A REVIEW OF OCULAR ALLERGIES
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THE PHARMACOLOGY OF ALLERGIES
Ocular Allergic Disease Fun Facts!

- 50 million people suffer some type of allergic disorder
- Incidence is way up over past 40 yrs
- 90% Of those have ocular involvement
- 32% involve only ocular tissue
- 40% Of population affected
- Initial onset is trending younger
- Warm, moist climate
- SAC responsible for 85% of allergic eye disorders
Allergic Conjunctivitis Facts & Figures

• Overall allergy prevalence has been increasing since the 1980s\(^1\)
  – Increased industrialization
  – Increased pollution

• More than 20% of the general population suffer from allergic conjunctivitis\(^2\)

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OCULAR VS. NASAL COMPLAINTS

- Ocular symptoms as severe or more severe than rhinitis symptoms in 70% of seasonal allergy patients

OCULAR SYMPTOMS ARE FREQUENT

WHERE IN THE US ARE ALLERGIES MOST PREVALENT?
Ocular Symptoms: Prevalence by Month (Pollen)

Symptom prevalence differs by regions
AC and Contact Lens Wear

Contact Lens Wearers Diagnosed with AC

- More than half (54%) of contact lens wearers suffer from ocular allergies\(^1\)
- Allergens can become trapped under the lens, prolonging their contact with the ocular surface.

Potential Patient Responses:

- Discontinue wearing them
- Take a hiatus from wearing them
- Reduce daily wearing time
- Switch to daily disposable lenses

Result?

- Patients who take a hiatus from contact lenses may not return to wearing them

Take Action!

- Prompt and effective AC treatment cuts hiatus time
- Patients may be more likely to renew lens wear if their time without them has been brief

\(^1\) Asthma and Allergy Foundation of America. Eye on Allergies Survey. July 2006.
Seasonal and Perennial Allergic Conjunctivitis: Key Facts

- Represent the 2 most common ocular allergies\(^1\)
- Both are type I (immediate) hypersensitivity reactions, commonly grouped together under “allergic conjunctivitis” \(^2\)
- Main differentiator: timing of symptoms\(^2\)

**Seasonal Allergic Conjunctivitis**
Typically causes acute symptoms for a defined period: spring, summer, and/or fall\(^2\)

**Perennial Allergic Conjunctivitis**
Symptoms, triggered by household allergens, may last all year\(^2\)
Seasonal allergens may also play a role\(^2\)

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Basic function of immune system is to detect and eliminate any substance recognized as foreign.

Antigens (allergens) are the foreign substances that trigger the immune response.
BASIC IMMUNE RESPONSE

- Host recognizes a foreign body (antigen)
- Host mobilizes a reaction
- Self vs non-self
ALLERGIES

- Exaggerated Immune Response

- Body produces immunoglobulins (antibodies) specific to allergen (antigen)

- Release of chemical mediators, e.g. histamine, cause allergy symptoms
ALLERGIES & THE EYE

1. Allergen introduced into tear film
2. Allergen absorbed into conjunctiva
3. Allergen binds to IgE coated mast cells
4. Mast cell degranulates - allergic mediators released
5. Eyes swell and itch!
Stages of Allergic Conjunctivitis

Sensitization
Stages of Allergic Conjunctivitis

Sensitization

Early Stage
Stages of Allergic Conjunctivitis

Sensitization

Early Stage

Late Stage
Stages of Allergic Conjunctivitis

Sensitization

Early Stage

Late Stage
Sensitization

IgE Antibodies specific to an allergen are created

Mast Cell produces histamine, prostaglandins and leukotrienes and is now primed

- Histamine
- Prostaglandins
- Leukotrienes

Mast Cell
Early-Phase Allergic Response

Sensitization | Early-Phase | Late-Phase

Hallmark symptom of Itching
Early-Phase Review

Returning allergen

Allergen binding to IgE antibodies
Early-Phase Review

Returning allergen

Allergen binding to IgE antibodies

Degranulation
Early-Phase Review

Returning allergen

Allergen binding to IgE antibodies

Mediators Released (degranulation) – leading to signs and symptoms of AC

Leukotriene & IL-5 released

Degranulation

Histamine released

Prostaglandin released
Late-Phase

Sensitization

Early-Phase

Late-Phase

Prolonged and exacerbated symptoms
Late-Phase Review

Leukotriene and IL-5
Late-Phase Review

Leukotriene and IL-5

Eosinophils, and other mediators are recruited
Eosinophils release a variety of toxic proteins that can damage the conjunctival epithelium.
ALLERGIC CONJUNCTIVITIS

• A Mast Cell mediated hypersensitivity reaction
ALLERGIC CONJUNCTIVITIS SYMPTOMS

- Itching
- Hyperemia
- Mucus d/c
- Filmy vision
- Bilateral
- Burning
- Swelling
- Tearing
- FB sensation
- Rhinitis
ALLERGIC CONJUNCTIVITIS

OBJECTIVE FINDINGS

- Papillae
- Follicles
- Increased lacrimal lake
- Mucus strands
- Conjunctival injection
- Tear film debris
- Lid edema
- Conjunctival edema

*Symptoms often outweigh the signs*
CLASSIFICATION OF OCULAR ALLERGY

- Seasonal allergic conjunctivitis
- Perennial allergic conjunctivitis
- Vernal keratoconjunctivitis
- Atopic keratoconjunctivitis
- Giant papillary conjunctivitis
Typical Allergic Conjunctivitis Appearance

ALLERGY TREATMENT PEARLS

- Prescription products safer and more effective than OTC?
- Confirm symptoms, confirm diagnosis
- Treatment depends upon severity
- Treatment may be long term
- Frequent follow-up necessary
- Punctal occlusion?
- CL question
WHAT DO WE LOOK FOR IN A THERAPY?

- Control symptoms
- Work on intended targets
- No toxicity
- Comfort
- No side effects
- Rapid onset
- Long duration
- Easy to use dosing
SIDE EFFECTS OF TOPICAL ANTIHISTAMINES

- Surface drying
- CL dehydration
- Stinging
Bepotastine Mechanisms of Action

Bepotastine:
- A topically active, highly selective, direct H1-receptor inverse agonist
- Mast cell stabilizer

Figure adapted from study data. Clinical relevance of in vitro study is unknown.
DO ANTI-HISTAMINES CAUSE (OR TREAT) DRY EYE?
ANTI-HISTAMINE PHARMACOLOGY

- Reversible binding to H1 receptor sites
- Prevent the binding of histamine
- Thus the histamine effects cannot be released

- Blocks further release of histaminic symptoms but has no effect on the histamine that is already bound!
TOPICAL ALLERGY DROPS 2016

- Pataday/Patanol
- Bepreve
- Pazeo
- Lastacaft
- Elestat?
- Alaway
SO WHY ONE DROP OVER ANOTHER?

- Quicker onset
- Less toxicity
- Dosage
- Longer duration
- Action on eosinophils

- More comfortable – (pH issue)
- Less drying
SO DOES 1 TOPICAL ANTIHISTAMINE WORK BETTER THAN THE OTHERS?

Yes!!!
WHAT TO DO ABOUT GPC???
ALLERGY TREATMENT

- Are there any indications for
  - NSAID?
  - Steroid?
WHAT ABOUT ORAL ANTIHISTAMINES?

• Profound effects on both ocular and systemic allergies BUT…
• Are the ocular effects superior to eyedrops?
• Are the side effects worth the (perceived) extra benefit?
• Should we be treating systemic disease?
• Is there an advantage to co-manage with an allergist?
• Don’t forget about nasal steroids!!