Ocular Allergies

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Learning Objectives

- Understand the pathophysiology of ocular allergies
- Identify the aetiologies and clinical features of allergic conjunctivitis
- Recognise the various forms of allergic eye disease
- Discuss the various drugs used in the treatment of ocular allergies
- Formulate an appropriate management plan

Types of Ocular Allergic Disease

- Seasonal Allergic Conjunctivitis (SAC)
- Perennial Allergic Conjunctivitis (PAC)
- Contact Lens Papillary Conjunctivitis (CLPC)
- Vernal Kerato-Conjunctivitis (VKC)
- Atopic Conjunctivitis

SAC - Seasonal Allergic Conjunctivitis

- Most common ocular allergy
- Half of ocular allergies
- 10 to 30% world population
- Incidence doubled last 10 years (atmospheric pollution)
- Rarely appears before 5 years of age
- Allergic response mediated by mast cells
- Ocular component of hayfever (tree, grass, weed pollen)
- Occurs when pollen counts high
- Experience symptoms when count reaches “moderate” (30–49 pollen grains/cubic metre air)
**SAC - Seasonal Allergic Conjunctivitis**

**Symptoms**
- Red, itchy, burning & watery eyes
- Dryness/irritation
- Discomfort
- Mucoid discharge

**SAC - Seasonal Allergic Conjunctivitis**

** Signs**
- Bulbar conjunctival hyperaemia & oedema
- Eyelid chemosis and oedema
- Mild watery discharge
- Papillary hypertrophy of upper palpebral conjunctiva (redness & roughness)
- Cornea rarely involved

**PAC - Perennial Allergic Conjunctivitis**

- 1% of allergy sufferers
- Year round disease due to dust, animal skin and hair, mould, fungus etc
- Allergic response mediated by mast cells
- Signs and symptoms very similar to SAC
  - Chronic and less severe
  - Continue throughout year with seasonal exacerbation

**PAC - Perennial Allergic Conjunctivitis**

- 90% of housing are contaminated by specific moulds
- Allergies to moulds are known since 1873
  - Prevalence of allergies to moulds is 20 to 30% for atopic people
  - 3 to 10% of adults and children (worldwide) would suffer of allergies to moulds
- Even if it is a perennial problem there are some seasonal peaks due to heat and humidity
PAC - Perennial Allergic Conjunctivitis

**Symptoms**
- Very similar to SAC
  - burning
  - itching
  - watering eyes
  - sometimes mucoid secretions

CLPC – Contact Lens Associated Papillary Conjunctivitis

**Incidence** 2% – 15% depending on lens type

- Immune and/or mechanical response primarily affecting superior tarsal conjunctiva
- Response mediated by T-cells

**Aetiology**
- Mechanical
- Solution related
- Immune reactions

CLPC – Contact Lens Associated Papillary Conjunctivitis

- **Mechanical**
  - Lens edge, material stiffness or poor surface quality of CL in contact with conjunctiva
  - Mineral deposits from tears

- **Allergy**
  - Denatured proteins, accumulated on CL surface
CLPC – Contact Lens Associated Papillary Conjunctivitis

**CAUSES**
- Cytotoxic components of CL solutions
  - Preservatives
  - Antiseptic
  - Wetability agents
  - Enzymes

CLPC – Contact Lens Associated Papillary Conjunctivitis

**Signs**
- Palpebral hyperaemia
- Tarsal roughness and enlarged papillae
- Conjunctival oedema
- Mucous strands
- Mild ptosis if severe

CLPC

**Symptoms**
- Mucous discharge
- Itchiness, irritation
- Blurred vision
  - Lens deposition
  - Lens dislocation
  - Discharge
- Reduced CL comfort and wearing time
- Asymptomatic in early stages

VKC - Vernal Keratoconjunctivitis

- Rare but severe: affects children and more often boys (gender ratio 2/1)
- Resolves at adult age
- No specific allergen is clearly at the origin of VKC
- Children who have VKC have a higher incidence of keratoconus than the general population

CLPC – Contact Lens Associated Papillary Conjunctivitis

**CAUSES**
- Palpebral hyperaemia
- Tarsal roughness and enlarged papillae
- Conjunctival oedema
- Mucous strands
- Mild ptosis if severe
### VKC - Vernal Kerato-Conjunctivitis

**Symptoms**
- Intense photophobia
- Mucus discharge

**Clinical aspects**
- Hyperaemia
- Conjunctival oedema
- Giant papillary (>1mm) on superior tarsal conjunctiva
- Corneal staining
- In advance cases: shield ulcer
- Superinfection with staphylococcus

### Atopic Keratoconjunctivitis

- Resembles VKC but not seasonal
- Adults
- Associated with atopic dermatitis

### Diagnosis of Allergic Conjunctivitis

- Clinical history
- Typical symptoms
- 80% of patients are under 30 years of age
- Strong personal or family history of IgE-mediated diseases
  - Recurrent, intermittent or persistent symptoms

