AMSER Case of the Month September 2026

This is a 68-year-old woman with a history of Graves hyperthyroidism (previously treated with radioactive iodine therapy), subsequent thyroid eye disease c/b diplopia, and a history of multiple upper eyelid and lower eyelid surgeries, strabismus surgery, and bilateral orbital decompression

Angelica Kurtz and Hong Li, MD

Columbia University Vagelos College of Physicians and Surgeons

COLUMBIA
VAGELOS COLLEGE OF PHYSICIANS AND SURGEONS

AMSER

Patient Presentation

- Bilateral worsening eyelid retraction
- Decrease in left side extraocular motility
  - Current extraocular motility:
    - OD: -4 supraduction, -2 abduction, -1 adduction, -3 infraduction
    - OS: -3 supraduction, -4 abduction, -4 adduction, -3 infraduction
  - Previous extraocular motility:
    - OD: -4 supraduction, -2 abduction, -1 adduction, -3 infraduction
    - OS: -3 supraduction, -4 abduction, -3 adduction, -2 infraduction

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 8: **Ophthalmoplegia or diplopia. Initial imaging.**

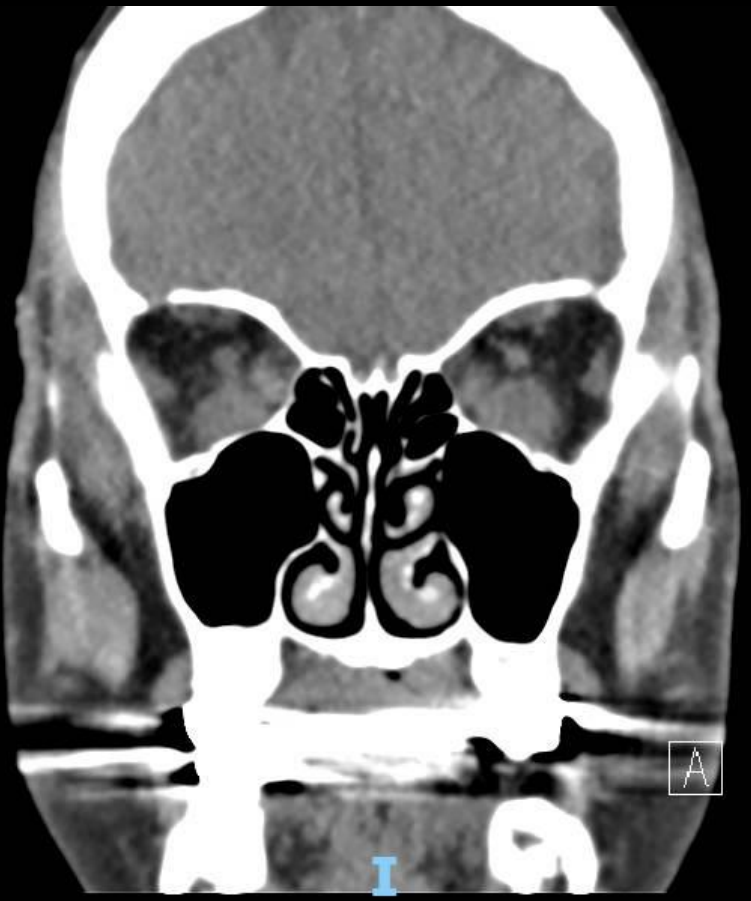
Procedure	Appropriateness Category	RRL
MRI head without and with IV contrast	Usually Appropriate	O
MRI orbits without and with IV contrast	Usually Appropriate	O
CT orbits with IV contrast	Usually Appropriate	☢☢☢
MRI orbits without IV contrast	Usually Appropriate	O
CT orbits without IV contrast	May Be Appropriate	☢☢☢
CTA head and neck with IV contrast	May Be Appropriate	☢☢☢
MRA head and neck without and with IV contrast	May Be Appropriate	O
MRA head and neck without IV contrast	May Be Appropriate	O
MRI head without IV contrast	May Be Appropriate	O
CT head with IV contrast	May Be Appropriate	☢☢☢
CT head without IV contrast	May Be Appropriate	☢☢☢
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CT orbits without and with IV contrast	Usually Not Appropriate	☢☢☢
X-ray orbit	Usually Not Appropriate	☢

