



Thyroid eye disease

Thyroid ophthalmopathy

DESCRIPTION

The most common cause of thyroid eye disease is Graves' disease, an autoimmune disorder which mostly affects women of child-bearing age. Other causes of hyper-thyroidism, with less tendency to affect the eyes, include multinodular goitre, subacute thyroiditis and excessive thyroid hormone medication.

Thyroid eye disease in the context of Graves' disease is termed thyroid-associated ophthalmopathy (TAO). It generally progresses independently of thyroid hormone levels, and occasionally occurs with normal thyroid function. Ocular changes may include:

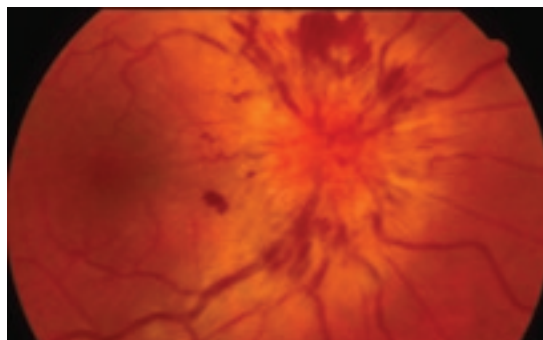
- Acute inflammation – of the conjunctiva, lacrimal gland and other periorbital tissues
- Proptosis (exophthalmos) – due to chronic inflammation within the orbit and extraocular muscles. Eyelid retraction occurs in approximately half of patients with Graves' disease, due to a combination of increased sympathetic activity, proptosis and fibrosis
- Ocular motility is restricted by oedema in the acute phase, and later by fibrosis, resulting in diplopia
- Optic nerve compression by enlarged extraocular muscles at the orbital apex is a serious complication affecting 5 per cent of patients with TAO. Compression of the optic nerve within 15mm of the globe may compress the venous outflow, leading to optic disc swelling.

SYMPTOMS

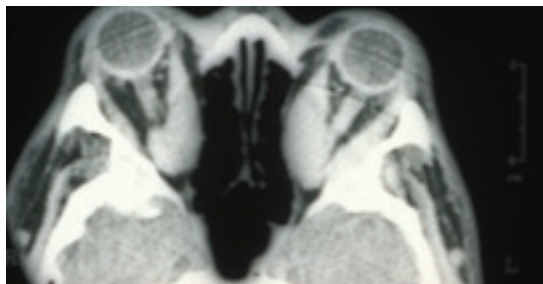
Ocular involvement is often asymmetrical. The eyes are swollen and red in the acute phase, with discomfort and possible blurred vision in severe cases. Diplopia occurs with exophthalmos and ocular motility disturbance. Optic nerve compression causes progressive visual loss.

SIGNS

- Proptosis ('thyroid stare') may be measured with an exophthalmometer. Lid retraction is measured as visible sclera between the limbus and eyelid margins. With lid lag there is delay of the upper lid in following downward rotation of the globe in downward gaze.
- Limitation of eye movements.
- Corneal exposure: superficial punctate keratitis, ulceration or necrosis.
- Optic nerve compression may cause relative afferent pupillary defect, reduced



Disc swelling with flame-shaped haemorrhages from compression of the optic nerve. Visual failure usually occurs without disc swelling unless within 15mm of optic nerve head



Same patient: CT scan showing grossly enlarged medial rectus muscles impinging on the optic nerve

central acuity, and colour vision or visual field defects. Fundoscopy may reveal disc swelling with congested retinal veins in acute compression, and a pale, atrophic optic disc in long-standing cases. However, the fundus appears normal in up to half of patients, when the optic nerve compression is more than 15mm from the globe.

PREVALENCE

TAO is the most common cause of proptosis in adults.

SIGNIFICANCE

Corneal exposure and optic nerve compression are preventable causes of severe visual impairment.

DIFFERENTIAL DIAGNOSIS

Orbital inflammatory pseudotumour, Orbital cellulitis, Orbital tumours, Orbital trauma.

SEE ALSO

Papilloedema.

MANAGEMENT

Additional investigations
 Thyroid function tests are performed

during diagnosis and monitoring. Anti-TSH (thyroid-stimulating hormone) antibodies are detectable in almost all cases of Graves' disease. Orbital computed tomography (CT) or magnetic resonance imaging (MRI) demonstrate thickening of extraocular muscles, and may help differentiate active inflammation from fibrosis.

Topical medications

Ocular lubricants and artificial tears may relieve conjunctival or corneal irritation.

Oral medications

In more severe cases, and in cases of optic nerve compression, oral corticosteroids (often prednisolone) may be used. Other immunosuppressives, radiotherapy and/or surgical decompression may be considered. Although systemic hyperthyroidism will require treatment on its own merits, lid retraction is the only ocular manifestation likely to respond.

Refractive

Diplopia may be temporarily relieved by prisms or, in severe cases, occlusion.

Incisional surgery

- Proptosis and diplopia. Surgery for proptosis entails removal of part of two or more orbital walls, allowing the orbital contents to prolapse into the surrounding sinuses. Surgery is considered when the inflammation has resolved and the diplopia has been stable for several months. Loosening (recession) of a fibrosed inferior rectus muscle is a common procedure.
- Lid retraction. Lid position surgery for exposure keratopathy or cosmetic reasons is best performed subsequent to any orbital or eye muscle surgery.

The full series of these articles is available in the book *Posterior Eye Disease and Glaucoma A-Z* by Bruce AS, O'Day J, McKay D and Swann P. £39.99. For further information click on the Bookstore at opticianonline.net

- **Adrian Bruce** is a Chief Optometrist at the Victorian College of Optometry and a Senior Fellow, Department of Optometry and Vision Sciences, The University of Melbourne.
- **Justin O'Day** is an Associate Professor in the Department of Ophthalmology, The University of Melbourne and Head Of Neuro-Ophthalmology Clinic, Royal Victorian Eye and Ear Hospital.
- **Daniel McKay** is a Medical Officer at the Royal Victorian Eye & Ear Hospital.
- **Peter Swann** is Associate Professor in the School of Optometry, Queensland University of Technology.