Clinical examination and investigations
Appearance of the everted (flipped) eyelid.
Skin prick/puncture tests or specific IgE tests to identify causative allergens
Diagnosis of Allergic Conjunctivitis

Mediators of IgE-related reactions in allergic conjunctivitis

- **Histamine**: Itching, redness, oedema
- **Prostaglandins**: Sensitized nerves, enhanced pain, oedema and redness
- **Leukotrienes**: Chemotaxis, oedema and vascular permeability
- **Chemotactic factors**: Recruitment of eosinophils and neutrophils leading to tissue destruction

Differential diagnosis Allergic Conjunctivitis

- Blepharitis
- Bacterial conjunctivitis
- Chlamydial conjunctivitis
- Corneal abrasion or ulceration
- Dry eye
- Episcleritis
- Staphylococcal marginal keratitis
- Superficial punctate keratitis
- Tight lens syndrome
- Viral conjunctivitis or keratitis

Treatment of ocular allergy

**Allergen avoidance**

**Palliative**
- Cold compresses
- Lubricants

**Over-the-counter medications**
- Topical decongestants/antihistamine
- Oral antihistamine

**Prescription drugs**
- Antihistamine
- Mast cell stabilizing antihistamine
- NSAID’s
- Corticosteroids

Over-the-counter medications

- **Topical decongestants**
  - Reduce chemosis and conjunctival hyperemia by an alpha-adrenergic mechanism resulting in vasoconstriction - work within minutes (duration of about 2 hours).
  - Phenylephrine
  - Naphazoline
But!!

- Side effects: rebound redness, dilation of the pupil, avoid in narrow angle glaucoma.
- Decongestants mask the signs and symptoms of allergic conjunctivitis
- Chronic use of vasoconstrictors can lead to toxic, follicular reactions or possibly a contact dermatitis.

Over-the-counter medications

**Decongestant/antihistamine combinations**

Antihistamines mildly suppress the immunological response. They help with itch more than straight decongestants.

- Opcon-A (0.315% pheniramine maleate, 0.02675% naphazoline hydrochloride)
- Vasocon-A (0.5% antazoline phosphate, 0.05% naphazoline hydrochloride)
- Naphcon-A (0.3% pheniramine maleate, 0.025% naphazoline hydrochloride)

- **Oral Antihistamines**

  - H1 antagonists
    - Do not prevent release of histamine
    - Inhibits contraction of bronchial smooth muscle
    - Inhibits increased vascular permeability
    - CNS effects include drowsiness

  - Oral antihistamines should be used when patient has significant nasal problems (primary care physician).
  - Cetirizine (Zyrtec)
  - Loratadine (Claritin)

  These yield therapeutically effective concentrations of the drug at the anterior surface of the eye.

  Several studies over the past few years have found topical allergy drops to be more effective in relieving symptoms of allergic conjunctivitis than oral antihistamines*.

  *Concomitant use of a nasal spray plus a topical allergy drop (e.g., Flonase + Patanol) was more effective than a nasal spray (Flonase) + an oral antihistamine (Allergy) for overall treatment of signs and symptoms of allergic conjunctivitis.
**Over-the-counter medications**

**Oral antihistamines**
All antihistamines (even nonsedating types) have a drying effect on the ocular surface. Antihistamines have atropine-like properties that decrease the tear production via the lacrimal gland. They could also be decreasing mucin production by the goblet cells.

Be sure to check to see whether your patient is taking OTC antihistamines.

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**Prescription drugs**

**Topical antihistamines**

These drops work by competing with histamine for the H1 receptor sites. Have unexplained vasoconstrictive properties.

- Livostin (levocabastine 0.05%)—suspension; qid dosing for 1-2 weeks, then 1-3 times/day as needed for itching.
- Emadine (emedastine difumarate 0.05%)—virtually identical to Livostin; same qid dosing; works immediately to reduce itch, redness, chemosis, and tearing.

Side effects: Stinging, burning, headache, fatigue, nausea.
Disadvantages: Do not prevent inflammation or release of histamine; short duration of action.

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**Prescription drugs**

- **Mast cell stabilizers**
  - Mast cell stabilizers work by inhibiting degranulation of mast cells (believed to prevent the influx of calcium to the mast cell).
  - Mast cell stabilizers can be used for months without any significant side effects.
  - They are good "prophylaxis".
  - They can prevent the ocular allergic outbreak all together.

**Mast cell stabilisers**

Act by preventing release of Histamine A.

