

Graves' ophthalmopathy

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Section: Head & neck imaging

Imaging Technique: MR

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Case Type: Clinical Cases

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Patient: 68 years, male

Clinical History:

A 68 year-old male hyperthyroid patient was presented with bilateral proptosis, lid lag, conjunctival injection, and decreased visual acuity.

Imaging Findings:

A 68 year-old male patient with multinodular goitre was presented with bilateral proptosis associated with upper eyelid retraction, severe conjunctival hyperemia, and decreased visual acuity on right side, no vision on left side. His T3 and T4 hormone levels were found to be very high. An orbital MRI study of the patient was performed with a 1.5 T MR scanner, with SE T1, FSE T2, STIR sequences on three planes.

Discussion:

Graves' ophthalmopathy (GO), also called thyroid ophthalmopathy, autoimmune thyroid disease, endocrine exophthalmos, and thyroid eye disease, is the most common cause of unilateral and bilateral proptosis in adults. GO affects approximately 0.5 % of the population of the United States. It is the underlying cause in 15-28 % of the cases of unilateral exophthalmos and in 80 % of the cases with bilateral exophthalmos. It occurs most frequently in women aged 30 to 50 years. GO is thought to be produced by long-acting thyroid stimulating factor (LATS) against the antigens common in thyroid and orbital tissue due to immunologic cross-reactivity. Histopathologically the deposition of hydrophilic mucopolysaccharides and glycoprotein in the muscle fibers with infiltration by mast cells and lymphocytes, edema are characteristic in the early stages of the disease, whereas muscle fiber necrosis, collagen deposition, fatty degeneration occur in the late stages of the disease. Clinical features include proptosis, upper eyelid retraction (lid lag), periorbital edema, conjunctival injection and chemosis, restricted extraocular muscle movements, exposure keratopathy, and optic nerve compromise. GO is bilateral in 70-85 %, asymmetrical involvement is observed in 10-30 %. The muscles are involved in decreasing order of inferior rectus, medial rectus, superior rectus and levator palpebrae, lateral rectus. Radiological findings of GO, which can be detected on ultrasonography, computed tomography, and MRI, are proptosis (globe protrusion more than 21 mm anterior to interzygomatic line on axial scans at the level of lens), swelling of muscles maximally in midportion with relative sparing of tendons (coke-bottle sign), slight uveal-scleral thickening, apical crowding, dilatation of superior ophthalmic vein due to compromised orbital venous drainage, increase in diameter of retrobulbar optic nerve sheath, increased amount of retrobulbar fat. MRI is the best modality to evaluate GO. The muscles are enlarged on edematous stage of the disease, and STIR sequence gives an assessment of muscle water content, and hence a high signal is seen in active disease.

Differential Diagnosis List: Graves' ophthalmopathy

Final Diagnosis: Graves' ophthalmopathy

References:

