Conjunctiva
Lecture 2

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Etiologic classification of conjunctivitis

- Bacterial
- Chlamydial
- Viral
- Allergic
- Chemical/toxic or irritative
- Associated with systemic disease,
- Rickettsial, fungal, parasitic
- Etiology unknown

Bacterial conjunctivitis

- Common, usually self-limited, mostly children
- Direct contact or from nasal and sinus mucosa
- Conjunctival inflammation and purulent discharge

PATHOGENS THAT CAUSE BACTERIAL CONJUNCTIVITIS

Acute	Hyperacute	Chronic
Staphylococcus aureus	Neisseria gonorrhoeae	Staphylococcus aureus
Streptococcus pneumoniae	Neisseria meningitidis	Moraxella lacunata
Haemophilus influenzae		Enteric bacteria

Gonococcal Conjunctivitis

- Gram (-) diplococcus;Neisseria gonorrhoeae

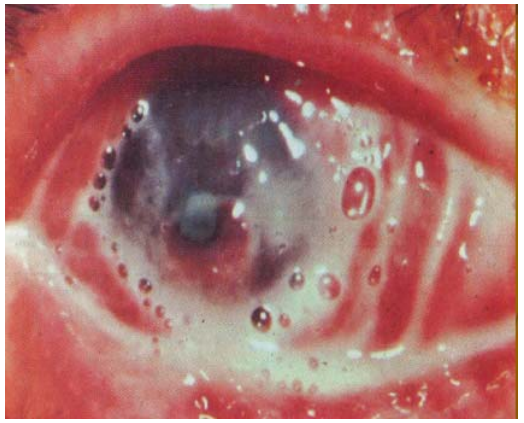
Adult:

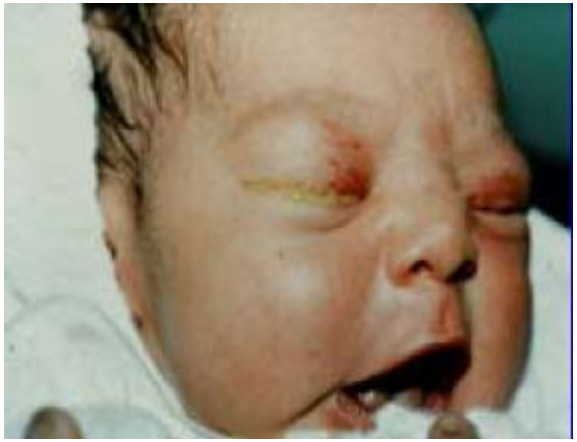
- Self contamination,
- Acute onset with marked
- Purulence, may progress to severe keratitis

Children:

- Ophthalmia neonatorum
- 3-5 days after parturition,
- profuse purulent
- discharge with swollen lids
- Treatment: topical gentamicin

Parenteral penicillin, 3rdcephalosporin





Causes of Neonatal conjunctivitis

Causes	Time of Onset (Postpartum)
Chemical (silver nitrate)	1–36 hours
Chlamydia	5–14 days
Neisseria gonorrhoeae	24–48 hours
Bacteria (Staphylococcus, Streptococcus, Haemophilus)	2–5 days
Virus (herpes simplex virus types 1 and 2)	3–15 days

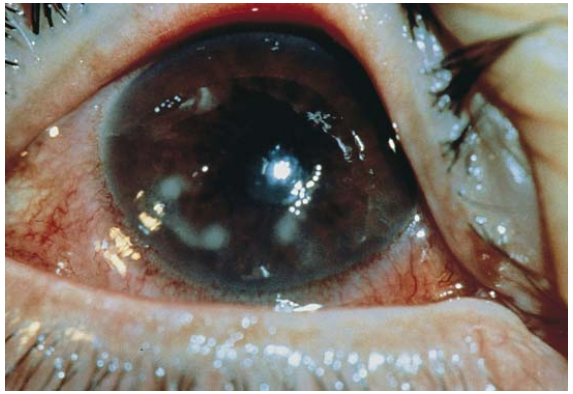
Guidelines for Rx of Neonatal conjunctivitis:

Infection	Treatment
Chlamydia	Oral erythromycin 50 mg/kg/day in four divided doses for 14 days
Bacteria	
Gram-positive	Erythromycin 0.5% ointment four times a day
Gram-negative, gonococcal	Penicillin G drops 10 000–20 000 units every hour and intravenous penicillin G drops 100 000 units/kg/day in four divided doses for 7 days
	Intravenous or intramuscular ceftriaxone 25–50 mg/kg/day once a day for 7 days
Gram-negative, others	Gentamicin or tobramycin ointments
Viral	Trifluorothymidine drops every 2 hours for 7 days

Chronic Conjunctivitis

Staphylococcal blepharoconjunctivitis:

- Clinical signs include:
  - Diffuse conjunctival hyperemia with papillae or follicles,
  - Minimal mucopurulent discharge
  - Conjunctival thickening.
  - Eyelid involvement may comprise redness, telangiectasis, lash loss, collarettes, recurrent hordeolae, and ulcerations at the base of the cilia. Chronic staphylococcal blepharoconjunctivitis may lead to marginal corneal ulcers



Chronic follicular conjunctivitis:

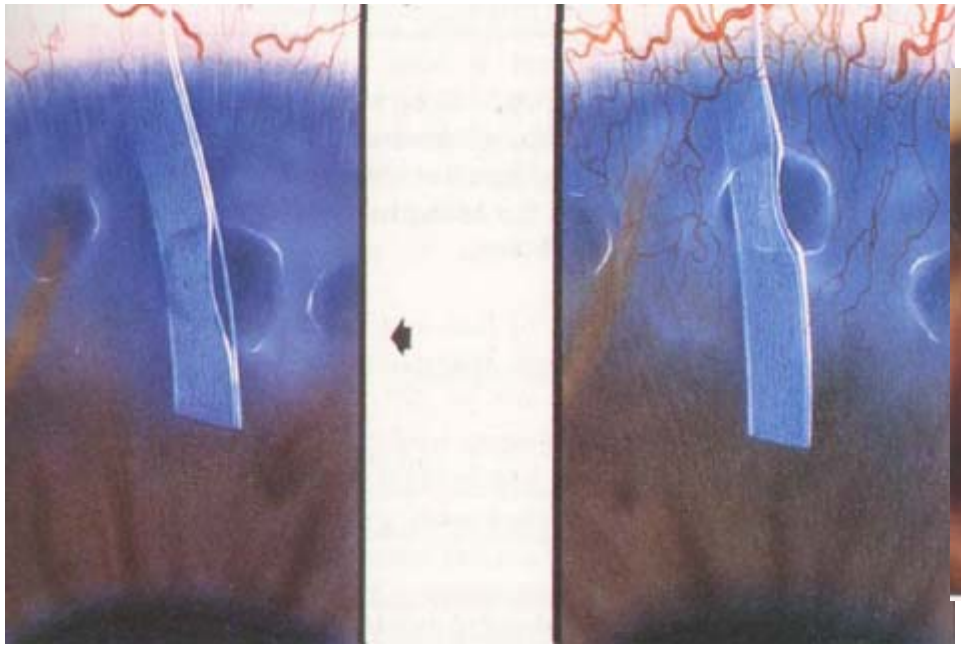
- Chlamydial
  - Trachoma
  - Adult inclusion conjunctivitis
- Molluscum contagiosum
- Drug-induced or toxic
- Bacterial
- Axenfeld's chronic follicular conjunctivitis
- Merrill-Thygeson type follicular conjunctivitis
- Parinaud's oculoglandular syndrome
- Folliculosis of childhood