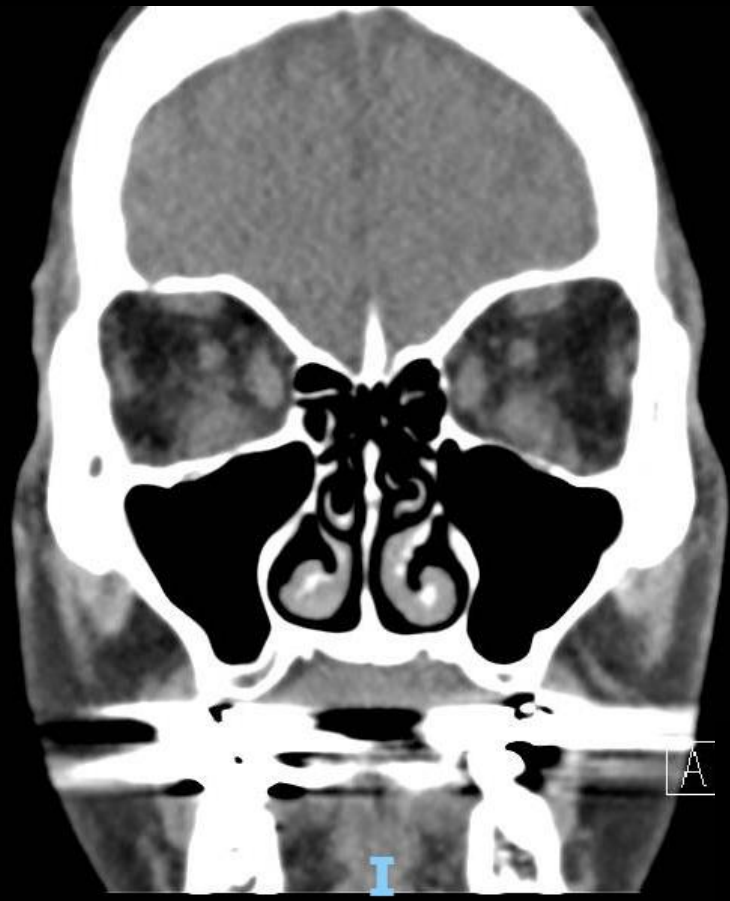
This imaging modality was ordered by the physician

AMSER

Findings: (unlabeled)

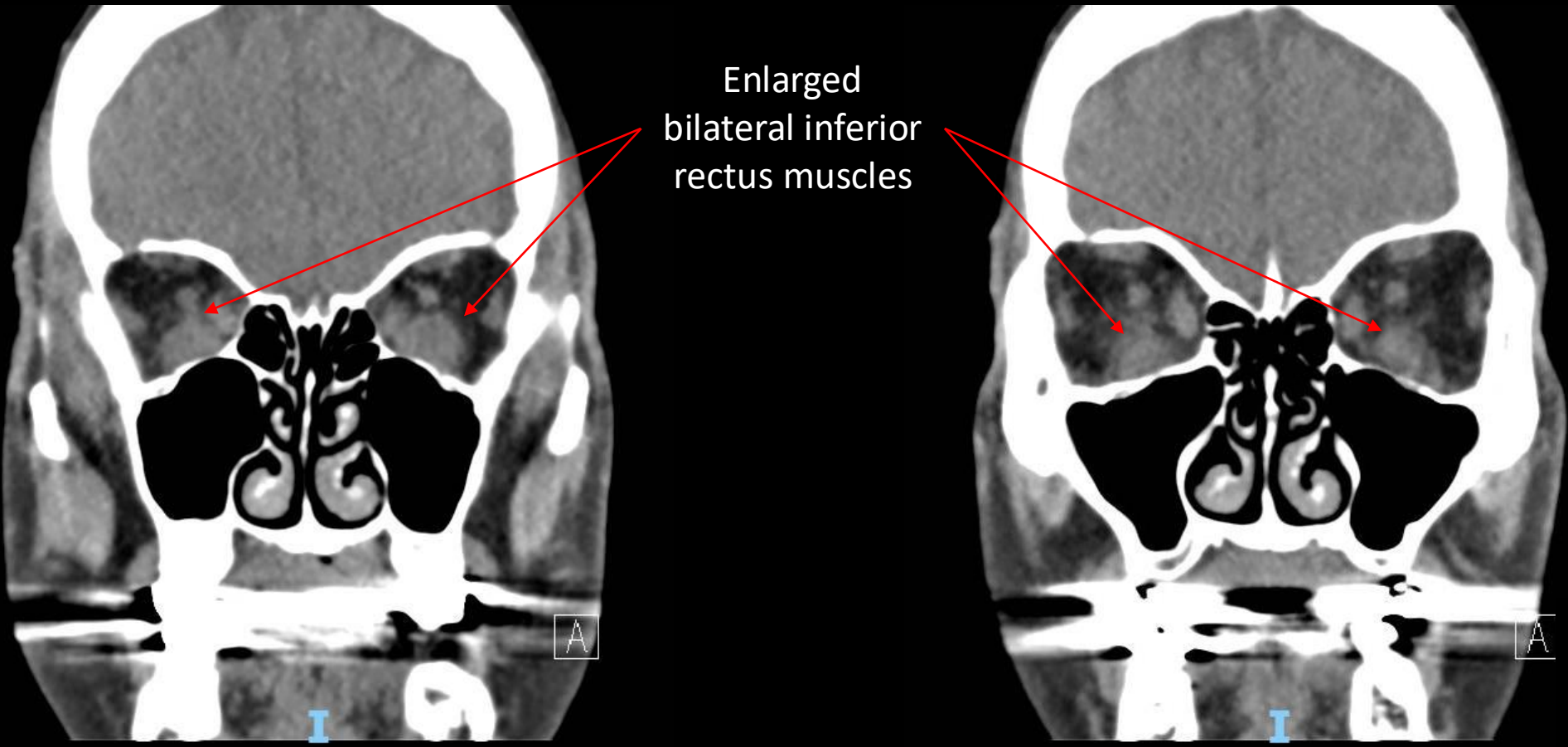
- Previous CT non-contrast 2016





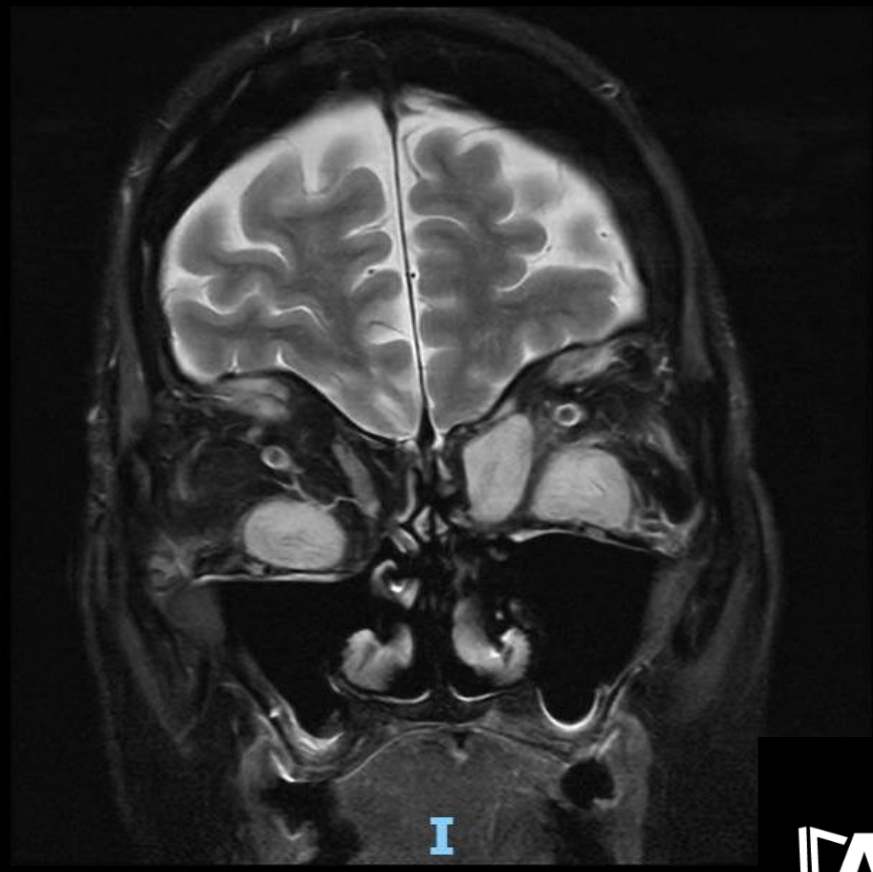
Findings: (labeled)

- Previous CT non-contrast 2016



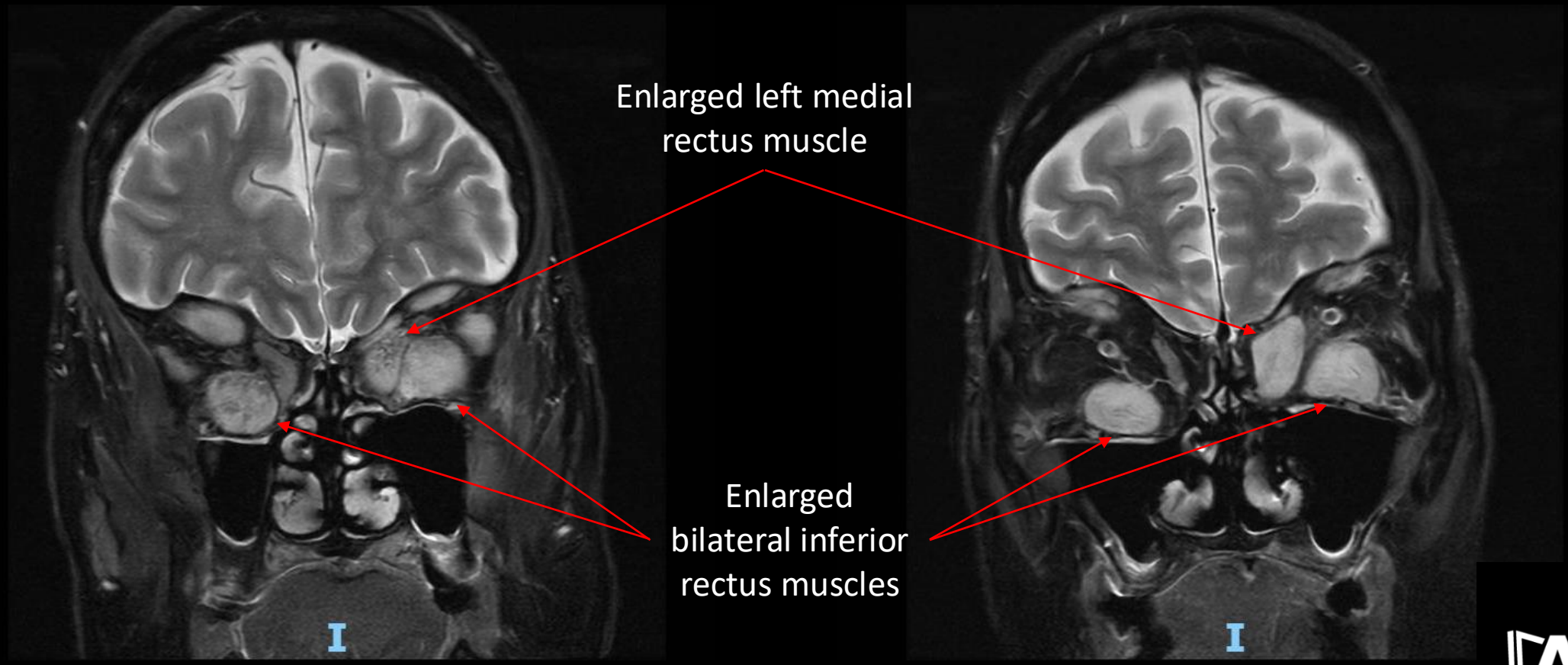
Findings (unlabeled)

- MRI with and without contrast 2024



Findings (labeled)

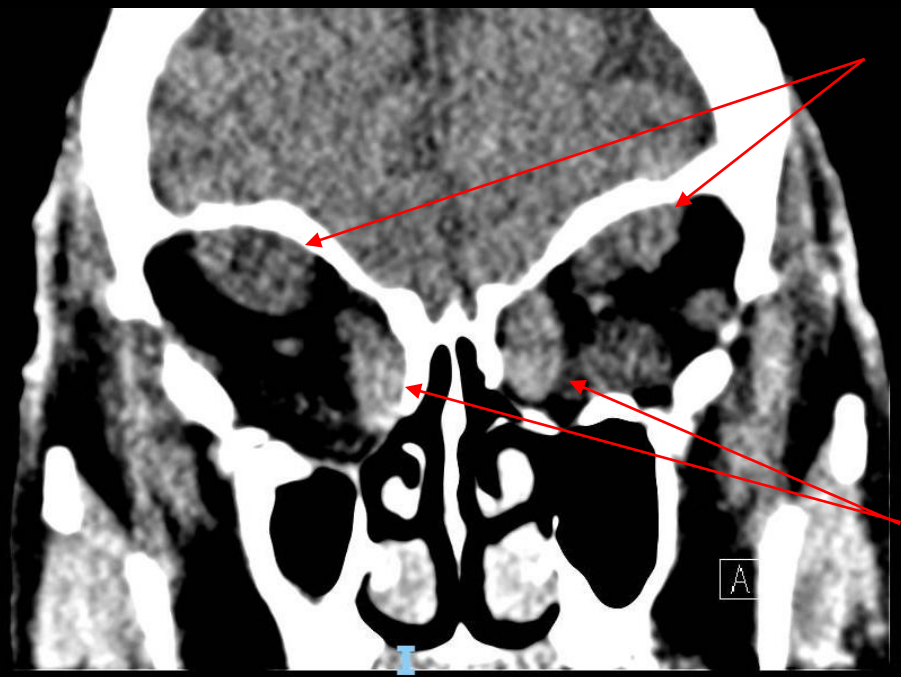
- MRI with and without contrast 2024



Final Dx:

Worsening Thyroid Eye Disease

Subsequent CT non-contrast 6/12/2025



Enlarged bilateral superior rectus muscles

Enlarged bilateral medial rectus muscles

Enlarged bilateral inferior rectus muscles

Case Discussion

- Prime example for progression of extraocular muscle involvement in Thyroid Eye Disease (TED)
  - The mnemonic **I'M SLO**w details the order in which extraocular muscles demonstrate enlargement in TED[1]
    - **I**nferior rectus
    - **M**edial rectus
    - **S**uperior rectus
    - **L**ateral rectus
    - **O**bliques (superior and inferior)

Case Discussion

- The patient presented here also had a history of radioactive iodine therapy
  - Radioactive iodine therapy is known to increase the risk of ocular manifestations of Graves' disease compared to other treatment options because "RAI-associated leakage of thyroid antigen(s) leads to an increased production of TSH-R antibodies that may initiate the eye injury"[2]
- TED Stages:
  - **Active stage** persists for 1.5 – 3 years typically followed by **stabilization** of symptoms
  - In rare cases, patients can experience a cycle of exacerbations and remissions[3]
  - Grading with Clinical Activity Score (CAS)[4]
    - CAS ranges from 0-10, with a correlation between higher CAS and greater extraocular muscle enlargement
    - CAS helps physicians determine treatment options
      - For example, a CAS of 3 or more is required to benefit from anti-inflammatory drugs

Table 1 *Proposed classification system to assess disease activity in Graves' ophthalmopathy*

Pain
painful, oppressive feeling on or behind the globe,
pain on attempted up, side, or down gaze
Redness
redness of the eyelid(s),
diffuse redness of the conjunctiva
Swelling
Chemosis,
swollen caruncule
oedema of the eyelid(s)
increase of proptosis of 2 mm or more during a period between 1 and 3 months
Impaired function
decrease in visual acuity of 1 or more lines on the Snellen chart (using a pinhole) during a period between 1 and 3 months
decrease of eye movements in any direction equal to or more than 5 degrees during a period of time between 1 and 3 months

For each of the signs present one point is given. The sum of these points defines the activity score.

Mourits MP, Koornneef L, Wiersinga WM, Prummel MF, Berghout A, van der Gaag R. Clinical criteria for the assessment of disease activity in Graves' ophthalmopathy: a novel approach. British Journal of Ophthalmology. 1989;73(8):639-644. doi:https://doi.org/10.1136/bjo.73.8.639

Case Discussion

- Treatment options:[3]
  - Maintain euthyroid status
  - Smoking cessation
  - Lubrication for ocular dryness
  - Oral or IV steroids
  - If steroids are not sufficient during the active phase, orbital radiation or immune modulation (rituximab, methotrexate, etc.) can be used
  - After stabilization, patients may require orbital decompression surgery, strabismus surgery for binocular diplopia, and/or eyelid surgery for eyelid retraction

References:

1. Mostafa El-Feky, Dawes L. Extraocular muscle involvement in thyroid associated orbitopathy (mnemonic). Radiopaediaorg. Published online May 2, 2008. doi:https://doi.org/10.53347/rid-1487
2. Ponto KA, Zang S, Kahaly GJ. The Tale of Radioiodine and Graves' Orbitopathy. Thyroid. 2010;20(7):785-793. doi:https://doi.org/10.1089/thy.2010.1640
3. Pillar AJ, Richa DC. Treatment Options for Thyroid Eye Disease. Current Treatment Options in Neurology. 2014;16(8). doi:https://doi.org/10.1007/s11940-014-0303-8
4. Mourits MP, Koornneef L, Wiersinga WM, Prummel MF, Berghout A, van der Gaag R. Clinical criteria for the assessment of disease activity in Graves' ophthalmopathy: a novel approach. British Journal of Ophthalmology. 1989;73(8):639-644. doi:https://doi.org/10.1136/bjo.73.8.639

AMSER