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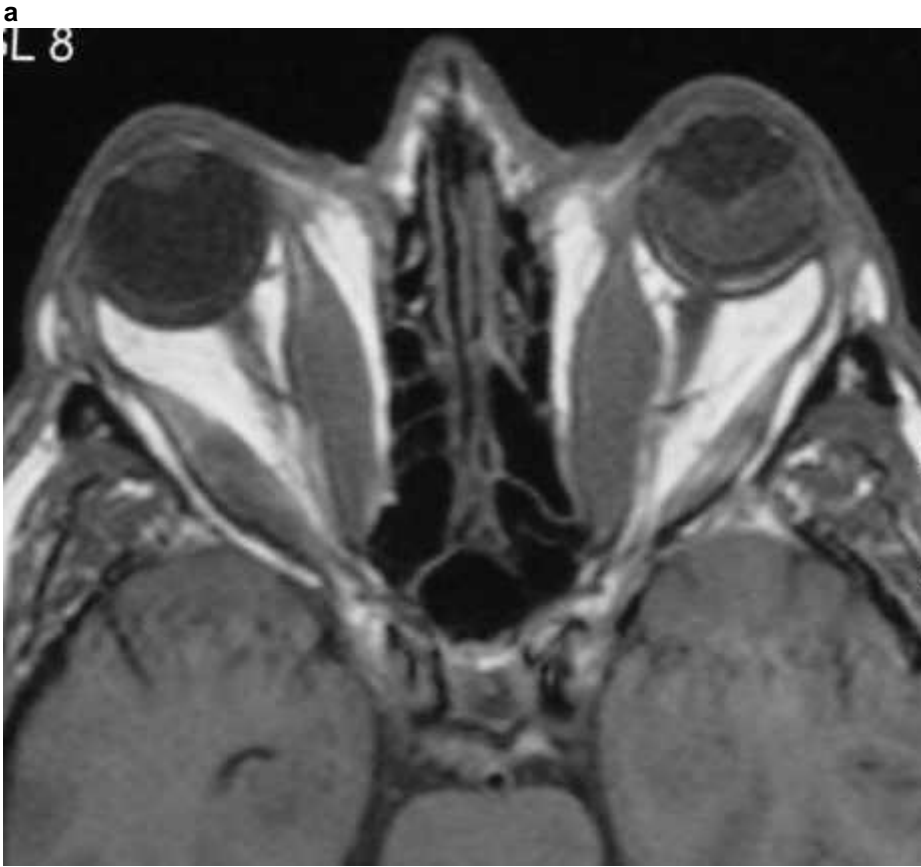
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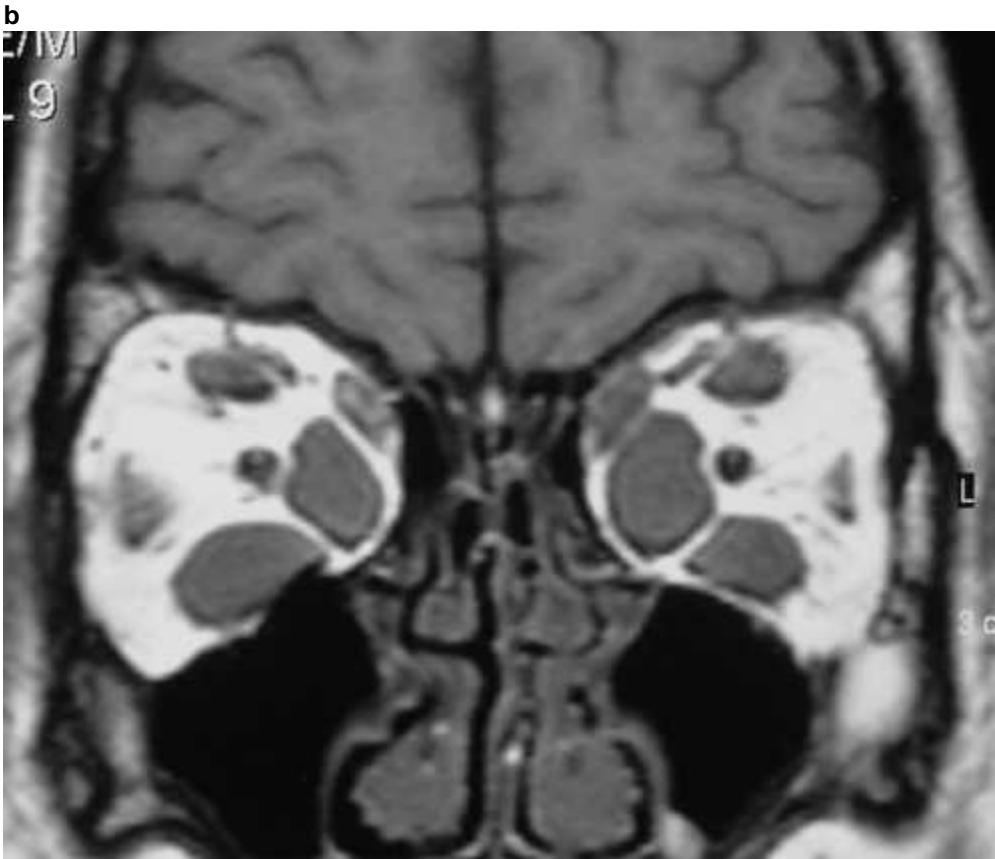
Bailey CC, Kabala J, Laitt R, Goddard P, Hoh HB, Potts MJ, Harrad RA. Magnetic resonance imaging in thyroid eye disease. Eye 1996;10 (Pt 5):617-9. (PMID: [8977792](#))

Hoh HB, Laitt RD, Wakeley C, Kabala J, Goddard P, Potts MJ, Harrad RA. The STIR sequence MRI in the assessment of extraocular muscles in thyroid eye disease. Eye 1994;8 (Pt 5):506-10. (PMID: [7835442](#))

Figure 1



Description: Axial SE T1 weighted MR image shows enlargement of right lateral and medial rectus, left medial rectus muscles. There are areas of increased signal intensity within bilateral lateral rectus and right medial rectus muscles, representing areas of focal lipomatous degeneration. Note that on the left globe a retinal detachment with subretinal fluid collection is associated. **Origin:**



