

Ophthalmology lecture

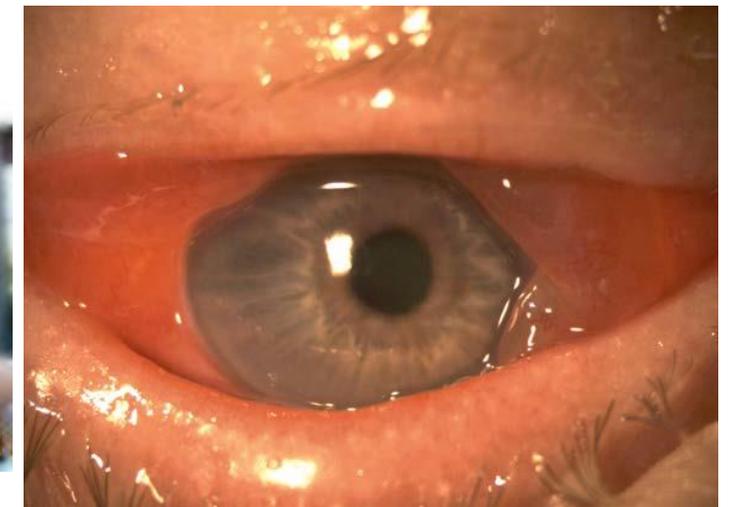
MJS

Specialist @ cornea and external eye disease unit



Common ocular presentation

□ **red eye** is one of the most common ocular presentation encountered in the primary care centers and ophthalmology clinics



Red eye

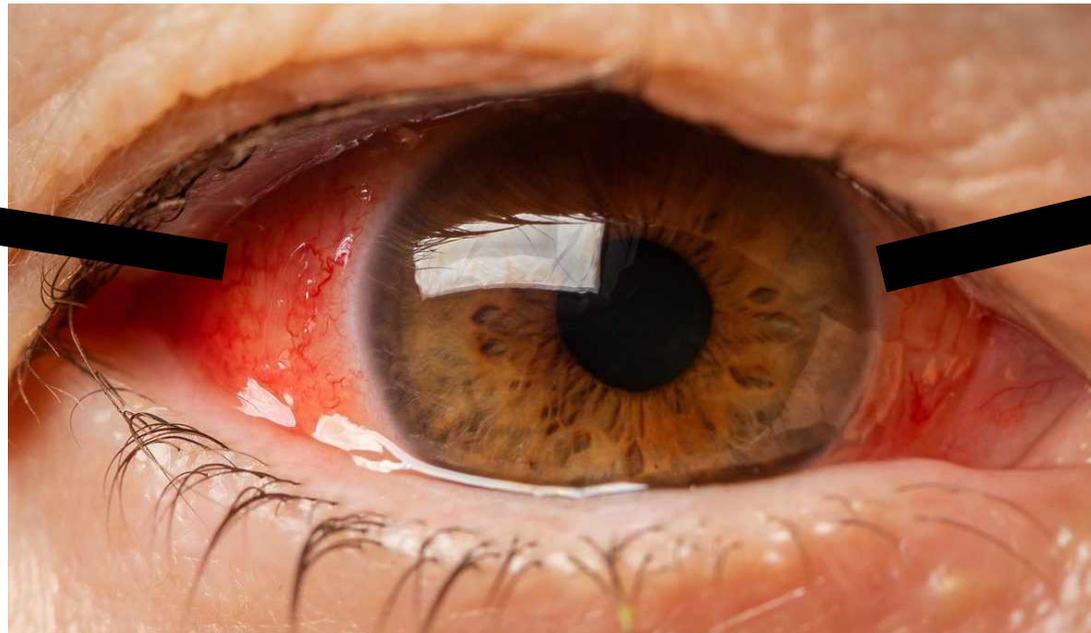
□ variable presentation from mild irritation to emergency cases that could be sight or life threatening

□ Red eye; known as conjunctival injection, results from inflammation of multiple anatomical parts within the eye

▪ Resulting in vascular dilatation and increased blood flow giving the red hyperemic appearance

□ External eye diseases causes

- Conjunctiva
- Episclera/sclera
- Cornea



□ Intra-ocular causes

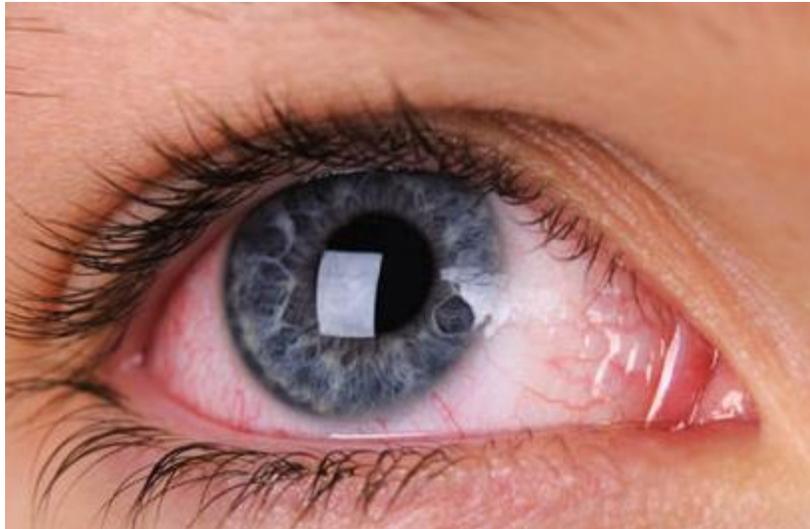
- Uveitis
- Endophthalmitis
- Acute elevation of Intraocular pressure

□ Orbital causes;

- Orbital cellulitis
- Thyroid eye disease
- Neoplastic

Conjunctiva- red eye

Conjunctivitis



**Sub-
conjunctival
hemorrhage**



Conjunctivitis

Definition and pathophysiology

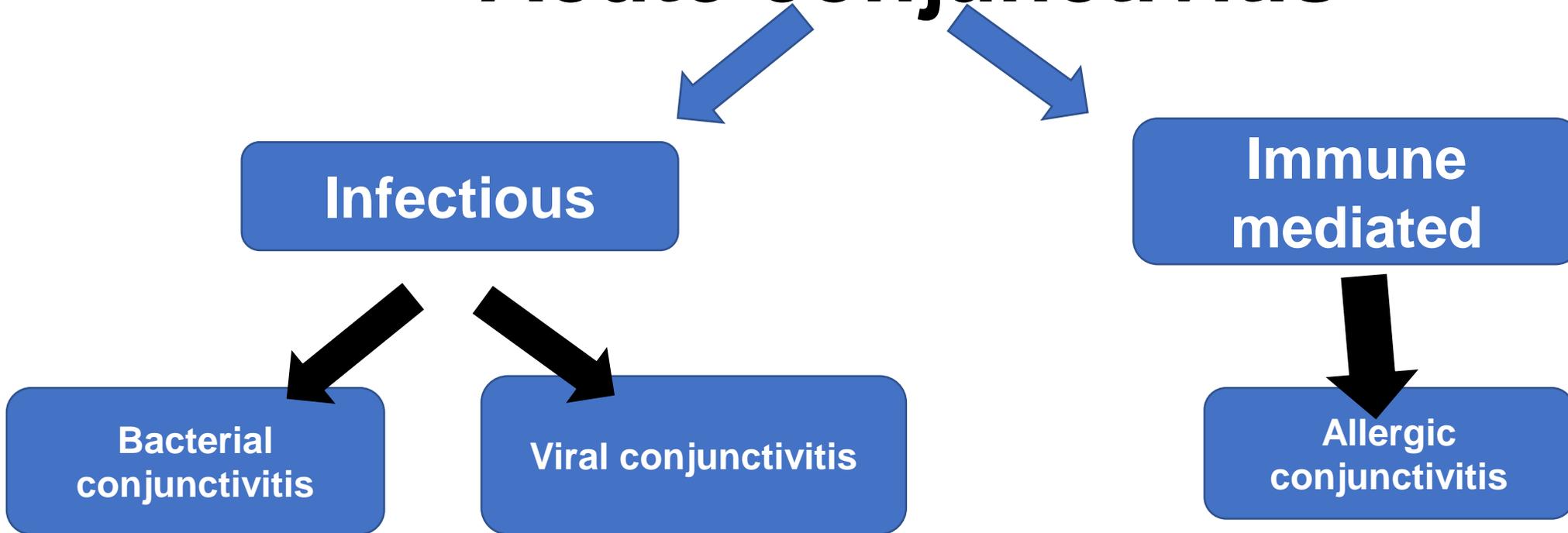
- ❑ Inflammation of the conjunctiva; resulting from Infectious or Immune mediated causes

Classification based on onset

- ❑ **Acute:** less than 4 weeks
- ❑ **Chronic:** more than 4 weeks
- ❑ Within the first month of age: **ophthalmia neonatorum**

- ❑ **Clinical presentation**; Conjunctival redness, chemosis, tearing/ discharge ; possible photophobia/ blepharospasm if the cornea is eroded