- Sodium cromoglycate (Opticrom)
- Nedocromil sodium (Rapitil)
- Lodoxamide (Alomide)
  (2,500 x more potent than sodium cromoglycate)
Mast-cell stabilisers: Sodium cromoglycate

- Sodium cromoglycate
- Prophylaxis of ocular allergy and vernal conjunctivitis
- Stabilises membrane of mast cell
- Prevents release of Histamine

Sodium cromoglycate (Opticrom)

- Course of treatment - QID
- Prophylactic
  - Not an antihistamine
  - Ineffective once histamine released
- Available over the counter as Opticrom

Nedocromil sodium (Rapitil)

- Superior/equal to sodium cromoglycate in:
  - Vernal conjunctivitis
  - Seasonal allergic conjunctivitis
  - Perennial conjunctivitis
- Effective against other inflammatory cells: macrophages, eosinophils & inhibits release of inflammatory & chemotactic mediators
- Twice a day (***4 times per day)

Lodoxamide (Alomide)

- Mast cell stabiliser
- Eosinophil inhibitor
- 2,500 x more potent than sodium cromoglycate
- TDS – QDS
- All forms of allergic conjunctivitis
**Prescription drugs**

**Mast cell stabilizing antihistamine**

**is Dual action**

- Patanol (olopatadine hydrochloride 0.1%)
- Zaditor (ketotifen fumarate 0.025%)

Dosing: bid

Side effects: eye burning/stinging, headaches, bitter or metallic taste.

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**Prescription drugs**

**NSAIDs (Non-Steroidal Anti-Inflammatory Drugs)**

Specifically inhibit the enzyme cyclooxygenase which blocks the production of prostaglandins from arachidonic acid metabolism. NSAIDs alter the patient's sensitivity to itch by raising the sensory threshold of peripheral nerve endings.

Acular (ketorolac tromethamine 0.5%) is the only NSAID approved for the treatment of itch (as well as p/o cataract inflammation). Acular basically works as an analgesic to decrease pain. Onset of relief occurs within an hour. It is considered safe with few contraindications, although it does sting quite a bit.

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**Prescription drugs**

**Topical Steroids**

Topical steroids are particularly helpful in severe cases of VKC, AKC, GPC, and allergic contact dermatitis. They reduce the inflammatory response by:

- Decreasing the production of prostaglandins and leukotrienes
- Reducing capillary permeability
- Suppressing lymphocyte circulation
- Inhibiting mast cell degranulation, therefore, preventing the release of histamine

**Common topical steroids**

- Dexamethasone alcohol 0.1% Maxidex
- Prednisolone Na Phosphate 0.5% Predsol
- Betamethasone Na Phosphate 0.1% Betnesol
- Prednisolone Acetate 1.0% Predforte
- Fluoromethalone 0.1% Flucon
Why Steroids are “devil’s work”?

**Side effects of topical Steroids**

Ocular infection

Glaucoma

Cataract

Corticosteroids & ocular infections

Ocular HSV can be reactivated by a single dose!

Established HSV keratitis is exacerbated by steroid

Corticosteroids & microbial keratitis

May mask presentation & delay appropriate management of severe keratitis, particularly acanthamoeba


Topical steroids shown to be a significant risk factor in severe keratitis requiring hospitalisation in Australia

Tay KEang HK, McGregor CH et al. Severe microbial keratitis in temperate and tropical Western Australia. EYE 1996;10:575-80

Elevation of IOP with corticosteroids

4-6% high responders  > 15mmHg

1/3rd moderate responders  6 – 15mmHg

2/3rd non-responders  < 6mmHg

Higher risk in glaucoma, myopia, diabetes, RA.

Onset days to weeks usually 4-6 weeks.

Children – peak Dexamethasone response in 8 days!
Corticosteroid induced cataract

Association first identified by Black et al in 1960

Relative risk:
86 keratoconic subjects post-graft
At 18 months 28 (32.6%) exhibited PSC


PSC reported after 4 months of QDS fluorometholone


Corticosteroids: Miscellaneous complications

1. Ocular surface toxicity
2. Delayed epithelial healing
3. Reduced wound strength
4. Keratocyte apoptosis
5. Corneal phosphate deposits
6. Exacerbation of microbial infections
7. Reactivation of HSV
8. Crystalline keratopathy
9. Steroid glaucoma
10. Steroid cataract
11. Uveitis
12. Dilated pupil
13. Extraocular imbalance
14. Orbital fat atrophy
15. Intraocular penetration/injection
16. Systemic absorption


Allergies and Contact Lens Wear

- Easy to manage in practice
- Question patients about allergies
- Identify signs and symptoms allergic eye disease (reduced comfort and wearing time, dryness and itching)
- Management and advice
- If managed, SAC and PAC should not contraindicate CL wear even in peak seasons

Contact Lens Performance with Allergy Sufferers

- History of atopy leads to increase of symptoms
- Reduction in wearing time may be necessary during peak allergy season – depends on severity of condition
- Differences in performance between lens types
- With careful monitoring, successful CL wear in most patients with ocular allergies
Managing CL Wearing Allergy Sufferer

- Reduce allergen exposure
  - Daily disposables
  - Increase lens replacement frequency during peak season
  - Preservative free care products (oxygen peroxide)
  - Surfactant cleaner
  - Change lens material
  - Reduce wearing time

Alleviate symptoms
- Cold compresses
- Re-wetting drops during wear (non-preserved, single dose)
- Anti-allergy eye drops pre and post daily wear, prior to and during allergy season for SAC
  - Topical mast cell stabilizer
  - Topical antihistamine

CLPC Management

- Increase lens replacement frequency
  - disposables – 2 weekly or daily disposables
- Alter lens type
  - material, thickness
- Alter care system
  - improve cleaning, avoid MPS
- Improve hygiene
  - washing, lid hygiene
- Cease lens wear and pharmaceutical agents if severe
- Patient education

How can you describe the observation?
Bulbar Redness

How can you describe the observation?

Corneal Staining

How can you describe the observation?
How can you describe the observation?

Lid Roughness

32-year-old white female complaining of itchy eyes (especially in corners; no burning).
History of seasonal and ocular allergies since childhood.
Takes oral antihistamine

Case 1
Case 1

VA 20/20 OD, OS; no conjunctival injection; grade 1 papillae on lower and upper palpebral conjunctiva

How would you manage this case?

Case 1- to remember

Seasonal Allergic Conjunctivitis (SAC)

Significant dry eye plus allergic conjunctivitis:
Topical antihistamines or antihistamine/mast cell stabilizer.

Treatment with artificial tears + mast cell stabilizer. Oral antihistamines may be drying out eye; consider having patient switched to nasal inhaler.

Patanol bd

Lubricants
Case 2

28-year-old white male having difficulty wearing contact lenses can only wear 4-6 hours comfortably. Reports that they itch and burn (especially when removing)

VA 20/20 OD, OS with contact lenses. Grade 3+ papillae on upper palpebral conjunctiva.

Diagnosis (DD)?

How would you manage this case?

Discontinue lenses for 1 month
Short term steroids/mast cells stabiliser
Switch to daily disposables or RGP
Case 2 – take home message

GPC -Traditional therapeutic strategies:

- Decrease wearing time
- Switch to disposable contact lenses or RGP
- Consider daily disposable lenses
- Consider extra strength daily cleaner or increasing enzyme use

Controversial as to best treatment with drops.

Recommend one of the following:
- a mast cell stabilizing antihistamine OR
- a topical steroid alone (if patient discontinues lens wear) OR
- a mast cell stabilizer plus a topical steroid drop

Discontinue steroid drop after 1-2 weeks; continue with mast cell stabilizer.

Note: Allergy drops can be used with contact lenses (preferably disposable).

Case 3

45-year-old white female complaining of chronic ocular irritation and redness for several years. History of eczema. Has used punctal plugs, topical steroids, artificial tears, allergy medications with no improvement in symptoms.

Objectively:
- VA 20/80 OU
- Signs: 4+ SPK OU, 3+ conjunctival injection OU, ectropia OU, red scaly lids, grade 1 papillae OU

Diagnosis?

How would you manage this case?
Case 3

Hygiene, avoid eye rubbing
Short term steroids/mast cells stabilizer
Mast cell stabilizer – prophylaxis
Treat the skin – steroid cream

Case 3 – take home message

Atopic Keratoconjunctivitis (AKC)

Requires:
Long term treatment
Palliative treatment
Lid hygiene
Consider steroids
Mast cell stabilizers – the key

Case 4

15-year-old white male complaining of “right eye watering, stinging, eyes matted all the time.” History of seasonal and “skin” allergies (no history of eczema or asthma). History of acute allergic and bacterial conjunctivitis since age 6. Current diagnosis of chronic allergic conjunctivitis.

Diagnosis?

How would you manage this case?
Case 4

Vernal conjunctivitis:

History
Age
Gender
Associated pathology

Management

Acute treatment:
Mast cell stabilizing antihistamine OR
Topical steroid plus mast cell stabilizer.

Long-term treatment:
Mast cell stabilizer & observation

Management strategies

There is a good chance that when the patient presents to you, they have likely tried and failed to treat their symptoms on their own:

Take a thorough ocular history on anyone who has a history of systemic allergies.

Try to identify the offending allergen.

Remind patients not to rub their eyes.

Rubbing causes mast cell degranulation which perpetuates the allergic cycle.

Don't forget palliative therapies - cold compresses and artificial tears.

In dry eye patients, nasal inhalers are often as effective in reducing allergy symptoms as oral antihistamines without drying the eye and without the systemic side effects.

A bid topical allergy drug is always preferable in those patients wearing contact lenses.