Ocular Allergies: Scratching the Surface

Mile Brujic, OD

How Many People Are Affected?

-20%-50% of the population has allergies
-83% of allergy sufferers experience ocular symptoms

Disclosure:

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Allergists and general practitioners should be disciplined to ask patients presenting with gross nasal allergies about their eyes, for it is only upon direct questioning that most will indicate that their eyes have been an issue.”

2006 Clinical Guide to Ophthalmic Drugs; Ron Melton, Randall Thomas

Allergy

• A hypersensitivity to a specific substance or condition which in similar amounts or degrees is harmless to most people

How Many People Are Affected?
Types of Allergic Eye Disease

- Acute allergic conditions
  - Seasonal Allergic Conjunctivitis (Hay Fever) - SAC
  - Perennial Allergic Conjunctivitis – PAC

- Chronic allergic conditions
  - Vernal Conjunctivitis - VKC
  - Atopic Conjunctivitis - AKC
  - Giant Papillary Conjunctivitis - GPC

Common Causes of Ocular Allergies

Allergic Conjunctivitis:

**Causes:**
- Environmental
- Genetic predisposition

**Findings:**
- Family history
- No eosinophils found in scrapings
- Spike in tear histamine
- Normal histaminase function

**Signs/Symptoms:**
- Itching
- Redness
- Chemosis
- Lid swelling
- Tearing
<table>
<thead>
<tr>
<th>Atopic Keratoconjunctivitis (AKC)</th>
<th>Vernal Keratoconjunctivitis (VKC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causes:</strong></td>
<td><strong>Causes:</strong></td>
</tr>
<tr>
<td>• Associated with atopic dermatitis</td>
<td>• Genetic predisposition, atopy</td>
</tr>
<tr>
<td>• May be perennial</td>
<td>• Seasonal/perennial allergens (IgE)</td>
</tr>
<tr>
<td>• Genetic predisposition</td>
<td>• Nonspecific hypersensitivity</td>
</tr>
<tr>
<td>• Environmental antigens</td>
<td><strong>Clinical Findings:</strong></td>
</tr>
<tr>
<td></td>
<td>• Most predominant in males from 3 to 20 years old</td>
</tr>
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<td><strong>Signs/Symptoms:</strong></td>
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<td>Photophobia</td>
<td>• Most predominant in males from 3 to 20 years old</td>
</tr>
<tr>
<td>Keratopathy</td>
<td>• Increased levels of superficial mast cells, eosinophils, and lymphocytes</td>
</tr>
<tr>
<td>SPK/Ulcers</td>
<td>• Decreased levels of histaminase</td>
</tr>
<tr>
<td>Keratoconus</td>
<td><strong>Signs/Symptoms:</strong></td>
</tr>
<tr>
<td>Anterior polar cataracts</td>
<td>• Photophobia</td>
</tr>
<tr>
<td>Mucous discharge</td>
<td>• Trantas dots</td>
</tr>
<tr>
<td>Atopic blepharitis</td>
<td>• Limbal nodules</td>
</tr>
<tr>
<td></td>
<td>• Neovascularization</td>
</tr>
<tr>
<td></td>
<td>• Shield ulcers</td>
</tr>
<tr>
<td></td>
<td>• Itching</td>
</tr>
</tbody>
</table>

**Clinical Findings:**
- Initiates between 20 and 50 years of age
- Elevated levels of eosinophils, TH2 lymphocytes, and mast cells

**Signs/Symptoms:**
- Ptosis
- Ropy mucous discharge
- Photophobia
- Large, nonuniform cobblestone papillae
- Trantas dots
- Limbal nodules
- Neovascularization
- Shield ulcers
- Itching

Contact Lenses
Giant Papillary Conjunctivitis (GPC)

**Causes:**
- Repeated mechanical irritation caused by:
  - Contact lens edge
  - Exposed sutures
  - Extruded scleral buckle
  - Ocular foreign bodies
  - Aggravated by concomitant allergy
  - Can also aggravate ocular allergy

**Symptoms:**
- Decreased CL tolerance
- Blurred vision
- Foreign body sensation
- Small, uniform papillae on upper tarsal plate
- Thick mucous

**Clinical Findings:**
- Increased chronic inflammatory cells
GPC TREATMENT

- Swab area to remove any bound mucous
- Discontinue contact lens wear or change to a daily disposable contact lens
- May begin short term steroid pulse (1 gt qid x 1 week)
- Maintenance of mast cell stabilizer/antihistamine combination 1 gt qd x 1 month

Clinical Relevance of Eosinophils

![Graph showing eosinophil cell count in allergic eye diseases]

Differential Diagnoses of Other External Diseases

- Dry Eye
- Blepharitis
- Viral
- Contact Dermatitis
- Chlamydial
- Bacterial
- Contact lens related (irritant conjunctivitis, infiltrates)
- Ocular Rosacea
- Medicamentosa

Allergic Response

1. Allergen is taken up, processed and bound to surface of Antigen Presenting Cell (APC).
2. Allergen/APC complex activates Th2 lymphocyte which in turn activates naïve B cells to proliferate and differentiate.
3. Plasma Cells (B Cell) secrete allergen specific IgE which bind to sensitized Mast Cells (MC).
**IgE 30 Minutes Post-Challenge**

**Histamine**

Response to Topical Challenge with Histamine 25 µg/ml

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Role</th>
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<tr>
<td>IL-4</td>
<td>IgE Production, Mast Cell Modulation</td>
</tr>
<tr>
<td>LTC4, IL-5, TNF α</td>
<td>Leukocyte Adhesion</td>
</tr>
<tr>
<td>IL-5, IL-6, PAF</td>
<td>Leukocyte Migration and Activation</td>
</tr>
<tr>
<td>Histamine, PGD2, LTC4, Kinins</td>
<td>Mucus Secretion, Edema, Vasodilation, and Nerve Stimulation</td>
</tr>
</tbody>
</table>

**Treatment Options**

- **Topical Medications**
  - Antihistamine/ Mast Cell Stabilizer Combinations
    - Blocks Histamine receptors on blood vessels, nerve endings, etc
    - Inhibits histamine degranulation from sensitized mast cells so that when these cells are challenged with antigen, they do not degranulate
    - Patanol, Pataday, Elestat, Zaditor, Lastacaft, Bepreve, Optivar

- **Anti-inflammatory medications (Steroids)**
  - Suppresses the whole inflammatory response
  - Loteprednol Etabonate (0.2%, 0.5%)
  - Prednisolone Acetate
Thank You
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