Acute conjunctivitis

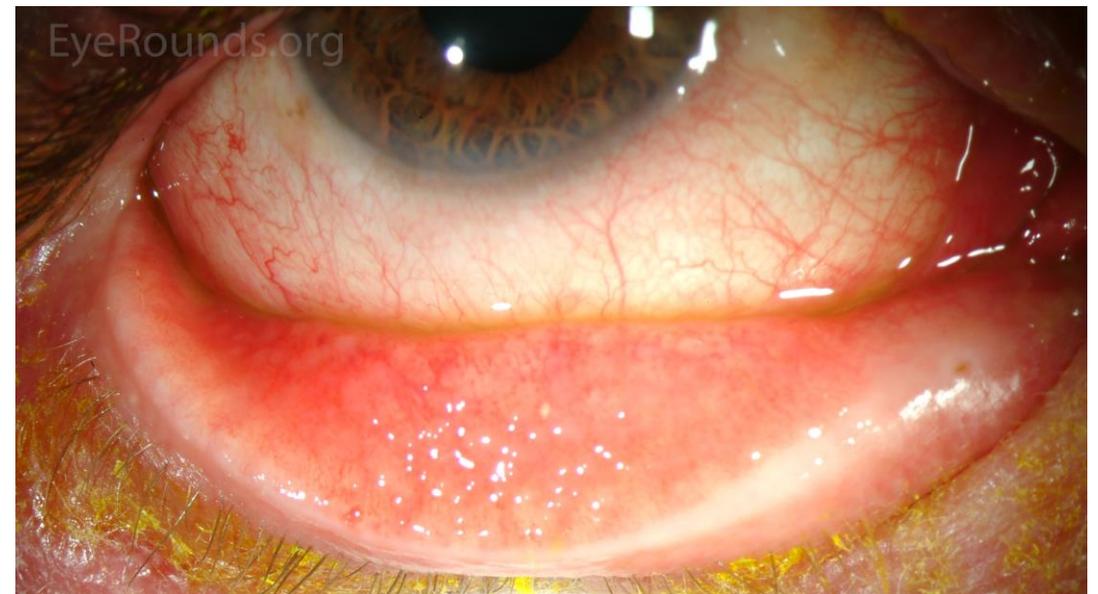


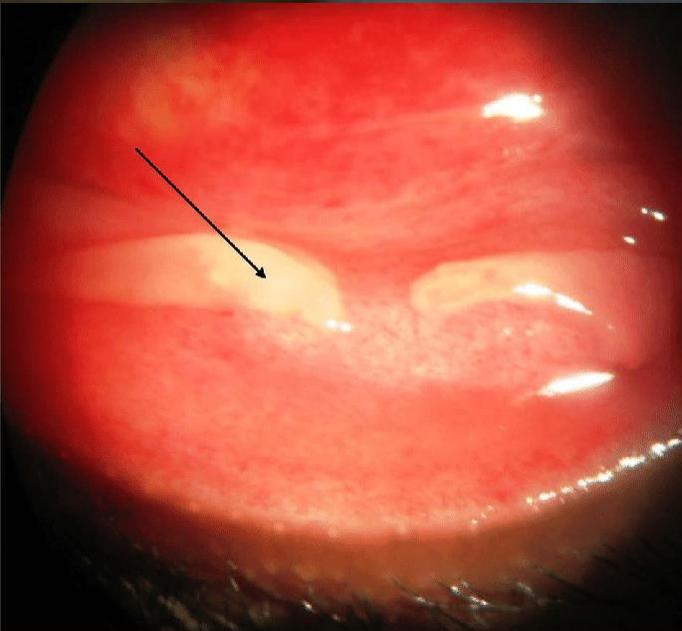
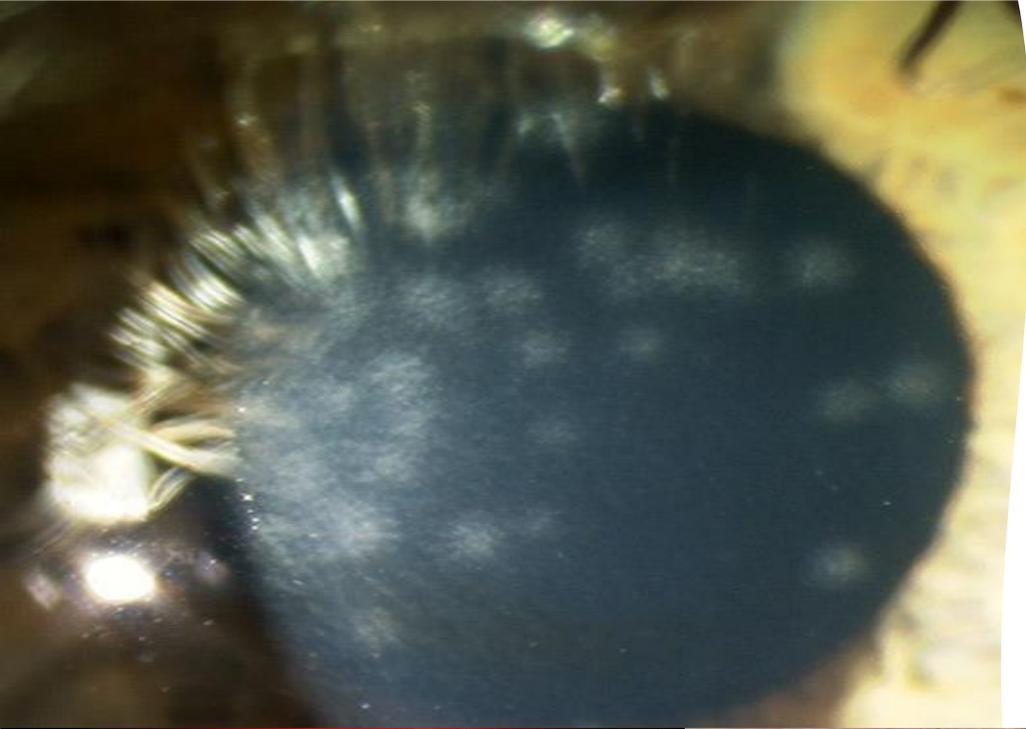
Viral conjunctivitis

- ❑ Most common cause of conjunctivitis;
- ❑ Multiple DNA /RNA viruses can cause conjunctivitis; most common is **adeno viral**

❑ Clinical manifestation

- Follicular conjunctivitis presented with redness , chemosis , tearing ,and none-tender lid swelling preceded by flu-like symptoms
- Usually start in one eye then proceed to involve the other eye in few days
- highly contagious form of conjunctivitis; can be transmitted via contact with contaminated source





□ Clinical progression

- **Self limiting**; Lasting about 1-3 weeks then resolve; however, the patient can still be contagious during this period; so careful measures should be taken to prevent transmission
- In certain cases; there can be immune mediated reaction to the viral antigens within the cornea causing **Sub-epithelial infiltration**
- In more prolonged cases; inflammatory exudative coagulum forms within the fornix called **conjunctival membrane** (pseudo-membrane)

Treatment

- Mainly conservative symptomatic treatment for simple mild cases with no cornea involvement**
- Cool compressions and artificial tears may provide symptomatic relief.
- Anti-allergy useful for itching
- Vasoconstrictors; NAPHCN-A may provide short temporary relief of the redness, limited use only
- Topical antibiotics usually not needed
- Preventive measures; hand washing; social distancing; avoid using patient personal items

☐ Cases of corneal involvement presented with photophobia / blurry vision or conjunctival membrane

☐ Best to refer to ophthalmology centre to start steroid therapy

☐ Indications: useful primarily with a true membrane or vision worse than 20/40 from SEIs and to reduce the associated photophobia

☐ Usually, weak steroid is advised for a period of 3 weeks

Allergic conjunctivitis

Definition and pathophysiology

- inflammatory response of the conjunctiva to an allergen; Resulting in immune inflammation of the conjunctiva
- with secondary involvement of the cornea in chronic; repeated cases

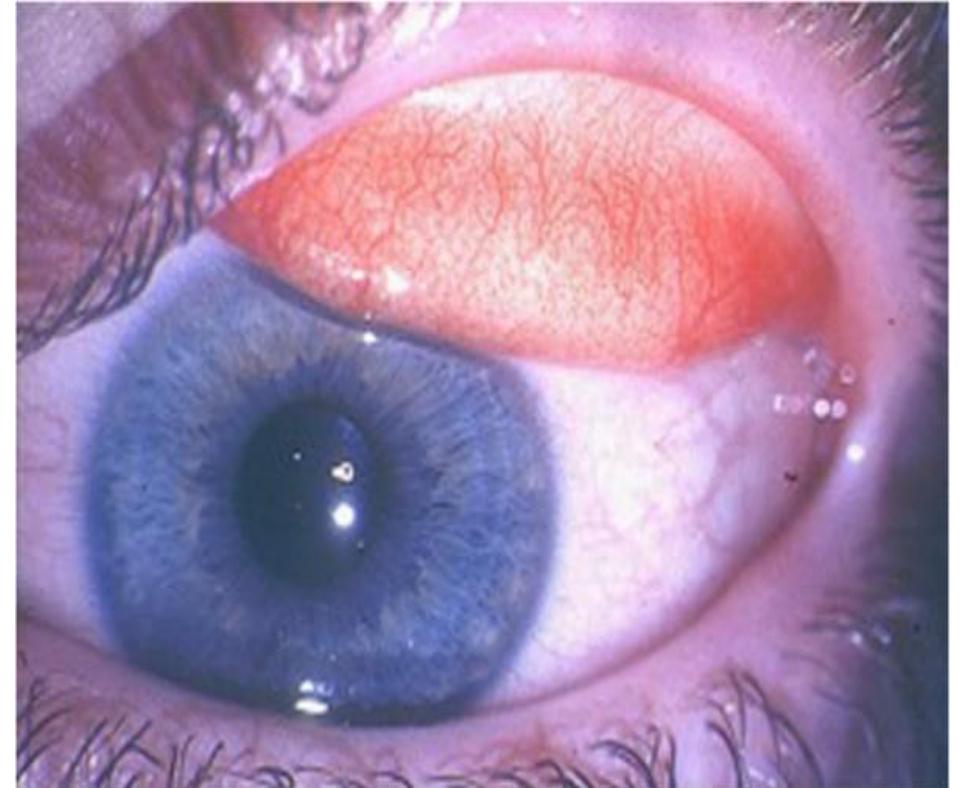
□ Mediated by Type 1 and Type 4 hypersensitivity reaction



Clinical manifestation

- ❑ Acute papillary conjunctivitis presenting very similar to viral conjunctivitis with with redness , chemosis , tearing ,and none-tender lid swelling

- ❑ No flu symptoms but allergic rhinitis could mimic the presentation specially if associated with atopy





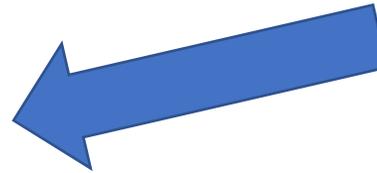
□ Mild presentation

- Itching is the primary symptom where patients are constantly rubbing their eyes with temporary relief.
- The eyelids and conjunctiva become edematous and diffusely hyperemic.



