Allergy and the Eyes

Papillae and much more……..

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Omni Eye Specialists/Spring Vision Center
Spring Symposium 2014

Allergies

- Allergic Rhinitis
  - Roughly 20% of people 30 and over in the U.S. have been
  - Worldwide, allergic rhinitis is the most common cause of work absence in adults
  - Worldwide, sensitization (IgE antibodies) to foreign proteins in the environment is present in up to 40% of the population.

- Drug Allergy
  - Worldwide, adverse drug reactions may affect up to 2% of the world’s population and affect up to 5% of all hospitalizations
  - Worldwide, drugs may be responsible for up to 20% of fatalities due to anaphylaxis.

- Food Allergy
  - Roughly 0.1% of newborns by 2010, 1 in 132 has food allergy
  - 60% of food allergic children have multiple food allergies.

- General Allergy
  - Worldwide, the rise in prevalence of allergic diseases has continued in the urbanized world for more than 50 years.
  - One or more allergies for one or more chronic allergies among school children are currently approaching 50%.

- Skin Allergy
  - Roughly 10% of people 30 and over in the U.S. have skin allergies.

- Skin Allergy
  - In 2001: 31% of U.S. children aged 17 years and under suffered from hay fever in the past 12 months.

*All data collected by American Academy of Allergy, Asthma, and Immunology

Journal Club

- Date: April 24th
- Time: 6:30 pm
- Topic: Retina

**2 CE credits offered**

Allergies

- The association of allergic nasal and ocular symptoms (rhinoconjunctivitis) is common.
- Most children with allergic conjunctivitis have allergic rhinitis.
- Older population studies estimate a prevalence of 15-20% of allergic conjunctivitis have allergic rhinitis, but more recent studies implicate rates as high as 40%
- Ocular symptoms are common and contribute to the burden of allergic rhinitis.
- Ocular allergies rank a close second and at times may overcome the primary complaints of nasal congestion in rhinoconjunctivitis patients.


What are we going to talk about?

- Introduction to allergies
  - Epidemiology
  - Hypersensitivity reactions
- Papillae vs. Follicle
- Allergic Conjunctivitis
  - Subcategories
- Diagnosis
- Treatment

Hypersensitivity

“Excessive, undesirable (damaging, discomfort-producing and sometimes fatal) reactions produced by the normal immune system”
Hypersensitivity

- **Type I (immediate)**
  - Involve immunoglobulin E (IgE)-mediated release of histamine and other mediators from mast cells and basophils.
  - Immunoglobulin E (IgE) has a strong affinity for mast cells, and the cross-linking of 2 adjacent IgE molecules by the antigen triggers mast cell degranulation.
  - Mast cell's degranulation releases various preformed and newly formed mediators of the inflammatory cascade.
    - Histamine, tryptase, chymase, heparin, chondroitin sulfate, prostaglandins, thromboxanes, and leukotrienes

- **Type II**
  - Cytotoxic hypersensitivity reactions
  - Involve IgG or IgM antibodies bound to cell surface antigens.
  - Antibodies produced by the immune response bind to antigens on the patient’s own cell surfaces.
  - Cells are recognized by macrophages or dendritic cells, act as antigen-presenting cells. Thus, causing a B-cell response, wherein antibodies are produced against the foreign antigen.
  - Examples: Graves disease, Myasthenia gravis, MS (antibodies are made against the oligodendroglia cells that make myelin).

- **Type III**
  - Classes of antibody involved are the same ones that participate in type II reactions—IgG and IgM.
  - The antigen to which the antibody binds is not attached to a cell. Once the antigen-antibody complexes form, they are deposited in various tissues of the body (blood vessels, kidneys, lungs, skin, and joints).
  - Deposition of the immune complexes causes an inflammatory response, which leads to the release of tissue-damaging substances
  - Ocular type III hypersensitivity reactions include Stevens-Johnson syndrome and marginal infiltrates of the cornea. These type III reactions can often induce a corneal immune ring (infiltrate) that dissolves when the inflammatory reaction subsides.
Type IV

“Delayed hypersensitivity reactions or Cell-mediated immunity”

- Involves the activation of phagocytes, natural killer cells (NK), antigen-specific cytotoxic T-lymphocytes, and the release of various cytokines in response to an antigen.
- A cell-mediated immune response that takes two to three days to develop.
  
  Ex. PPD test, contact dermatitis, corneal graft rejection

Papillae

- Papillae:
  "Cone-shaped elevations that develop on the surface of the conjunctiva in response to inflammation. Each papilla contains a central core of vessels that branch over the surface of the papilla.”

- Follicle:
  "Accumulation of lymphocytes in the conjunctival tissue due to chronic irritation usually mechanical, toxic, or viral in nature or STDs.”
  - Greyish white to yellowish, avascular elevations

Follicles

- Viral
  - Adenoviral infection
    - EKC
  - Pharyngoconjunctival fever
  - HSV, Herpes Zoster

- Toxic
  - Repeated exposure to toxic chemical
  - Preservatives

- STD
  - Major culprit is chlamydia (inclusion conjunctivitis)
Allergic Conjunctivitis

- “Red eye”
- Type I hypersensitivity
  - Mast cell degranulation induced by allergen – IgE interaction
  - Bilateral itching and redness occurring at least in the past 2 consecutive years.
- 4-50 years of age
- Papillae
- Inflammation of the conjuctiva
- High IgE serum levels
- (+) allergen sensitization
- Association with other allergic diseases (asthma, rhinitis, eczema)

**Different clinical features, different evolution, and different response to therapy**

AKC

- Severe chronic inflammatory disease of conjunctiva
- Children and adults, 20-50 years of age
- Men more frequently affected than women
- Ocular involvement associated with eczema of lids or other parts of the body
- Presence or history of atopic dermatitis is recorded in 95% of AKC patients.
- Hyperemia of conjunctival and episcleral vessels, papillae of upper tarsal conjunctiva, mucus in AM, associated blepharitis

SAC

- Most common form of ocular allergy disease
- Grass and ragweed pollens being most important season triggers
- Young adults, 20-40 years old
- Spring and fall onset of sympotms
- Bilateral red, itchy eyes with associated watering and burning
- Blurred vision may be due to affected tear film
- Response to topical antihistamine helpful in diagnosis
- Eosinophil infiltration in conj. scraping is not highly specific in SAC.

PAC

- Dust mites and animal dander/feathers important triggers
- Characterized by year-round symptoms with season exacerbations
- PAC has higher prevalence of associated perennial rhinitis
- Positive response to topical antiallergic treatment is typical of PAC

AKC cont....

- Severe cases: conjunctival scarring, symblepharon, corneal ulceration.
- Symptoms: intense itching, photophobia, burning, FBS
- Increased levels of serum IgE, conjunctival eosinophil infiltration and eosinophils in tears.
AKC

- Recurrent, bilateral, chronic allergic inflammatory disease
- Mainly affecting young men in first decade of life
- Intense itching, intense photophobia, sticky mucous discharge, giant papillae on upper tarsal conjunctiva or at limbus, conjunctival hyperemia, corneal shield ulcer in up to 10% of patients.
- Frequently has a FMH or MH of atopic diseases
- VKC not associated with positive skin test...confirming not solely an IgE-mediated disease.

VKC

GPC

- Common condition frequently seen in CL wearers
- Contact lens deposits act as allergens
- Exposed corneal/conjunctival sutures and patients with ocular prostheses
- Patients with atopic diseases at greater risk
- Allergic and mechanical
- Intense itching after CL removal, mucus discharge, photophobia, and intolerance to CLs.
- Papillae may cause mechanical corneal abrasions and contribute to conjunctival inflammation.
- Histamine level of tears remains same in GPC

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Table 1: Diagnostic features for the different forms of allergic conjunctivitis

<table>
<thead>
<tr>
<th>AKC</th>
<th>VKC</th>
<th>GPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30-40</td>
<td>Less than 5 or 30-40</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Allergies</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Contact lenses</td>
<td>Frequent</td>
<td>Rare</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Red, itchy eyes</td>
<td>Red, itchy eyes</td>
</tr>
<tr>
<td>Treatment</td>
<td>Antihistamines</td>
<td>Antihistamines</td>
</tr>
</tbody>
</table>

Note: AKC = allergic keratoconjunctivitis, VKC = vernal keratoconjunctivitis, GPC = giant papillae conjunctivitis.
Diagnosis

• SLE
• Age
• Clinical history
• Patient symptoms
• IgE serum levels
• Conjunctival scrapings
• Skin tests

Treatment

• Avoidance

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing</td>
<td>Avoid wearing cotton clothing</td>
</tr>
<tr>
<td>Environment</td>
<td>Eliminate dust mites from home</td>
</tr>
<tr>
<td>Medications</td>
<td>Avoid medications with high risk of side effects</td>
</tr>
<tr>
<td>Removal of irritants</td>
<td>Remove irritants from home</td>
</tr>
<tr>
<td>Skin care</td>
<td>Use hypoallergenic creams</td>
</tr>
<tr>
<td>Diet</td>
<td>Avoid foods that trigger symptoms</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td>Wash hands frequently</td>
</tr>
<tr>
<td>Home care</td>
<td>Use air purifiers</td>
</tr>
<tr>
<td>Pets</td>
<td>Keep pets with hypoallergenic fur</td>
</tr>
<tr>
<td>Allergen avoidance</td>
<td>Avoid接触 to allergens</td>
</tr>
<tr>
<td>Medications</td>
<td>Use medications as prescribed</td>
</tr>
<tr>
<td>Education</td>
<td>Educate family about the condition</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Regular monitoring of symptoms</td>
</tr>
<tr>
<td>Emotional support</td>
<td>Support emotional needs</td>
</tr>
<tr>
<td>Stress management</td>
<td>Manage stress levels</td>
</tr>
<tr>
<td>Sleep hygiene</td>
<td>Maintain good sleep hygiene</td>
</tr>
<tr>
<td>Exercise</td>
<td>Regular exercise to improve immune function</td>
</tr>
<tr>
<td>Vaccinations</td>
<td>Keep up with recommended vaccinations</td>
</tr>
<tr>
<td>Other</td>
<td>Other specific measures as required</td>
</tr>
</tbody>
</table>

Diagnosis

![Image of dermatitis]