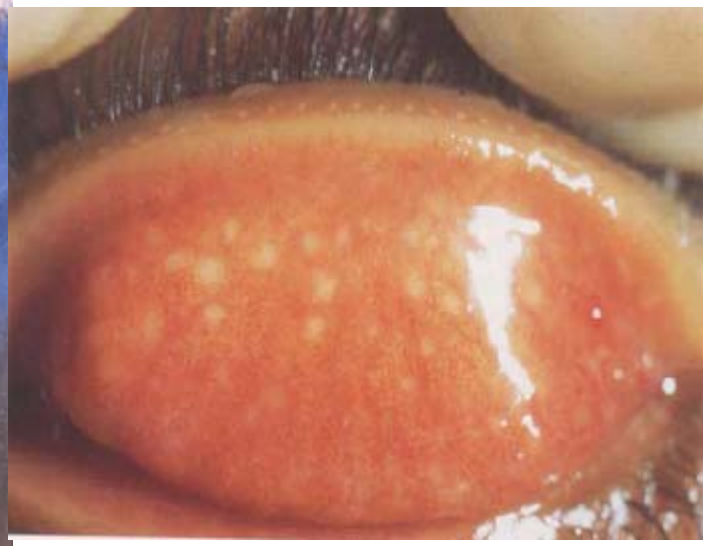
Chlamydial conjunctivitis

Trachoma

- Used to be one of the Leading cause of preventable blindness in the developing world
- Chalmydia trachoma serotype A-C
- Giemsa stain: basophilic intracytoplsmic epithelial inclusions
- Immunofluorescent testing, EIA(Enzyme immunoassay),PCR, McCoy cell culture
- Treat with topical and oral tetracycline or erythromycin

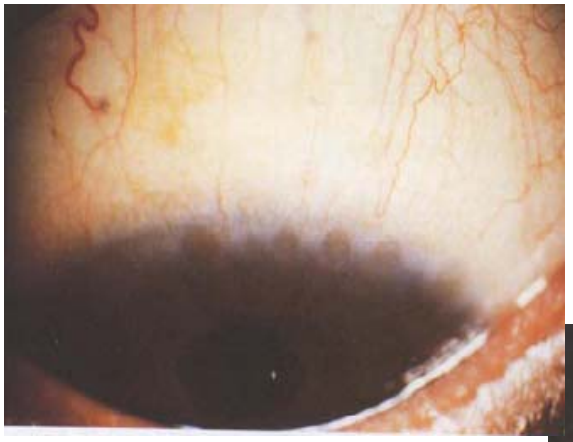
- Chronic follicular conjunctivitis, pannus formation, limbal follicles and Herberts pits, later scaring of conjunctiva(Arlt's line), upper tarsal>lower

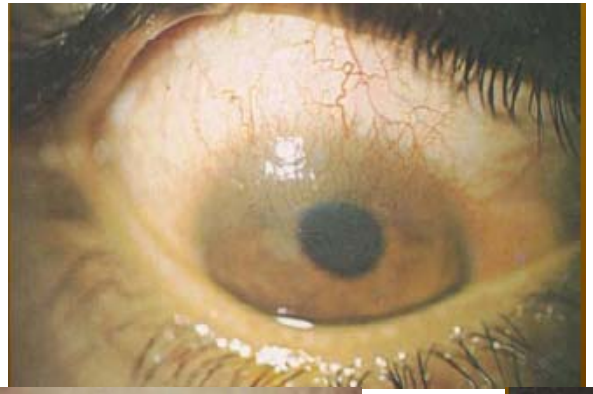


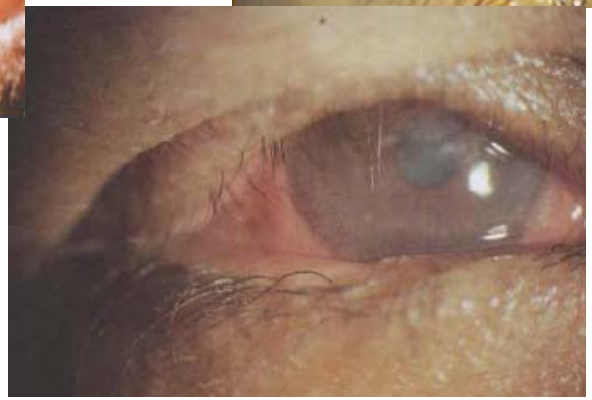


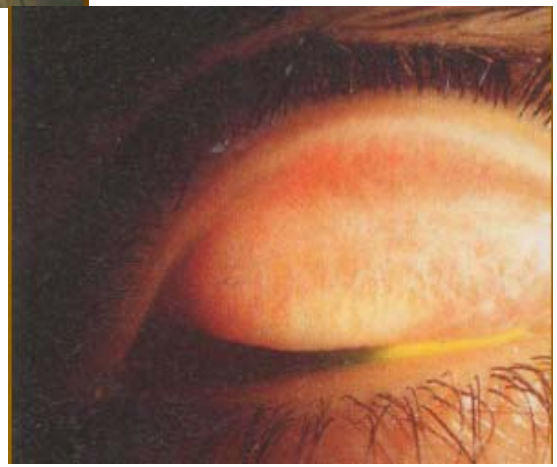
Late Complications of Trachoma

- Tear deficiency, dacryostenosis, entropion, trichiasis, corneal scarring, salzman's nodules









WHO severity grading for trachoma

- **TF:** Follicular conjunctival inflammation,

>5 follicles (>0.5mm) on upper tarsus

- **TI:** Intense conjunctival inflammation, obscuring >50% large, deep, tarsal vessels
- **TS:** Tarsal conjuntiva cicatrization, scarring
- **TT:** Trichiasis
- **CO:** Corneal opacity, VA<6/18

Chlamydial conjunctivitis

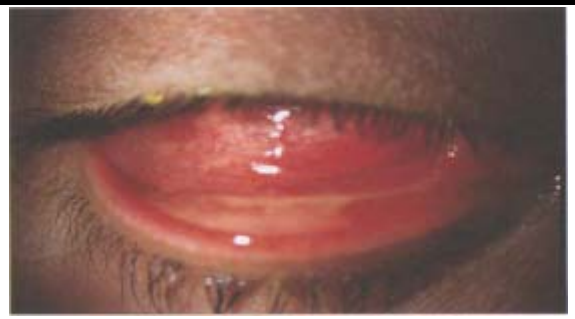
Adults:

- Chlamydia trachoma D-K
- Sexually active young people, transmission to eye from genitourinary tract
- Acute or subacute, red eye, discharge,
- Lower tarsus, papillae andFollicles in adult,
- Treat as trachoma

Children:

- Ophthalmia neonatorum
- 5-14 days after birth,
- Papillary in infant

Viral conjunctivitis

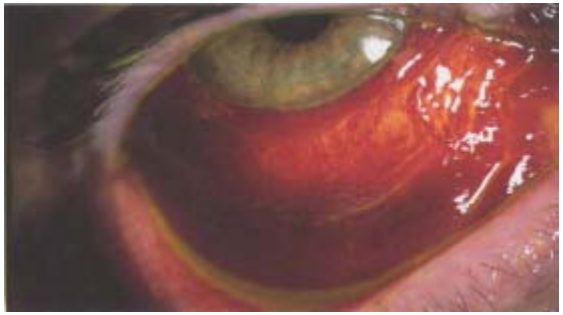


- Via respiratory or ocular secretions

Epidemic keratoconjunctivitis (EKC)

Adenovirus 8, 11, 19, 37

Epidemic hemorrhage Keratoconjunctivitis (EHKC)



- Picornavirus (Enterovirus 70),
- coxaschievirus A24
- subconjunctival hemmorrhage

Pharyngoconjunctival fever (PCF)

- Adenovirus 3, 4, 7
- fever, URI, conjunctivitis,
- transmitted by droplets , children

EKC vs. PCF

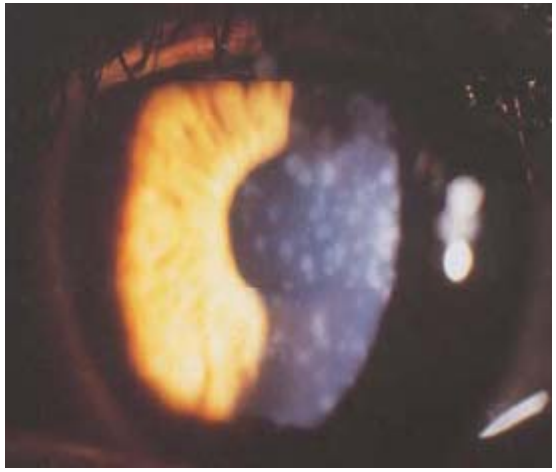
Comparison of EKC and PCF

	EKC	PCF
Adenovirus type	8 and 19	3 and 7
Keratitis	80%	30%
Fever and sore throat	rare	common
Spread by office contamination	yes	yes
Intraepithelial corneal involvement	common	unusual
Preauricular nodes	yes	yes
Contagious	yes	yes
Length of conjunctivitis	10–14 days	10–14 days
Discharge	watery	watery
Hemorrhages	yes	yes
Light-sensitive symptoms	yes	yes