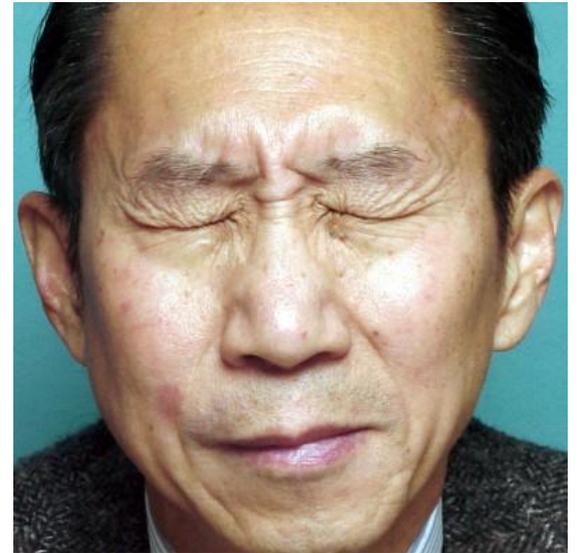
☐ Moderate presentation

- Photophobia
- and possible blurry vision Indicating corneal epithelial involvement
- Maybe associated with corneal pannus and vascularization



□ Severe presentation

- Significant photophobia causing blepharospasm
- Usually this presentation occurs with VKC/ AKC



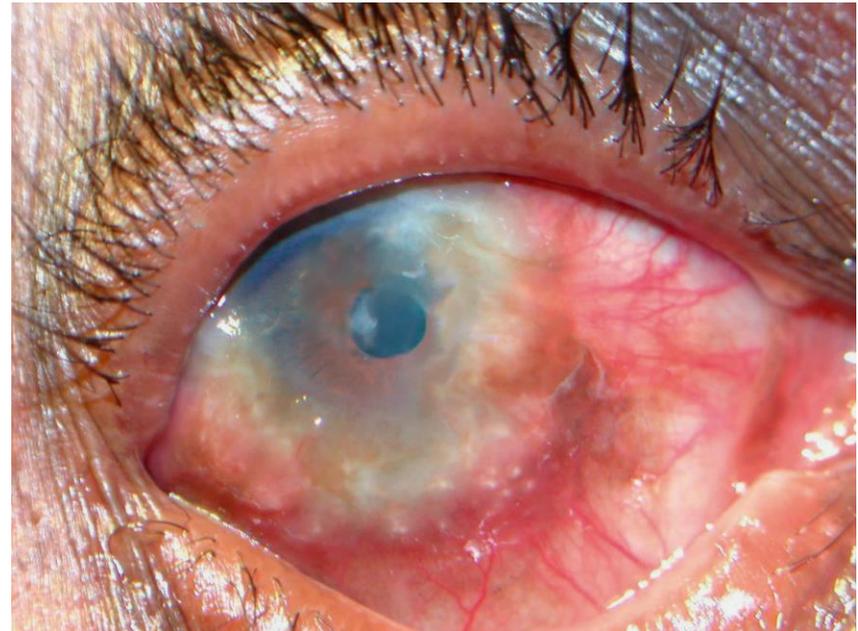
□ **Complicated presentation**

- May be associated with more More significant signs such as significant corneal vascularization and maybe cicatricial conjunctiva changes



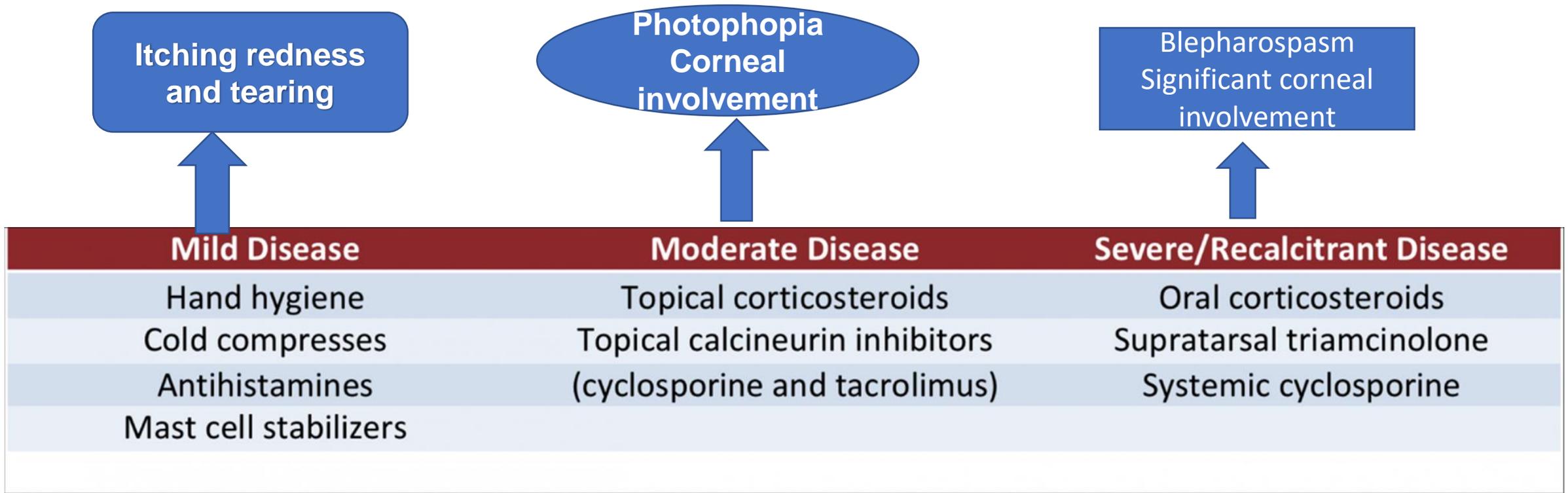
Clinical progression

- ❑ Highly variable; as some cases could only involve the conjunctiva causing few symptoms and then resolve
- ❑ recurrent or chronic cases can compromise the cornea thus the vision



Treatment

□ Treatment follows a step wise approach according to the severity



Bacterial conjunctivitis

Clinical presentation

- ❑ Usually, unilateral redness associated with mucopurulent discharge causing matting of the lashes; described as sticky eye
- ❑ The causative organisms could also infect the adjacent corneal causing suppurative corneal ulcer or it could be associated with infection of the adjacent nearby structures



Management

Broad spectrum anti-biotics

When to refer

- In cases with corneal ulcer
- In recurrent or protracted cases with no improvement despite topical anti-biotic therapy
- In cases associated with systemic infectious presentation
- In newborn within 1st month of age

□ Hyperacute gonococcal conjunctivitis

- Presenting less than 24 hours with copious amount of discharge with progressive rapidly deteriorating corneal ulcer
- Indicative of *Neisseria gonorrhoea*
- Could occur in infants within 3-5 days of post normal vaginal delivery (up to a month) or In adults as part of STD; which require immediate hospitalization for microbiological investigation; systemic evaluation and treatment of *N.gonorrhoea* once its confirmed
- Keep in mind investigation of the mother and her partner in these cases and to consider investigation and treatment of concomitant chlamydia infection



□ **Chlamydia inclusion conjunctivitis**

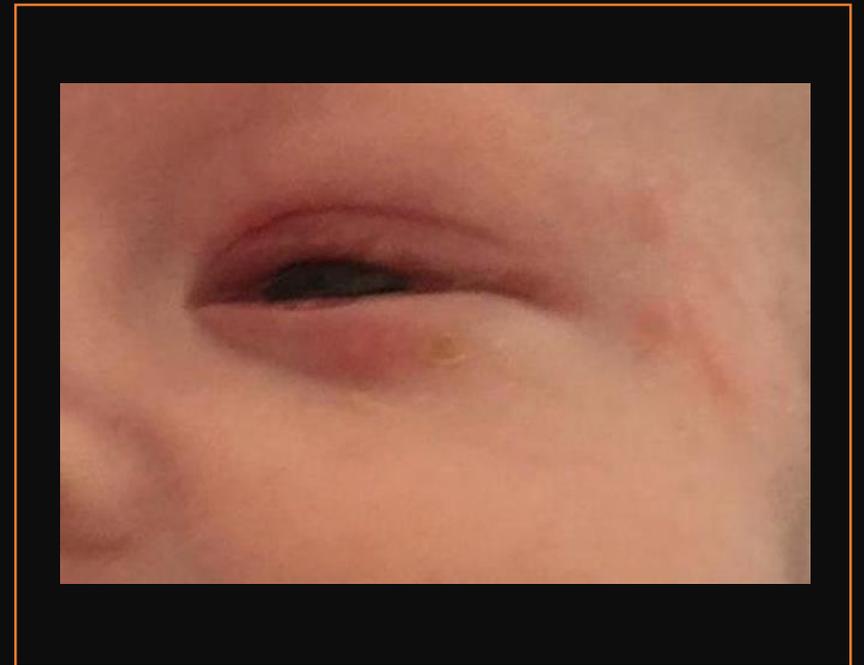
- Infectious conjunctivitis occurring in newborn within first month of Post vaginal delivery or in adult as STD
- In infants may be associated with otitis media and pneumonia
- In adults could be associated with UTI
- systemic erythromycin

- Treatment is also needed for the mother and her partner



□ Neonatal herpes

- Very highly symptomatic; and can result in devastating systemic infections including CNS
- With higher risk in cases of posterior uveitis
- Urgent referral is advised and multidisciplinary approach is needed

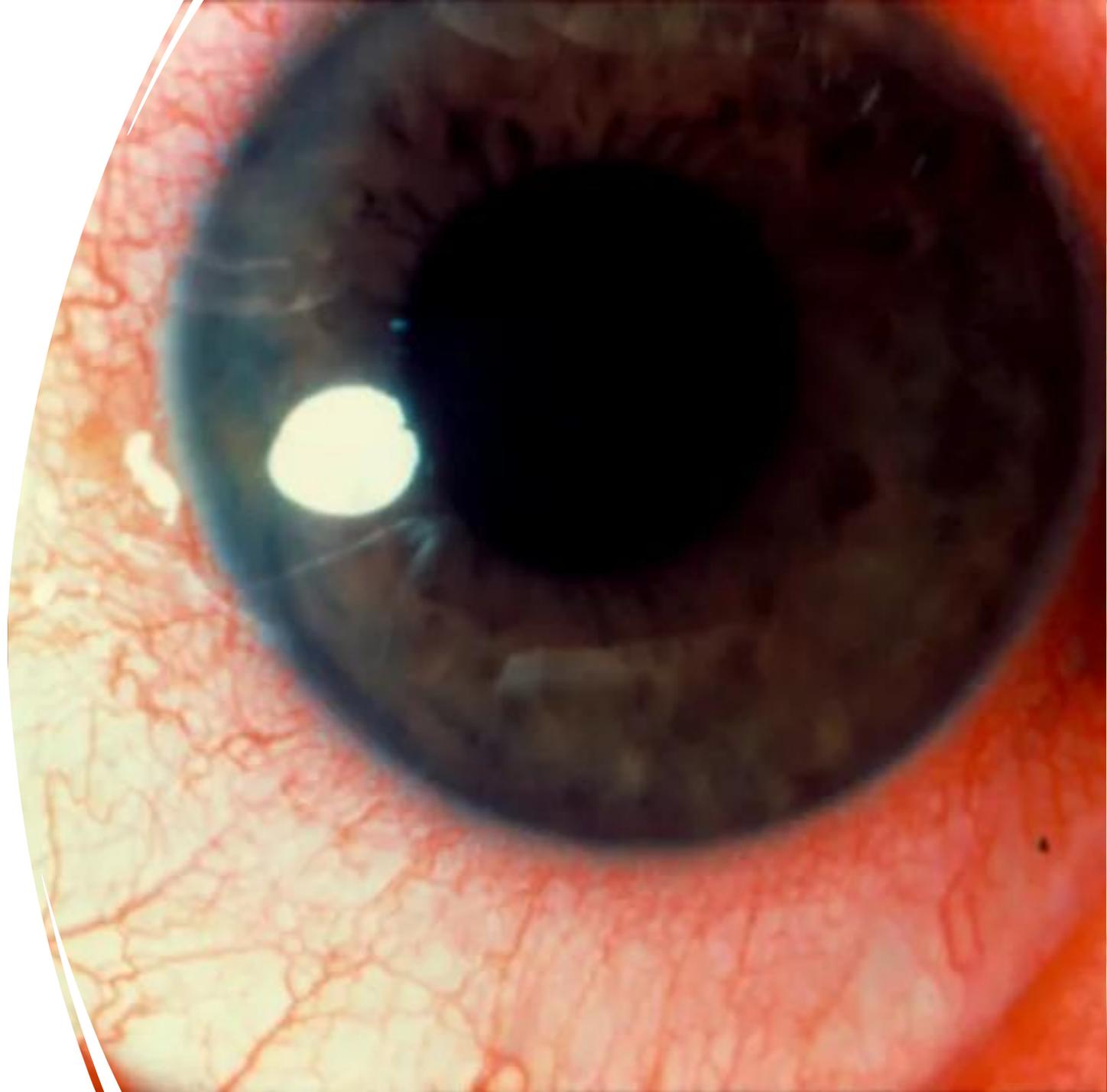


Ciliary injection

❑ Circumcorneal vascular congestion and redness

❑ Indicate:

- Keratitis
- intra-ocular inflammation
- Acute elevation of Intra-ocular pressure



Microbial keratitis

- common sight-threatening condition caused by variety of organisms
- Untreated, it often leads to **progressive tissue destruction** with corneal **perforation or extension of infection** to adjacent tissue.
- One of the most common causes of corneal opacities; the 5th leading cause of blindness worldwide

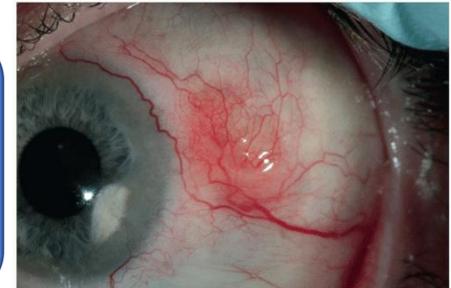
Routine non
complicated
keratitis



Severe sight
threatening
keratitis



complicated
keratitis



Routine non complicated keratitis



- Not directly affecting visual axis; no hypopyon, and not deep and smaller than 2 mm

- Mono anti-biotic therapy with topical fluoroquinolones***

- Check Response after 48 hours***

Severe sight threatening keratitis



- large ulcer more than 2mm, central vision threatening, or atypical in nature very deep**

- Start with **corneal scrapping and conjunctival swap** send for microbiology

- empirical **combined fortified anti-biotic therapy**

- Check Response after 48 hours**

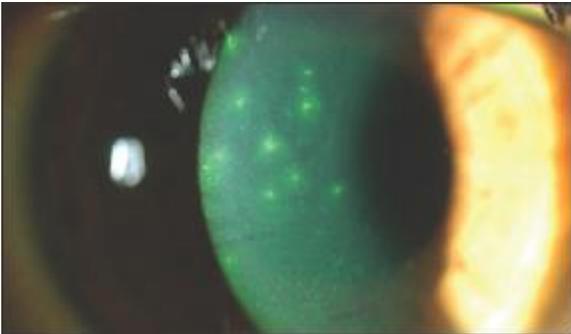
complicated keratitis



- Melting**
- Perforation**
- Sceritis**

Immune keratitis: Very difficult to assess properly with out slit-lamp bio microscopy

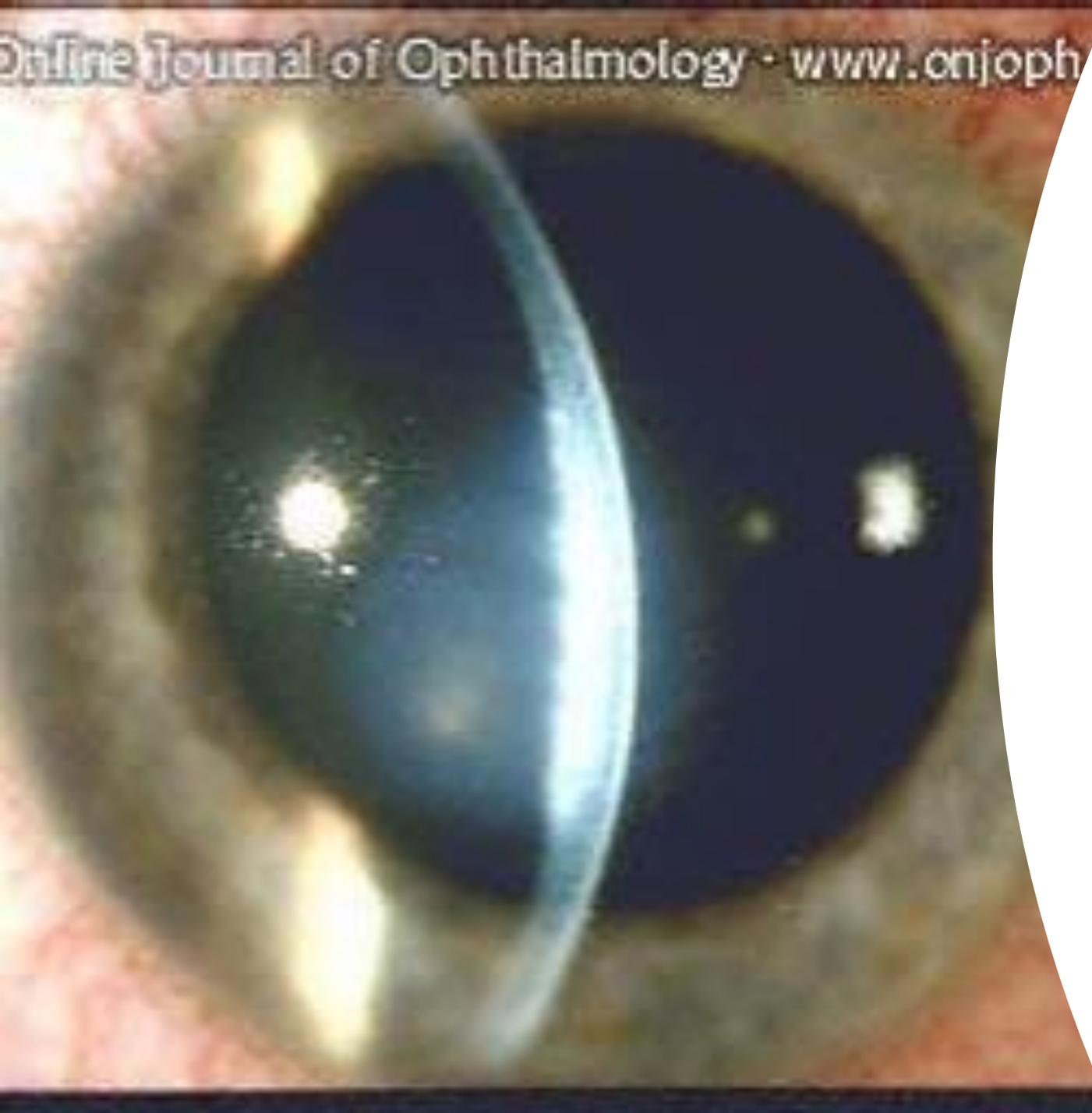
- ❑ **Immune superficial epithelial keratitis of thygeson**



Interstitial keratitis

- Immune reaction to microbial antigens or systemic inflammatory condition like sarcoidosis / cogan syndrome





Endothelitis

- Usually of viral etiology
- Present with redness, blurry vision
- Respond very well to steroid in combination with anti-viral meds to prevent recurrence

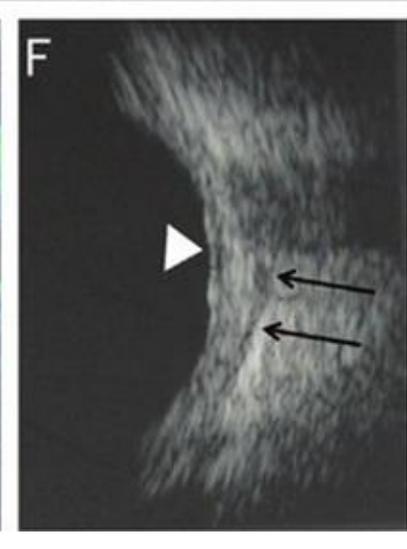
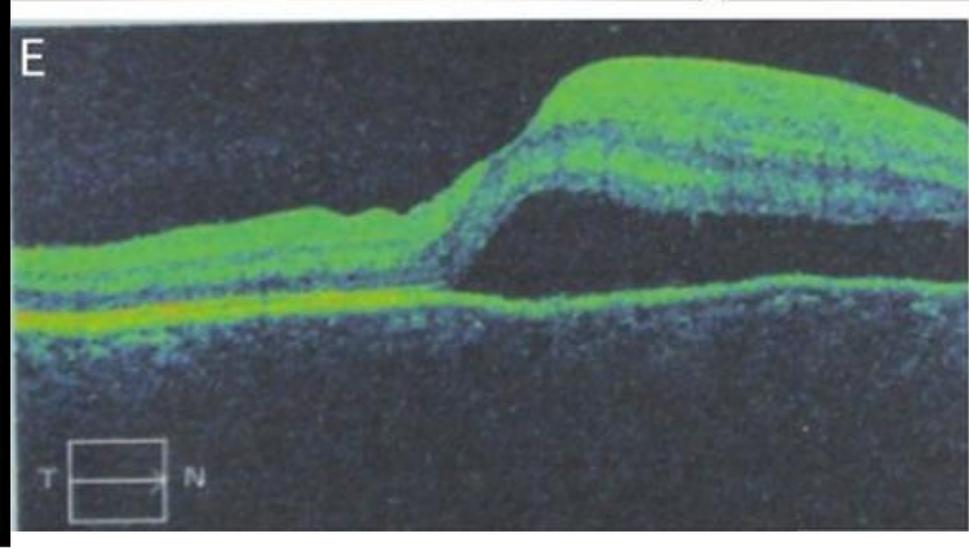
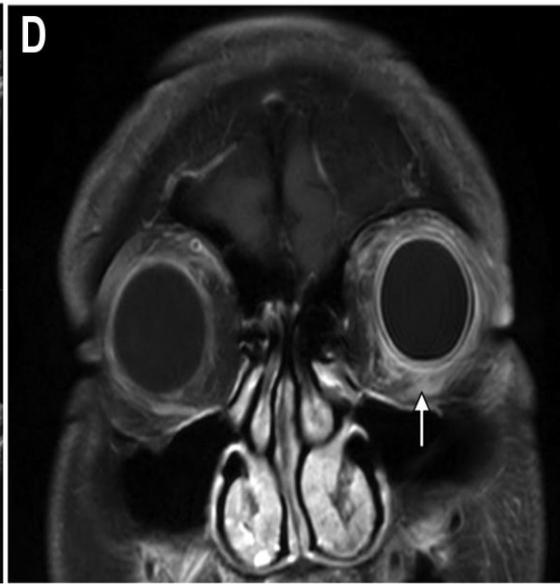
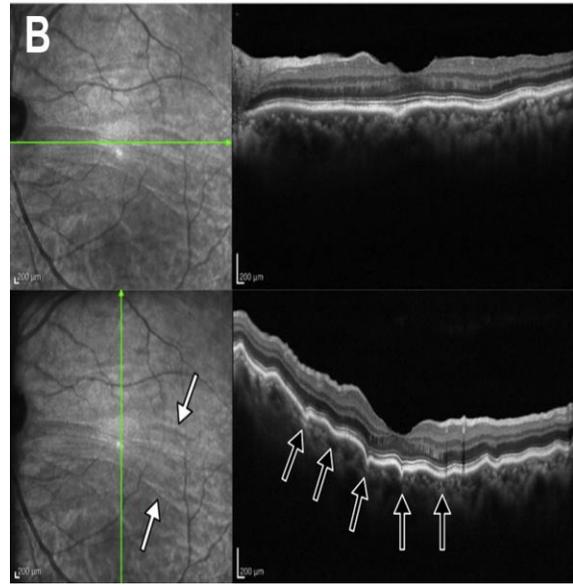
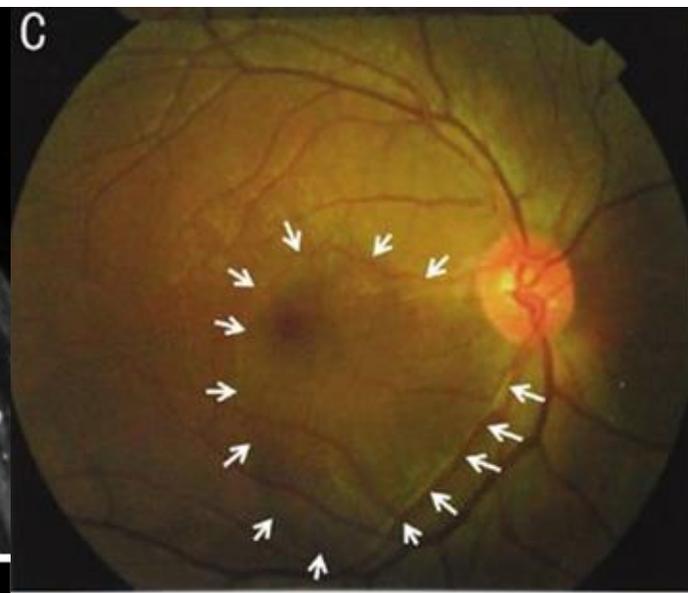
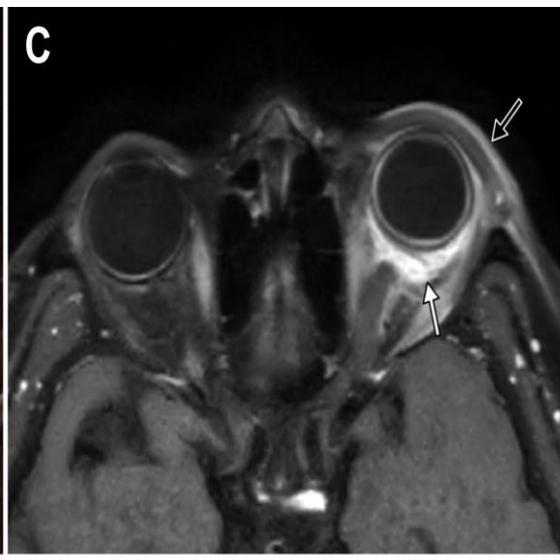
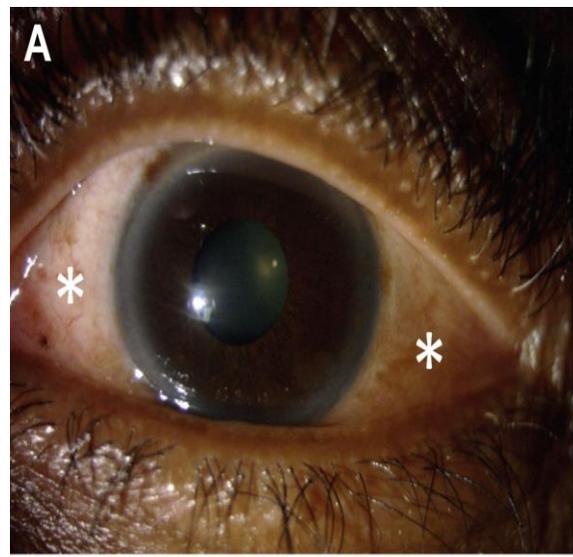
Immune ulcerative peripheral keratitis



- ❑ The most devastating form of immune keratitis
- ❑ Associated with multi-systemic vasculitis and collagen vascular disorders most commonly RA and Granulomatosis with polyangiitis as well certain infections (ocular Tb)
- ❑ Urgent referral is advised for systemic immune therapy and evaluation

Scleritis





Location	Subtype	Prevalence, %
Anterior sclera	Diffuse scleritis	75
	Nodular scleritis	14
	Necrotizing scleritis	5
	with inflammation	(4)
	without inflammation (<i>scleromalacia perforans</i>)	(1)
Posterior sclera		6

Intra ocular inflammation

Uveitis

Endophthalmitis

- Endogenous
- Traumatic
- Post cataract surgery

Uveitis

- **Definition and pathophysiology**

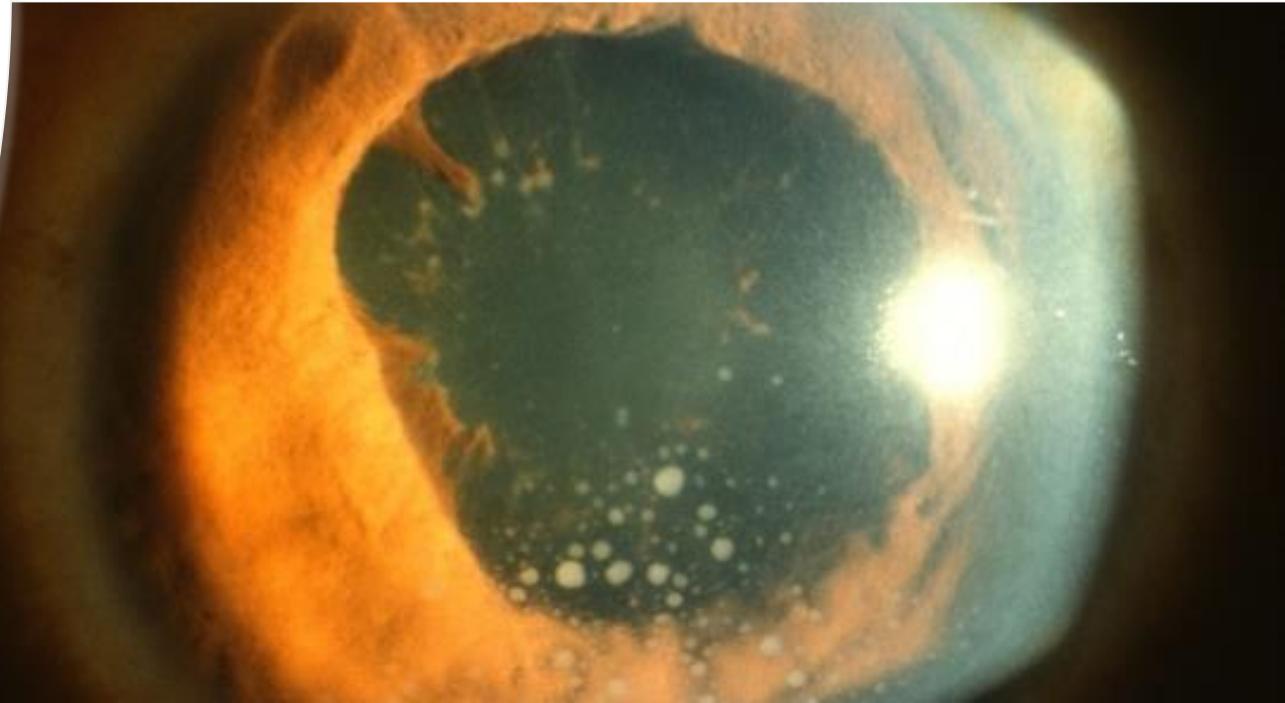
Uveitis

❑ Clinical presentation

- Present with redness, photophobia , possibly blurry vision

❑ On examination

- Ciliary injection
- Keratic precipitate
- Possible corneal edema
- Anterior chamber reaction
- iris atrophy; synechia
- Cataract
- Elevated IOP



Uveitis

□ Etiology

- Immune mediated

- Infectious
- Traumatic

Uveitis

MANAGEMENT

- Predforte acetate Steroid drops
-
- Cyclopentolate drops

First attack of Uveitis without systemic symptoms

- No need for investigations

Investigations required in these following cases

- Recurrent cases
- Bilateral cases
- Cases with systemic symptoms

HLA B-27

Ace-inhibitors levels

Sarcoidosis lysosomal levels

C-anca P-anca

PPD test

T-spot / quantiferon test

MS investigation

Endophthalmitis

□ Definition and pathophysiology

- Endophthalmitis is a purulent inflammation of the intraocular fluids (vitreous and aqueous) usually due to infection.
- Serious intraocular inflammatory disorder resulting from infection of the vitreous cavity
- Progressive vitritis is the hallmark of any form of endophthalmitis



- massive infiltration of the vitreous cavity with inflammatory cells

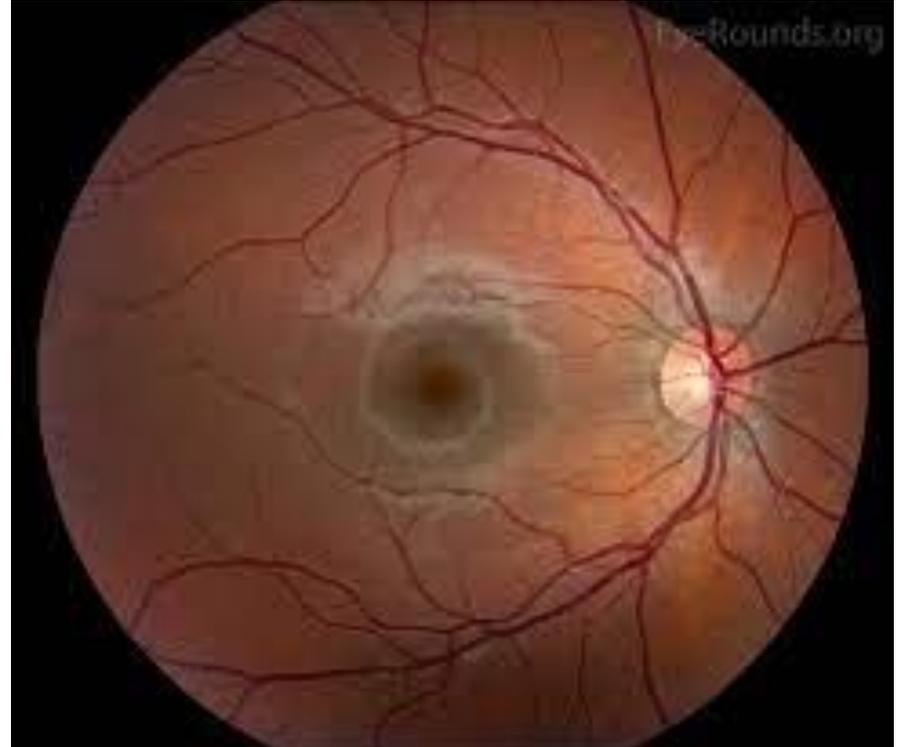
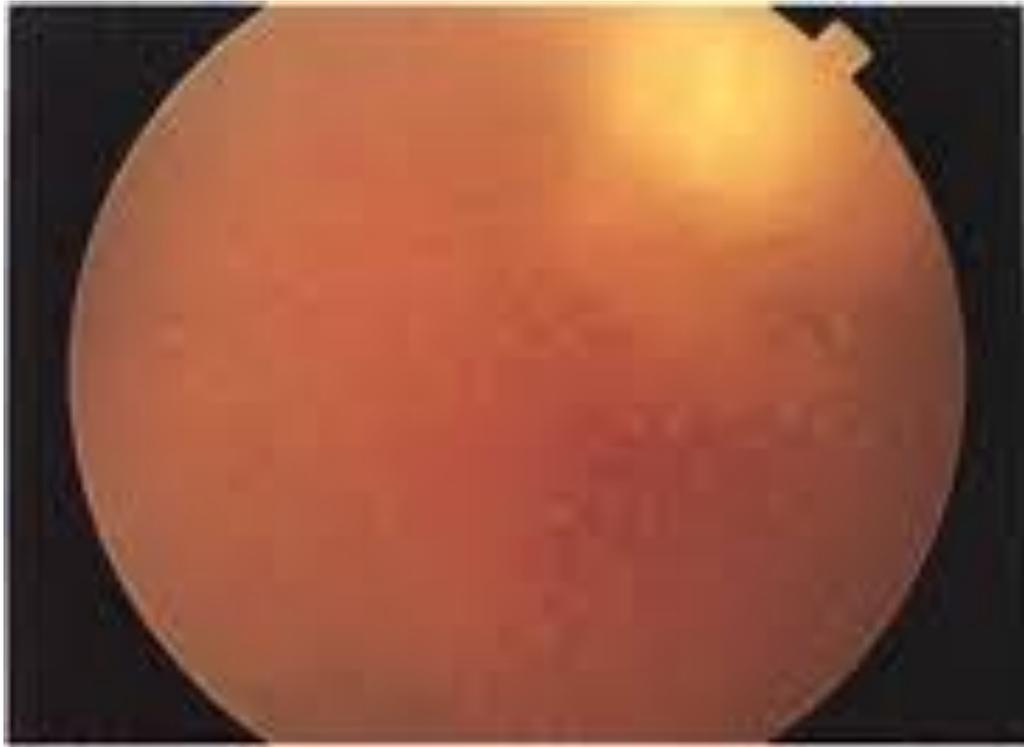
Endophthalmitis



□ Clinical presentation

- Redness with Severe boring pain
- Tender globe
- Blurry vision due to edema, vitritis
- Presenting 2-3 days following intraocular surgery , trauma or associated with sick debilitated patient with fever and systemic infection
- Lid edema
- Corneal edema
- Severe Iridocyclitis
- Hypopyon
- Hall mark progressive vitritis
- Dim red reflex

- **Examination tip:** in clinic with the direct ophthalmoscope check the red reflex to get a clue about the vitreous



□ Management

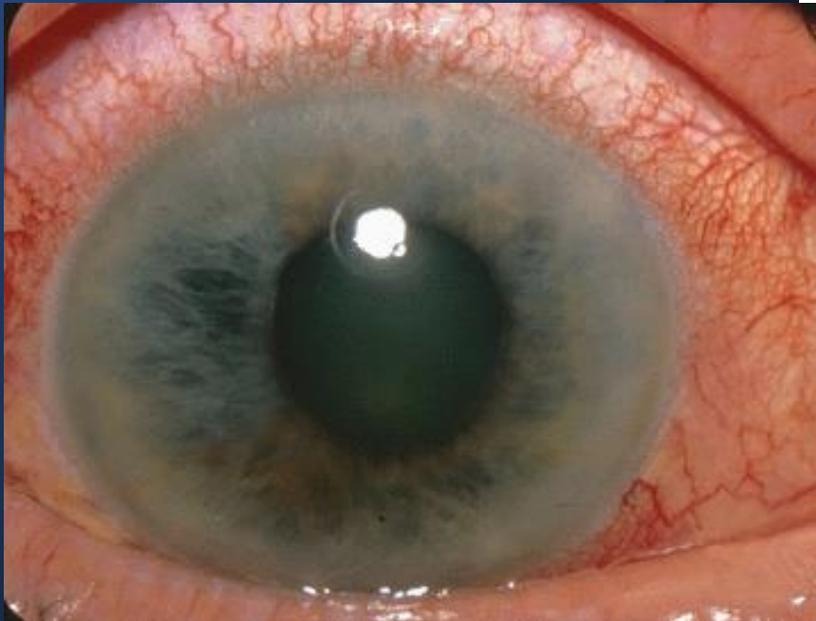
- Urgent referral to ophthalmology center for **intra-vitreous tap** (for microbiological investigation and injections of anti-biotics for treatment)
- In severe cases with LP vision on initial presentation or worsening of presentation despite repeated anti-biotics injections; the case is managed by **surgical vitrectomy**

Acute angle closure glaucoma

□ Definition and pathophysiology

- Acute severe elevation of the intra-ocular pressure due to obstruction of the aqueous humor outflow
- Acute attack is usually precipitated by pupillary dilation with subsequent pupillary block
- Increased posterior chamber pressure causes iris to bulge forward (iris bombé) → further obstruction of outflow tract → further increase IOP
- Obstructed aqueous outflow tract → aqueous humor builds up → increased intraocular pressure (IOP) → corneal edema and optic nerve damage → vision loss associated with severe pain

Acute angle closure glaucoma



□ Clinical presentation

- Abrupt onset of severe pain associated with Frontal or supraorbital headache
- [Nausea](#) / [vomiting](#) / [abdominal pain](#)
- usually unilateral
- [Blurred vision](#) with Halos around lights
- Fixed, midposition pupil
- Hazy cornea
- Conjunctival injection most prominent at limbus (ciliary flush)
- Rock-hard globe

Acute angle closure glaucoma

❑ **Goal of medical therapy is to 'break the attack' in order to prepare the patient for laser iridotomy.**

1. Emergent ophthalmology consult
2. Keep patient supine
3. Reduce the intra-ocular pressure via medical anti-glaucoma management: systemic acetazolamide/ mannitol combine with topical steroid as well as α_2 adrenergic agonist, beta-blockers, carbonic anhydrase inhibitors, prostaglandins and pilocarpine 1-2%
4. Administer anti-emetic and pain killers
5. If IOP check up device available; re-check the IOP after an hour
6. Urgent referral

Dacryoadenitis

□ Definition and pathophysiology

- Acute inflammation of the lacrimal gland (*dacryoadenitis*)
- most often seen in **inflammatory disease**; granulomatosis with polyangiitis ; sarcoidosis, IgG4 related disease
- occasionally is the consequence of **malignancy**, such as lymphoproliferative disease (50% of orbital involvement is within the lacrimal fossa).
- **Infectious infiltration** by bacteria, viruses; Given the rare occurrence of these infections, large case series are lacking, as are a precise breakdown of causative organisms and suggestions on management.

Dacryoadenitis

□ Clinical presentation

- Swelling of the outer portion of the upper lid, with possible redness and tenderness
- Pain in the area of swelling
- Excess tearing or
- Swelling of lymph nodes in front of the ear.



In cases of infections

□ Bacterial

- Fever, feeling sick
- discharge
- gross purulence and abscess formation are uncommon.

□ Viral

- Flu like symptoms

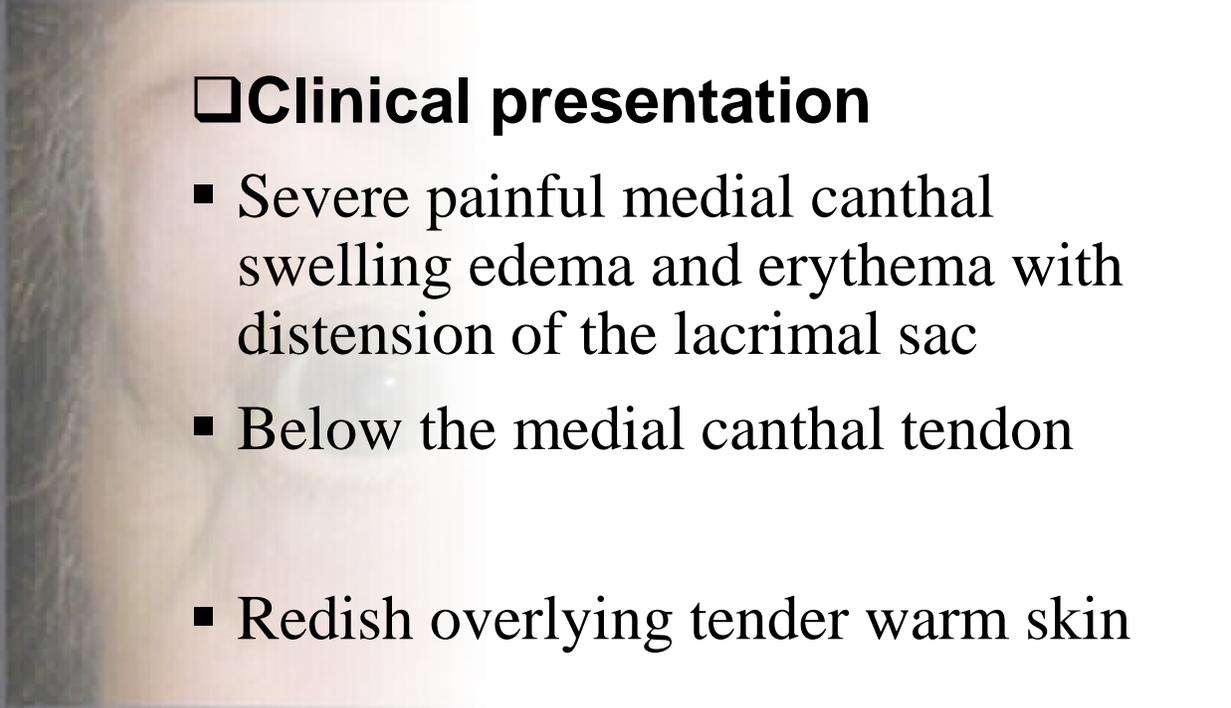
Management

- ❑ Blood test: cbc.
- ❑ Microbiological : culture , serology.
- ❑ Imaging: CT scan may be required to search for the cause, or check for invasive tumors of the gland.
- ❑ Histopathology: biopsy will be needed to be sure that a tumor of the lacrimal gland is not present.

Dacryocystitis

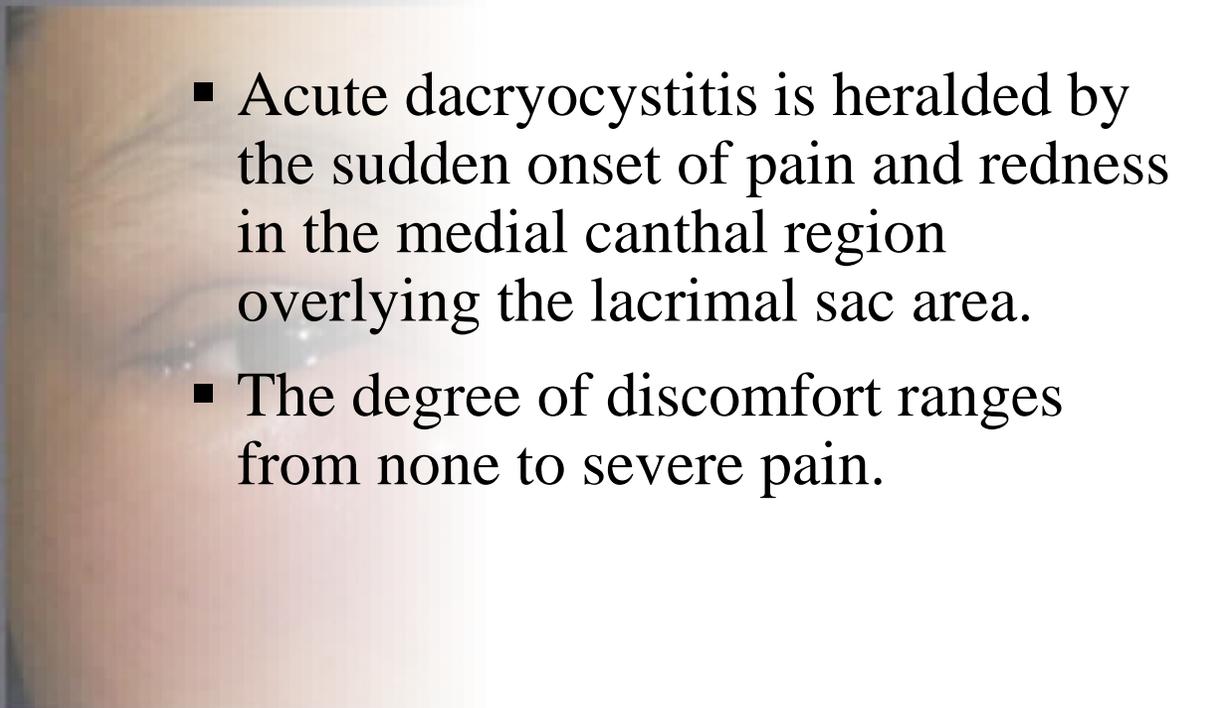
□ Definition and pathophysiology

- Inflammation of the lacrimal sac.
- Almost always related to nasolacrimal duct obstruction.
- Causing stagnation of the secretion
- Allowing for bacterial colonization
- Eventually resulting in infectious inflammation



❑ **Clinical presentation**

- Severe painful medial canthal swelling edema and erythema with distension of the lacrimal sac
- Below the medial canthal tendon
- Reddish overlying tender warm skin



- Acute dacryocystitis is heralded by the sudden onset of pain and redness in the medial canthal region overlying the lacrimal sac area.
- The degree of discomfort ranges from none to severe pain.

□ Treatment

- Warm compressions with messaging
- Urgent referral for systemic anti-biotics and microbiology investigation
- Pointing abscess should drained after incision



Orbital pathology

Clinical presentation

- ❑ Most orbital pathologies present with disfiguring proptosis with redness and chemosis
- ❑ Restricted ocular motility with resultant diplopia
- ❑ Pain
- ❑ **Vision loss**
 - Exposure keratopathy
 - optic neuropathy
 - Retinopathy
 - Glaucoma



Differential diagnosis of proptosis

Infectious orbital cellulitis

Inflammation

Neoplasia /tumor

Vascular

Traumatic

Infectious orbital cellulitis

Definition and pathophysiology

❑ Infectious inflammation of the orbital tissues (fat and muscles) around the eyeball

❑ **Etiology:** caused by several microbial organisms , bacterial , fungal and viral

❑ Source of infection

- direct traumatic inoculation; skin abrasions/cut wounds and orbital surgeries
- Spread from adjacent areas; sinuses, infected chalazion , dacrocystitis, otitis media, upper respiratory tract
- Systemic endogenous spread from a distant source

❑ Clinical manifestation: **bulging of the globe and restricted ocular motility**



- Stretching of the optic nerve / compressive
- Retinopathy
- Redness, chemosis; And Exposure keratopathy



Pain and diplopia

❑ **Complications:** if untreated or delayed

- subperiosteal abscess collection, which will require surgical drainage
- Spread into the CNS; resulting in abscess collections there or meningoencephalitis

Orbital inflammation

Similar presentation to orbital cellulitis

- ❑ **Orbital inflammatory syndrome**
- ❑ **Thyroid eye disease**
- ❑ **Multi-systemic inflammatory conditions**
 - Sarcoidosis (dacryoadenitis, myositis)
 - IgG-4 related
 - Vasculitis; granulomatosis with polyangiitis
 - Lymphoproliferative diseases can have a similar inflammatory effect

Orbital neoplasia

Definition and pathophysiology

- ❑ Neoplastic outgrowth of the various orbital tissues; forming lesions that can distort the eyeball
- ❑ Etiology 
- ❑ Clinical manifestations and complications
 - similar to previous cases
 - Certain tumors can be malignant and spread toward adjacent structures or even systemic spread

❑ **Primary ocular / orbital tumors**

❑ **Tumors spread from adjacent structures**

❑ **Systemic spread from distant tumors**

❑ **Paraneoplastic syndromes**

Orbital vascular pathologies

□ **Vascular malformation: resulting from vascular dysgenesis**

- venous malformation: varix
- arteriovenous malformation
- lymphatic malformation: LYMPHANGIOMA

□ **Arteriovenous fistula**

- direct
- indirect

□ **Vascular tumors**

- capillary hemangioma
- cavernous hemangioma
- hemangiopericytoma

Clinical approach

Important to differentiate pre-septal from orbital cellulitis

Basic evaluation of vision

External gross examination

- Globe position / auscultation / positional variation
- Ocular motility
- Pupil and Red reflex
- Lymph nodes
- CNS evaluation

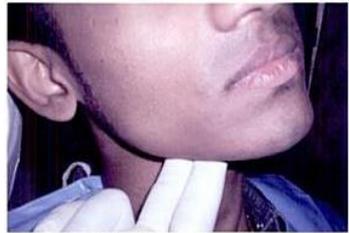
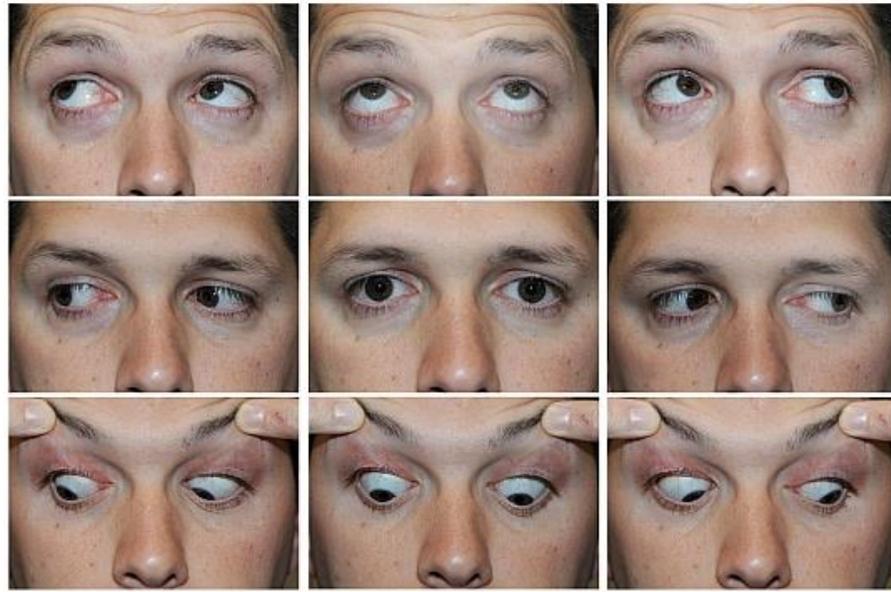
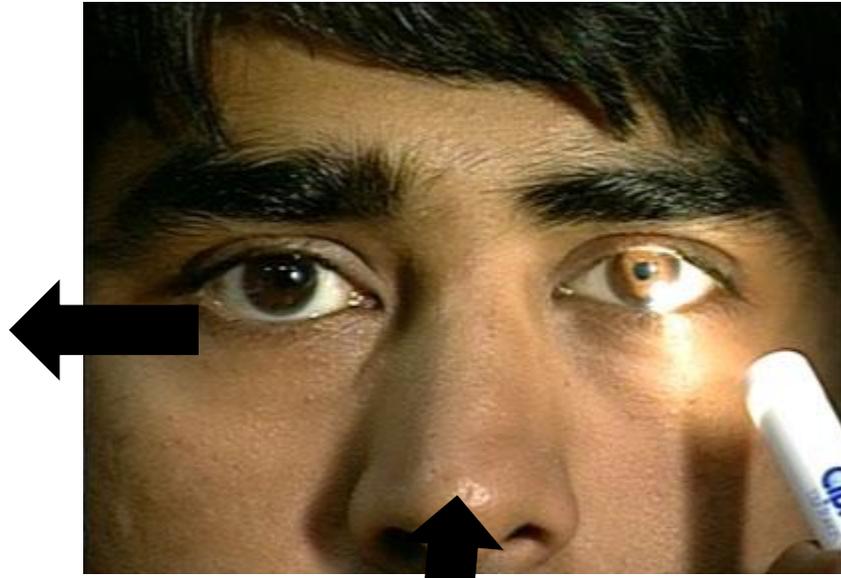


Fig. 1.1A: Palpation of the submandibular lymph nodes

Fig. 1.1D: Palpation of the middle jugular lymph nodes

Fig. 1.1B: Palpation of the submental lymph nodes

Fig. 1.1E: Palpation of the lower jugular lymph nodes



Clinical approach

Slit lamp evaluation

- Conjunctiva
- Cornea
- Anterior chamber
- IOP
- Gonioscopy
- Posterior segment

Clinical approach

Radiological workup

Vascular studies

Biopsies and histopathology

Diagnostic workup

Blood workup

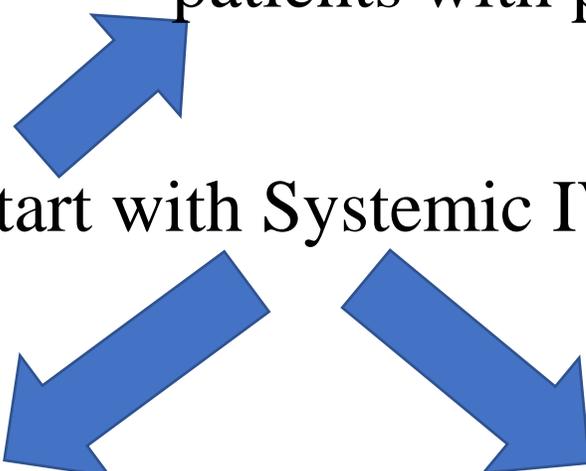
- CBC, ESR, C-RP
- TFT, collagen vascular , systemic inflammatory conditions

Microbiological workup

- Cultures in cases of systemic infection
- Cultures of any drained samples

Management

Orbital cellulitis

- ❑ **Microbiological workup**; blood , urine , sputum maybe needed in sick feverish patients with possible systemic infection
 - ❑ Typical presentation start with Systemic IV anti-biotics' re-evaluate in two days
 - ❑ if improved then continue and modify to oral AB
 - ❑ If not improved ; urgent CT scan with contrast
 - ❑ Sub-periosteal abscess collection, AB are enough in children less than 9 years ; while surgical drainage may be necessary in those older
- 

Management

Orbital inflammation

- ❑ **blood workup-up:** CBC, ESR, C-RP TFT, C-anca, P-anca, ACE-levels, lysomomes, IgG4/ IgG LEVELS, others

❑ Radiological workup

- CT-scan
- MRI

❑ Treatment

- systemic steroid / immune suppressive

Tumors

- ❑ Initial evaluation by **radiological workup**
- ❑ Diagnosis is confirmed by **Biopsy and histopathology**
- ❑ **Treatment**
 - Surgical excision/ debulking
 - Radio/chemotherapy