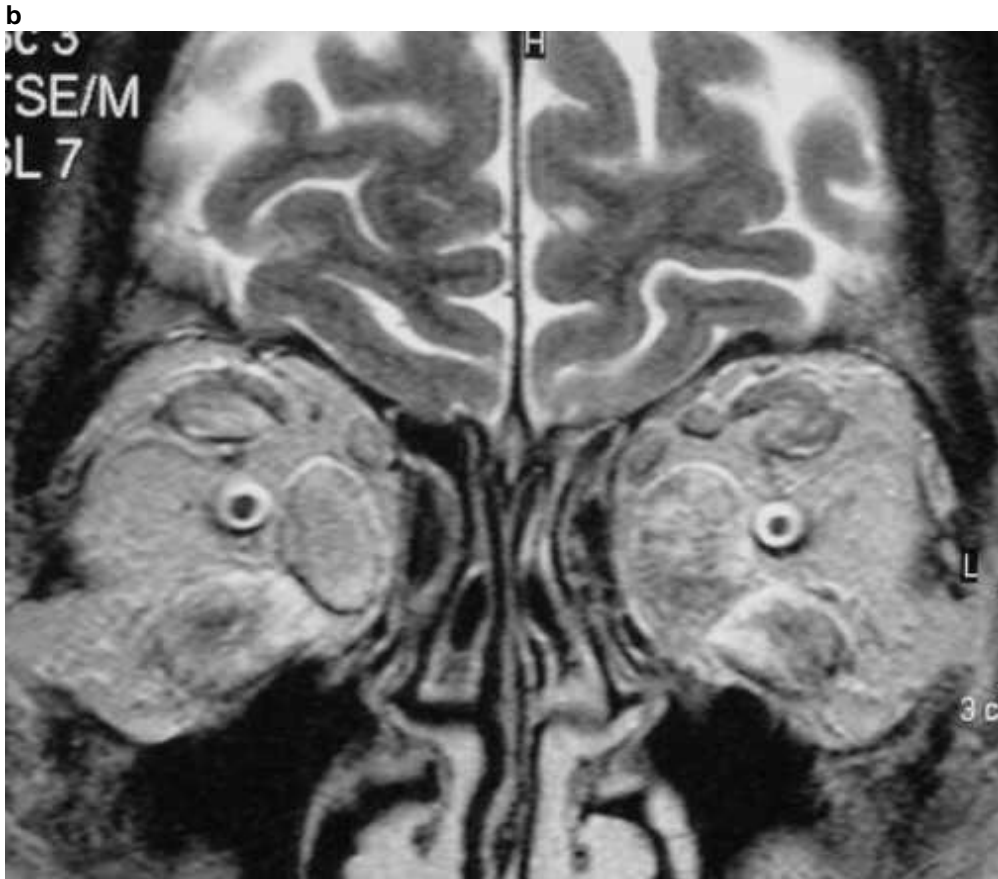
Description: Coronal SE T1 weighted MR image shows enlargement of bilateral medial, inferior, superior rectus, superior oblique and right lateral rectus muscles. **Origin:**

Figure 2

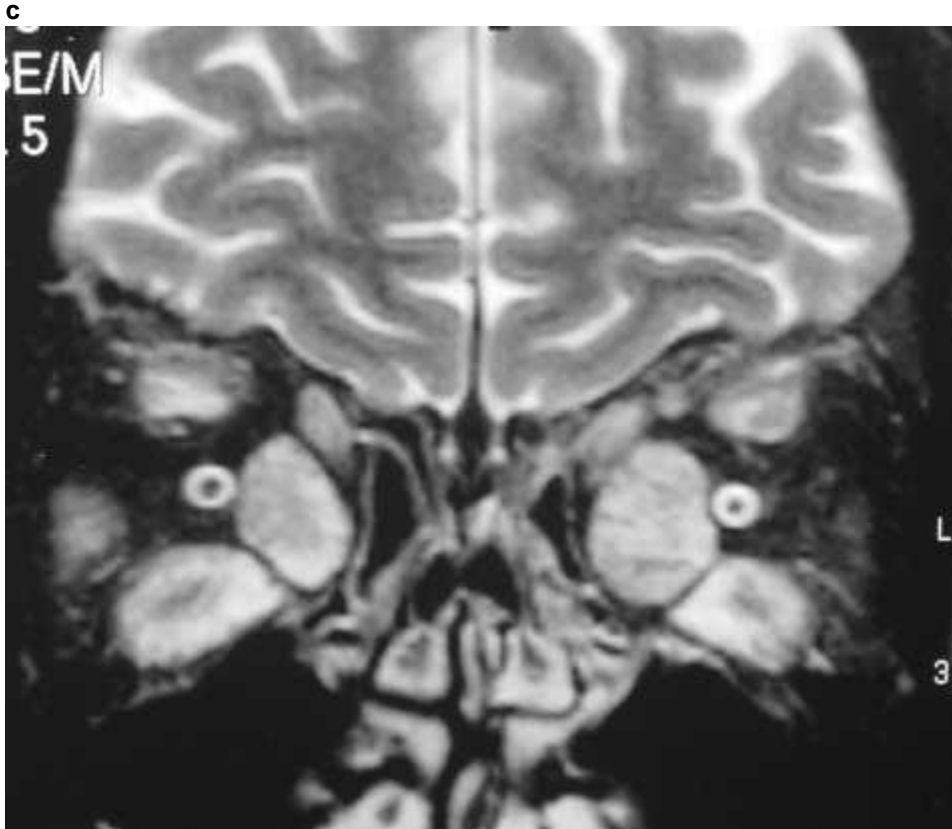
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Description: Axial FSE T2 weighted MR image reveals enlargement of right lateral and medial rectus, left medial rectus muscles. The signal intensities of the herein muscles increased. **Origin:**



Description: Coronal FSE T2 weighted MR image reveals enlargement of bilateral medial, inferior, superior rectus, superior oblique and right lateral rectus muscles. **Origin:**



Description: Coronal STIR MR image shows enlargement of bilateral extraocular muscles, the increase in their signal intensities is clearly observed, representing increased water content of the muscles, which indicates edematous phase of GO. **Origin:**