medial Rectus Muscle belly enlargement and stranding of surrounding orbital fat

Fig 3: Improvement in bilateral proptosis and sign

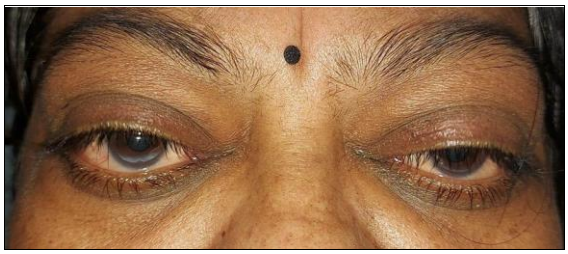

Fig 4: At the 4 weeks follow-up, normal eyeball and corneal opacity in inferior quadrant in right eye

Conflict of Interest
Not available

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Not available

References
1. Yanoff M, Duker JS. *Ophthalmology*. Fourth Edition, 2011.
2. Bothun ED, Scheurer RA, Harrison AR, Lee MS. Update on thyroid eye disease and management. Clinical ophthalmology (Auckland, NZ), 2009; 3: 543.
3. Bartley GB. The epidemiologic characteristics and clinical course of ophthalmopathy associated with autoimmune thyroid disease in Olmsted County, Minnesota. Trans Am Ophthalmol Soc. 1994;92:477–588.
4. A. of Ophthalmology. Oculofacial Plastic and Orbital Surgery. 53(9) [Google Scholar] [Ref list]
5. Heufelder AE. Pathogenesis of Graves' ophthalmopathy: recent controversies and progress. Eur J Endocrinol. 1995;132:532–541.
6. Korducki JM, Loftus SJ, Bahn RS. Stimulation of glycosaminoglycan production in cultured human retroocular fibroblasts. Invest Ophthalmol Vis Sci. 1992;33:2037–2042.
7. Sorisky A, Pardasani D, Gagnon A, Smith TJ. Evidence of adipocyte differentiation in human orbital fibroblasts in primary culture. J Clin Endocrinol Metab. 1996;81:3428–3431.
8. Michael PR, Jacqueline RC. Update on advanced imaging options for thyroidassociated orbitopathy. Saudi J Ophthalmol., 2012 Oct;26(4):385–392.
9. Chaudhuri Z, Vanathi M, editors. Postgraduate Ophthalmology, Two Volume Set. Wife Goes On, 2011.
10. Bartley GB, Gorman CA. Diagnostic criteria for Graves' ophthalmopathy. American journal of ophthalmology, 1995 Jun 1;119(6):792-5.
11. Perros P, Dayan CM, Dickinson AJ, Ezra D, Estcourt S, Foley P, *et al*. Management of patients with Graves' orbitopathy: Initial assessment, management outside specialised centres and referral pathways. Clini Med. 2015;15:173.
12. Wang Y, *et al*. Trends in Treatment of Active, Moderate-to-Severe Thyroid Eye Disease in the United States. J Endocr. Soc. 2020 Dec;4(12). Doi: 10.1210/jendso/bvaa140.
13. Bartalena L, *et al*. The 2021 European Group on Graves' orbitopathy (EUGOGO) clinical practice guidelines for the medical management of Graves' orbitopathy. Eur. J Endocrinol. 2021;185(4):G43-G67. Doi: 10.1530/EJE-21-0479.
14. McAlinden C. An overview of thyroid eye disease. Eye and Vision, 2014 Dec;1(1):1-4.

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