Seasonal Allergies

Brown Bag Webinar Series

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Disclosures

• Speaker
  – Thermofisher
  – Boehringer-Ingelheim

Learning Objectives

• Diagnose a patient with rhinitis
• Provide effective management for rhinitis
Allergic Rhinitis

- 50 Million Americans Affected
  - 10-22% Adults
  - 16-26% Children
- Peak Incidence
  - Late Childhood
  - Early Adolescence
- 2nd Most Common Chronic Condition in U.S.

Prevalence of Allergic Rhinitis

Allergic rhinitis affects about 40 million people in the United States, or approximately 10% to 30% of the US population.1

![Graph showing prevalence of chronic conditions](image)


Physiology of the Nose

- The nose is the “air conditioner” to the lower airways
- Humidifies
- Warms
- Filters out particles
- Olfaction
- Phonation
- Source of Nitric Oxide
Seasonal vs Perennial Allergic Rhinitis

Seasonal
• Symptoms recur each year during the same season
• Antigens include:
  – tree pollen
  – grass pollen
  – weed pollen
  – molds

Perennial
• Symptoms are persistent year-round resulting from constant challenge
• Antigens include:
  – dust
  – animal dander
  – molds
  – cockroach

Major Source of Seasonal Allergens

<table>
<thead>
<tr>
<th>Pollens</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree pollens</td>
<td>Early to mid-spring</td>
</tr>
<tr>
<td>Grass pollens</td>
<td>Late spring and early summer</td>
</tr>
<tr>
<td>Weed pollens</td>
<td>Late summer to early fall</td>
</tr>
</tbody>
</table>

Pollination can vary widely by locale; it may occur year round in the southern U.S.

Indoor Aeroallergens

• Cat epithelium (Felis domesticus)
• Dog epithelium (Canis familiaris)
• Arthropods (domestic mites):
  – Dermatophagoides farinae,
  – Dermatophagoides pteronyssinus
• Insects (German cockroach: Blattella germanica)
• Fungi (Alternaria, Cladosporium, Ascospores, Aspergillus, Penicillium)
## Seasonal vs Perennial Allergic Rhinitis

<table>
<thead>
<tr>
<th>Seasonal</th>
<th>Perennial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms recur each year during the same season</td>
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</tr>
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<td>- tree pollen</td>
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</tr>
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<td>- grass pollen</td>
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</tr>
<tr>
<td>- weed pollen</td>
<td>- molds</td>
</tr>
<tr>
<td>- molds</td>
<td>- Cockroach</td>
</tr>
<tr>
<td></td>
<td>- fungi</td>
</tr>
</tbody>
</table>

## Air Sampling

- **Volumetric Samplers**
  - Burkard
  - Sampler MK-3
  - Rotorod

## Microscope Room
Ragweed

Rhinitis: Differential Diagnosis

- Non Allergic Rhinitis
  - Septal Deviation
  - Foreign Body
  - Granuloma
  - Tumor
  - Polyps
- Structural
- Medication Related
  - Oral Contraceptives
  - Antihypertensives
  - Topical Decongestants
- Vasomotor Rhinitis
- Atrophic Rhinitis
- Gustatory Rhinitis
- CSF Leak
- NARES

- Infectious
- Endocrine
  - Pregnancy
  - Hypothyroid
Vasomotor rhinitis

- Sometimes used synonymously with nonallergic rhinitis without eosinophilia
- Nasal symptoms can be provoked by non-allergic factors
  - Changes in external environment
    - Ambient temperature
    - Odor/irritants (e.g., perfumes, cleaning materials, passive tobacco smoke)
  - Alcohol (vasodilation)
  - Exercise, sexual arousal, emotional factors

Non-allergic eosinophilic rhinitis (NARES)

- Nasal eosinophilia in absence of allergy
- 15%-33% of adults with non allergic rhinitis
- Anosmia common
- NARES patients more likely to have more severe nasal symptoms than in VMR or allergic rhinitis.
- May evolve to nasal polyposis and aspirin sensitivity
- Nasal entopy? Local IgE production without positive skin tests or in vitro tests for serum IgE


Structural/mechanical factors that mimic rhinitis

- Deviated septum/septal wall anomalies (unilateral?)
- Hypertrophic turbinates
- Adenoidal Hypertrophy
- Foreign Bodies
- Nasal tumors; benign, malignant
- Choanal atresia
Diagnosis

• History
• Physical exam
• Allergy testing if indicated
• Other diagnostic testing

Symptoms of Allergic Rhinitis

• Eye Symptoms
  – Itchy
  – Watery
  – Red
  – Swollen (chemosis)
• Nasal
  – Runny
  – Stuffy
  – Itchy
  – Sneezy

HISTORY

• Pattern?
  – Seasonal vs perennial
  – Intermittent vs episodic vs persistent
• Environmental effects?
  – Home vs work?
    • Take detailed environmental history
  – Outdoors vs indoors?
  – Acute sx with house dust mites, molds
    (cutting grass), pets
  – Better on vacations (away from pets)?
### Selected LRs

<table>
<thead>
<tr>
<th>History</th>
<th>LR+</th>
<th>LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does pollen cause symptoms?</td>
<td>2.52</td>
<td>0.49</td>
</tr>
<tr>
<td>Does mold cause symptoms?</td>
<td>2.09</td>
<td>0.73</td>
</tr>
<tr>
<td>Does dust or mites cause symptoms?</td>
<td>3.34</td>
<td>0.39</td>
</tr>
<tr>
<td>Do you have hayfever?</td>
<td>4.80</td>
<td>0.58</td>
</tr>
<tr>
<td>Family history of allergies?</td>
<td>3.41</td>
<td>0.70</td>
</tr>
<tr>
<td>Are symptoms seasonal?</td>
<td>1.59</td>
<td>0.59</td>
</tr>
<tr>
<td>Itchy, watery eyes?</td>
<td>2.49</td>
<td>0.51</td>
</tr>
<tr>
<td>Are you allergic?</td>
<td>3.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Nasal symptoms (sneezing, runny nose)?</td>
<td>1.33</td>
<td>0.65</td>
</tr>
</tbody>
</table>

### PHYSICAL EXAM

- **Nose**
  - Septum (deviation, mucosal ulcers)
  - Turbinates boggy
  - Turinate color (red, pale, blue)
  - Characterize mucosa, mucus (purulence)
  - Nasal polyps
- **Sinus tenderness?**
- **Eyes, ears, oropharynx**
- **Lungs** (high prevalence of concomitant asthma)
The Allergic Inflammatory Response

IgE Testing for Sensitization

- Skin Testing
  - SPT rapid (30 minutes) and relatively inexpensive
  - Antihistamines may interfere
  - Can’t do for certain skin diseases
- Blood testing
  - No risk to patient
  - No interference by drugs
  - Somewhat more expensive per test
  - Delay in obtaining results
Skin Tests

Suppression of Skin Tests

- Most antihistamines and anti-depressants suppress skin tests for 3-7 days.
- H₂ antagonists have no or a very minor effect.
- Bronchodilators do not effect skin tests.
- Short-term and low dose oral corticosteroids have no effect.

Cook. J ACI 1973;51:71-7
Rao. JACI 1988;82:752-7
Miller. JACI 1989;84:895-99
Slott. JACI 1974;554:229-34
Selected LRs: SPT vs. ICT

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Cat LR+</th>
<th>Cat LR-</th>
<th>Tree LR+</th>
<th>Tree LR-</th>
<th>Grass LR+</th>
<th>Grass LR-</th>
<th>Mold LR+</th>
<th>Mold LR-</th>
<th>Mite LR+</th>
<th>Mite LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percutaneous Test</td>
<td>4.93</td>
<td>0.08</td>
<td>16.17</td>
<td>0.09</td>
<td>3.23</td>
<td>0.04</td>
<td>11.75</td>
<td>0.05</td>
<td>4.06</td>
<td>0.03</td>
</tr>
<tr>
<td>Intracutaneous Test</td>
<td>2.45</td>
<td>0.28</td>
<td>1.05</td>
<td>0.98</td>
<td>8.90</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Selected Likelihood Ratios

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Cat LR+</th>
<th>Cat LR-</th>
<th>Grass LR+</th>
<th>Grass LR-</th>
<th>Mold LR+</th>
<th>Mold LR-</th>
<th>Mite LR+</th>
<th>Mite LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Vitro Test</td>
<td>9.38</td>
<td>0.14</td>
<td>3.13</td>
<td>0.09</td>
<td>15.00</td>
<td>0.20</td>
<td>6.33</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Approaches to Treatment of Allergic Rhinitis

- Avoidance
  - Environmental control
- Pharmacologic therapy
- Allergen immunotherapy
Avoidance (Pollen)

- Stay indoors
  - Air-conditioned,
  - Filtered Air
  - Caution-Attic Fan
  - Wear Mask When Working in Garden, Cutting Grass, Raking Leaves
  - Careful of Vectors, (e.g. pets outdoor to indoors, drying laundry outdoors)

Avoidance (pets)

- Keep in Kennel
- Wash Very Regularly
- Tannic Acid for Reservoirs
- Pick Non-Sensitive Pet (i.e. goldfish)
- Air Filtration
- Treat Reservoir (e.g. carpeting, furniture, bedding)
Avoidance (mites)
- Wash Bedding Very Often in warm water
- Low Humidity, Low Temperature
- Vacuum (Filter Type)
- Remove Carpet in Bedroom

Avoidance (mold)
- Dehumidifier
- Dry Up Damp Areas—Cellar
- Use Antifungal Solution
- Caution of Reservoirs (e.g. humidifiers)
- Avoid Warm, Dark, Humid Places

Medications
- Antihistamines (Oral, Nasal)
  - 1st and 2nd generation, azalastine
- Decongestant (Oral, Nasal)
  - Phenylephrine, pseudoephedrine, oxymetazoline
- Steroids (Oral, Nasal)
- Leukotriene modifiers
  - Montelukast is not an antihistamine!!!
- Cromolyn
- Anticholinergics
Oral Antihistamines

• Commonly used oral antihistamines
  • First generation: brompheniramine (Dimetapp), chlorpheniramine (Chlor-Trimiton), clemastine (Tavist), diphenhydramine (Benadryl)
  • Second generation: cetirizine (Zyrtec), desloratadine (Clarinex), fexofenadine (Allegra), loratadine (Claritin), levocetirizine (Azyal)

Intranasal Antihistamines

• May be used as first-line treatment in AR
  • Equivalent to or superior to oral 2nd generation antihistamines for treatment of SAR
  • Associated with clinically significant effect on nasal congestion
  • May have some anti-inflammatory effect
  • Generally less effective than intranasal corticosteroids in treatment of AR but quicker onset of action than intranasal corticosteroids (ICS)
  • Adding intranasal antihistamines to ICS may be of benefit in some patients
  • Side effects: bitter taste, sedation
    • Newer agents (eg, olopatadine hydrochloride [Patanase], azelastine HCl [Astepro]) are better tolerated; fewer reports of bitter taste


Intranasal Antihistamines

• Intranasal antihistamines available in the US:
  – Azelastine (Astelin or Astepro) nasal spray
  – Olopatadine (Patanase) nasal spray
  – Astelin is approved for age 5 years and up for allergic rhinitis; Patanase and Astepro are only approved for age 12 years and up

Decongestants

• Relieve obstructive nasal symptoms, but not other AR symptoms

• Indicated for relief of nasal and eustachian tube congestion

• Side effects:
  – Oral: nervousness, irritability, palpitations
  – Topical: Local irritation, rhinitis medicamentosa (rebound)

• Point of sale restrictions on oral decongestants


Commonly Used Oral and Topical Decongestants

• **Topical**
  – Phenylephrine (Neo-Synephrine)
  – Oxymetazoline (Afrin)

• **Oral**
  – Pseudoephedrine (Sudafed)
  – Phenylephrine (Sudafed PE)


Intranasal Corticosteroids

• Most effective medications for treating AR

• Reduce sneezing, itching, rhinorrhea, and congestion

• Patient preference in intranasal steroids greatly affects compliance with treatment

• Local side effects, which are generally minimal, include stinging, burning, dryness, sneezing, epistaxis

• Patient education about proper administration can help avert rare nasal septal perforations

Intranasal Corticosteroids

- Commonly used intranasal corticosteroids
  - Beclomethasone dipropionate (Beconase AQ)
  - Budesonide (Rhinocort Aqua)
  - Flunisolide (Nasarel)
  - Fluticasone furoate (Veramyst)
  - Fluticasone propionate (Flonase)
  - Mometasone furoate monohydrate (Nasonex)
  - Triamcinolone acetonide (Nasacort AQ)
  - Ciclesonide (Omnaris)


Immunotherapy\(^1,2\)

- Severity and duration of symptoms
- Responsiveness to other forms of therapy
- Unacceptable adverse effects of medications
- