Orbital and Ocular Adnexal Disorders with Red Eyes

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Overview

• Case Scenarios
• Not an exhaustive list of conditions
• Important orbital and ocular adnexal conditions to recognise
Orbit
Ocular adnexae

- Eyelashes
- Superior rectus muscle
- Eyebrow
- Eyelid
- Lacrimal puncta
- Lacrimal gland
- Medial canthus
- Lateral canthus
- Lacrimal sac
- Meibomian glands
- Nasolacrimal duct
- Inferior rectus muscle
30yo male presents with a 1 day history of left periorbital swelling, blurring of vision, fever and headache.
Scenario 1
Orbital Cellulitis

• OCULAR EMERGENCY!!!
• Occur at any age but more common in children
• Inflammation of orbital soft tissues behind the orbital septum

- Extension from preseptal cellulitis
- Local spread from periorbital infection / sinuses
- Direct inoculation
- Haematogenous spread
Preseptal vs Orbital Cellulitis

Chandler’s Classification

- Preseptal cellulitis (I)
- Orbital cellulitis (II)
- Subperiosteal abscess (III)
- Orbital abscess (IV)
- Cavernous sinus thrombosis (V)

Orbital Cellulitis

• Signs
  – Eyelid oedema and erythema
  – Increased orbital pressure
    • Decreased vision
    • RAPD
    • Proptosis
  – Soft tissue inflammation
    • Ophthalmoplegia

• Intracranial sequelae:
  – Cavernous sinus thrombosis
  – Meningitis
  – Cerebral abscess
Orbital Cellulitis

- **Management**
  - CT Orbits and Sinuses
  - Hospital Admission
    - **Serological investigations** – Blood cultures, FBC, wound swab if applicable
    - **Broad spectrum IV antibiotics**
      - Conversion to oral antibiotics when cellulitis improving (depending on culture and sensitivity)
    - **May require surgical drainage** if presence of abscess
Scenario 2a

- 37yo male presents after falling onto his right after an RTA.
- Complaining of diplopia on upgaze
- Vision normal and optic nerve function normal.
- Right infraorbital anaesthesia
CT Orbits
Scenario 2a
Orbital Blow-out fracture

- Fracture of orbital walls but **orbital rim intact** from a **blunt trauma** to the orbit
- 2 proposed mechanisms:
  - Hydraulic Theory
  - Buckling theory
- Sequelae?
Orbital Blow-out fracture

• Signs:
  – Periorbital haematoma
  – Restricted EOM
  – Subcutaneous emphysema
  – Infraorbital anaesthesia
  – Enophthalmos
Orbital Blow-out fracture

• Work-up:
  – *Exclude injuries* to other parts of body and face
  – *Full ophthalmic examination* to rule out globe rupture, traumatic optic neuropathy
  – *CT orbits and face*
Orbital Blow-out fracture

• Management:
  – Cold compress
  – No nose blowing
  – Broad spectrum oral antibiotics for 1 week
  – Short course of oral steroids
Orbital Blow-out fracture

• Surgical repair:
  – Immediate repair – muscle entrapment
  – Repair in 1 – 2 weeks (Indications)
    • Large orbital floor fractures of >50%
    • Enophthalmos of 2mm or more
    • Persistent, symptomatic diplopia on primary gaze
Beware of the White-eyed Blow-out fracture

- Young patients (<18yo)
- Inferior “trapdoor” orbital floor fractures with muscle and soft tissue incarceration
- Entrapment of inferior rectus muscle can produce an oculocardiac reflex:
  - Bardycardia
  - Nausea
  - Syncope
Scenario 2b

- 55yo male presents after falling onto his left face. He is unable to spontaneously open his eye. Examination reveals a very tense orbit with a left RAPD.
Retrobulbar haemorrhage

• **Ocular emergency!**

• **Signs:**
  
  – Diffuse subconjunctival haemorrhage *without a posterior margin*
  
  – **Tense proptosis** with resistance to retropulsion
  
  – Very *elevated intraocular pressure*
  
  – Very *limited extraocular motility*
  
  – Compressive *optic neuropathy*
Retrobulbar haemorrhage

• Management
  – Timely and aggressive decompression
  – If optic neuropathy is present, need to release orbital pressure with lateral canthotomy and cantholysis
Scenario 3

- 47yo male presents with a 1 month history swelling over right lower lid and medial canthal region. He had 7 previous less severe episodes all of which recovered with oral antibiotics.
Dacryocystitis

• Inflammation of the lacrimal sac
Pathophysiology

- Increased Age
- Female
- Idiopathic Inflammatory Stenosis (Primary Acquired)

Secondary Acquired

Obstruction of nasolacrimal duct

Stagnation of tears and infection

Trauma
- Infection
- Inflammation
- Neoplasm
- Mechanical obstruction
History to ask

• **Epiphora**
• **Previous** similar episodes
• History of **trauma** to medial canthal region
• History of **systemic disease**:
  – Lymphoma / Neoplasms
  – Granulomatosis with polyangiitis (Wegener’s Granulomatosis)
  – Sarcoidosis
Clinical findings

• Pain, redness and oedema
• Pus expressed from punctum
• Fistula may be present if sac ruptures through skin
• Conjunctival injection and preseptal cellulitis
• Can progress to orbital cellulitis
To note

- Not all masses in medial canthal area arise from lacrimal sac
  - Ruptured dermoid cyst
  - Acute skin infection
  - Acute ethmoiditis
- Swellings **below the medial canthal tendon** are typical of dacryocystitis
To note

• Signs in favour of a lacrimal sac tumor include:
  – Mass above medial canthal ligament
  – Telangiectasia in the skin overlying the mass
  – Serosanguinious discharge or bloody reflux with atraumatic irrigation
Dacryocystitis

• Management
  – **Oral antibiotics** (commonly gram positive)
  – May require **percutaneous drainage** of abscess, small risk of fistula formation
  – **Imaging** (CT orbits and Sinuses) may be required if atypical findings
  – **Dacryocystorhinostomy** (DCR) few weeks after acute infection resolves
Dacryocystorhinostomy

- Can be performed externally or endoscopically
Scenario 4

- 50yo Chinese male, smoker, with a known history of Grave’s disease presented with a 20 year history of “prominent eyes”. He now complains of a 1 week history of L>R eye redness and tightness with left eye blurring of vision.
Thyroid Eye Disease (TED)

• Diagnosed if eyelid retraction occurs with:
  – Thyroid dysfunction or;
  – Exophthalmos or;
  – Optic nerve dysfunction or;
  – Restrictive myopathy

→ If no eyelid retraction present, then TED can be diagnosed if exophthalmos, optic nerve dysfunction or restrictive myopathy is associated with thyroid dysfunction

Thyroid Eye Disease (TED)

- Affects 25 - 50% of patients with Graves disease, of which 5% have severe involvement.

Development or Progression of TED:

- Ancestry: Caucasians > Asians
- Radioactive Iodine Therapy
- Thyroid Dysfunction
  - Active or Passive Smoking
- Gender: Women – more frequent, Men – more severe
Extraocular signs

• Proptosis

• Lid signs
  – Lid retraction
  – Lid lag
  – Lid swelling
  – Lid erythema

• Restrictive Myopathy
Intraocular

• **Anterior segment**
  – Conjunctival injection and chemosis
  – Superior limbic keratoconjunctivitis
  – Exposure keratopathy
  – Glaucoma

• **Posterior segment**
  – Optic neuropathy
  – Choroidal folds
Clinical assessment of patients with TED

• Clinical Activity
  – CAS (Clinical Activity Score)
  – VISA (Vision, Inflammation, Strabismus, Appearance)

• Clinical Severity
  – NOSPECS (No signs and symptoms, Only signs, Soft tissue involvement, Proptosis, EOM involvement, Corneal involvement, Sight loss)
  – EUGOGO (European Group on Graves’ Orbitopathy)
Clinical Activity Score (First visit)

1. Ocular pain at rest
2. Ocular pain on attempted up, side or down gaze
3. Eyelid erythema
4. Eyelid swelling
5. Conjunctival injection
6. Chemosis of the conjunctiva
7. Chemosis of the caruncle

≥3/7 indicates active disease

Clinical Activity Score (Repeat visits)

- Ocular pain at rest
- Ocular pain on attempted up, side or down gaze
- Eyelid erythema
- Eyelid swelling
- Conjunctival injection
- Conjunctival injection
- Conjunctival injection
- Conjunctival injection
- Plus (during a period of 1 – 3 months):
  - Increase in proptosis by ≥ 2mm
  - Decrease in eye movement in any direction by ≥ 5°
  - Decrease in best corrected visual acuity by ≥ one line on the Snellen chart

≥4/10 indicates active disease

Severity of TED (EUGOGO)

• Classified into:

1) Mild TED
   – <2mm eyelid retraction
   – Mild soft tissue involvement
   – <3 mm exophthalmos
   – Transient or no diplopia
   – Corneal exposure responsive to lubrication
Severity of TED (EUGOGO)

2) Moderate-to-severe TED
   – ≥ 2mm Moderate or severe eyelid retraction
   – Moderate or severe soft tissue involvement
   – ≥ 3mm exophthalmos
   – Inconstant or constant diplopia

3) Sight-threatening (or very severe) TED
   – Dysthyroid optic neuropathy
   – Corneal breakdown

Management of TED

FIG. 1. Management of Graves’ orbitopathy. Rehabilitative surgery includes orbital decompression, squint surgery, lid lengthening, blepharoplasty/browplasty. IV GCs, intravenous glucocorticoids; OR, orbital radiotherapy; DON, dysthyroid optic neuropathy. For definitions of GO severity and activity see text.

References