Adenoviral keratoconjunctivitis

- Epidemic keratoconjunctivitis (EKC)
- Incubation:4-10 days
- Duration:14 days
- Acute onset red eye,watery discharge, photophobia, foreign body sensation,
- Preauricular lymph node invol.
- Second eye mild involvement
- Both eyes affected 60% cases

- Stage 1:
  - Diffuse punctate epithelial keratitis
  - Occur within 7-10 days of onset symptoms
  - May resolve within 2 weeks,or progress to stage 2
- Stage 2:
  - Focal white subepithelial opacities
- Stage 3:
  - Ant stromal infiltrates
  - Occasionally persist for months and even years



RX for EKC:

- Natural course is self limiting
- Supportive treatment
- Topical steroid when:
  - Membrane formation,
  - Eye is uncomfortable due to very severe inflammation
  - Visual acuity diminished by keratitis
- Steroids do not shorten natural course of the disease but merely suppress the inflammation

Atopic/Allergic disorders

1. Allergic conjunctivitis(AC) or rhinoconjunctivitis

Acute allergic conjunctivitis

- seasonal or hay fever (induced by seasonal allergens, MC: pollens)
- toxic-induced (induced by acute contact with irritants, drugs ,preservatives, etc)

Chronic allergic conjunctivitis

- Perennial (induced by non-seasonal allergens, dust mites and Fungal allergens, less prevalent and milder but more persistent)
- Toxic-induced

2. Giant papillary conjunctivitis (GPC)

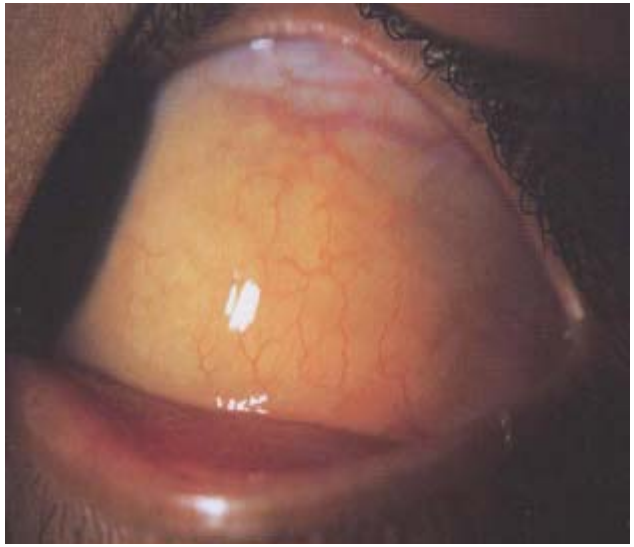
3. Vernal keratoconjunctivitis (VKC)

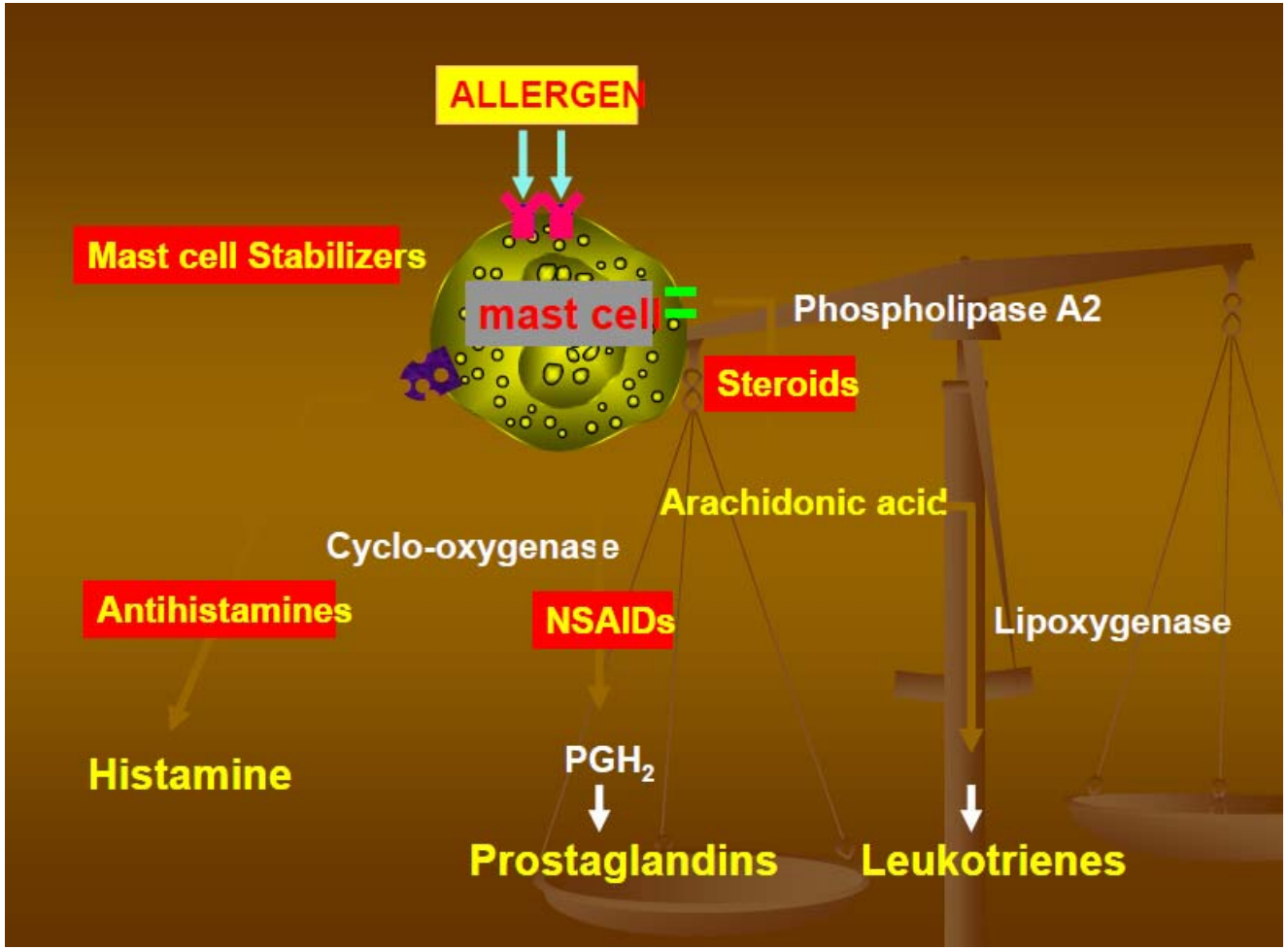
- Palpebral
- Limbal
- Mixed

4. Atopic keratoconjunctivitis (AKC)

Allergic Rhinoconjunctivitis:

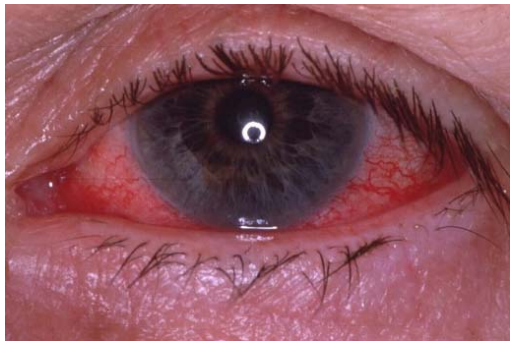
- Itching, foreign body sensation, tearing, lid swelling, conjunctiva congestion
- Rx:
  - Self limited,
  - Remove allergen,
  - Cool compress,
  - Mast cell stabilizers,
  - Antihistaminics,
  - Topical steroid,
  - Nsaid




ALLERGEN
Mast cell Stabilizers
mast cell
Phospholipase A2
Steroids
Arachidonic acid
Cyclo-oxygenase
Antihistamines
NSAIDs
Lipoxygenase
Histamine
PGH2
Prostaglandins
Leukotrienes

Acute allergic toxic induced conjunctivitis

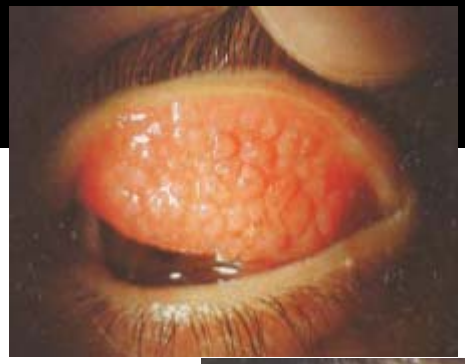
- Usually triggered by external non- airborne antigens such as drugs, contact lens solution, irritants, and preservatives.
- Type I mediated.
- Symptoms are similar to SAC but no seasonal component.
  - Itching, tearing, eyelid erythema and swelling, and conjunctival redness and chemosis. Typically occur within minutes after application of an allergen.
    - Bactriacin..cephalosporins..sulfacetamide..tetracycline
    - Atropine…homatropine.
    - Epinephrine..pilocarpine..apraclonidine.
    - Antiviral agents.
    - Thimerosal..chlorhexidine…bezalkonium chloride.

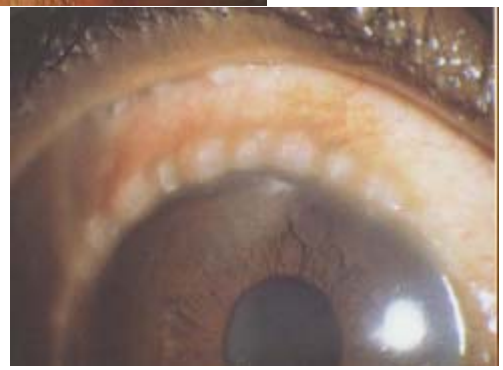


Vernal keratoconjunctivitis (VKC, Vernal catarrhal)

- Atopic state, seasonal pattern
- Chronic, recurrent, bilateral,
- usually males, beginning before age 10, and lasting 4-10 years
- Itching, hyperemia, mucoid discharge, papillary hypertrophy, may have corneal involvement (Keratopathy)

VKC.....





Two basic forms (may occur together)

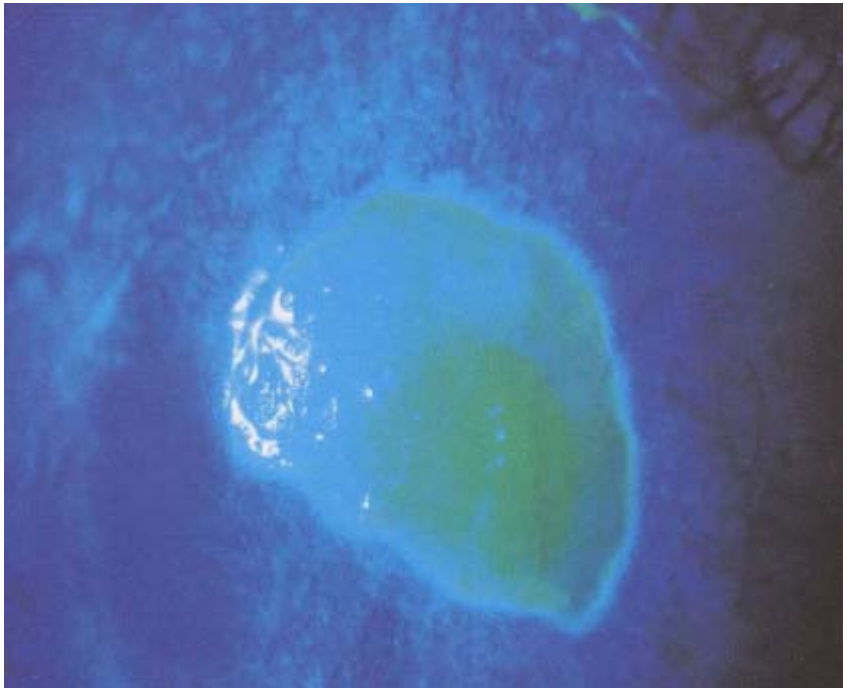
Palpebral form

- Upper tarsal conj: papillary
- Hypertrophy, " cobble stone "
- Abundant eosinophils, severe corneal
- Involvement than limbal form

Limbal form

- Papillary hypertrophy in limbal zone
- Superiorly " Horner-Trantas dot ";degenerated epi cell or eosinophil in deep epi of corneal limbus, pannus

Shield Ulcer



Treatment of VKC

Rx:

- Topical steroid
- Mast cell stabilizers
- Topical cyclosporine
- Antihistamine
- Supratarsal injection of steroid

Corneal ulcers:

- Steroids-antibiotic/eye patching.
- Superficial keratectomy.
- PTK.

GPC:

- Local steroid injection.
- papillae excision/cryotherapy/mucosal graft.

MEDICATIONS USED IN THE TREATMENT OF ALLERGIC CONJUNCTIVITIS

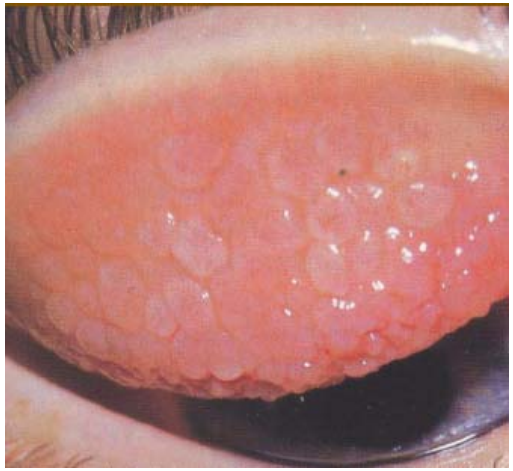
Category	Examples	Comments
H_1 receptor agonists	Levocabastine, emedastine difumarate	Use for isolated, acute allergic attacks. Use alone or in combination with mast cell stabilizers and nonsteroidal anti-inflammatory drug (NSAID) medication
Mast cell stabilizers	Cromolyn sodium, lodoxamide,pemirolast, nedocromil sodium	Most useful for chronic allergies. May take 1–2 weeks to be effective. Pemirolast and nedocromil have antihistamine effects as well. Nedocromil also reduces eosinophil and neutrophil chemotaxis
Antihistamines with mast cell-stabilizing activity	Olopatadine, ketotifen fumarate, azelastine	These medications combine the immediate effect of selective antihistamines with the long-term effects of mast cell stabilization. They have convenient twice-a-day dosing. Ketotifen and azelastine have anti-inflammatory properties as well
Topical NSAIDs	Ketorolac	Can reduce itching but stings when applied
Vasoconstrictors	Naphazoline/pheniramine,naphazoline/antazoline	Available over the counter; instruction must be given to patients to avoid chronic use and rebound redness
Topical steroids	Loteprednol, fluorometholone, rimexolone	May be useful in serious cases or until control is achieved with other agents. Side effects limit chronic use
Oral antihistamines	Fexofenadine, loratadine,cetirizine	Useful when systemic allergic symptoms are present but may cause dry eyes

VKC Vs AKC

	VKC	AKC
Age of onset	Childhood, teens	age 20 to 50
Duration	Resolved in mid to late teens	Resolved by age 50
Seasonal variation	Markedly worse in spring	variable
Conjunctival papillae	GPC….upper lid	Small or medium size..upper and lower
Conjunctival scarring	Uncommon	Can give symblepharon
skin	Uncommon	Often
Eosinophils	Numerous	Less munerous and less often degranulated
Corenal vascularization and scarring	Less extensive	More extensive
lens	No	ASCC/PSCC

Giant papillary conjunctivitis (GPC)

- Soft CL>Hard CL;exposed sutures; ocular prosthesis
- Redness, itching, mucoid discharge, CL intolerance, lens decentration
- Abnormal large papillae
- (>0.3 mm) on superior tarsal conjunctiva
- Mechanical trauma,hypersensitivity to CL or adherent material



- Stages:
  - Stage I:
    - Initial symptoms including mucus in the nasal corner of the eye after sleep and mild itching after lens removal. No papillae detected usually.
  - Stage II:
    - Increased severity of mucus and itching and mild blurring of the vision, which occur toward the end of the usual lens wearing time.
    - Small, round papillae, conj is thickened, edematous and hyperemic.

- Stage III:
  - Increased severity of mucus and itching, accompanied by excessive lens movement associated with blinking.
  - CL surface become coated with mucus and debris.
  - GPC..increased in numbers and size.
- Stage IV:
  - Exacerbation of stage III.
  - CL intolerance.
  - CL are coated and cloudy soon after insertion.

Rx of GPC:

- Discontinue CL wear
- Improve lens hygiene
- Discarding or refitting, daily wear,disposable CL or RGP
- Topical steroid, mast-cell stabilizer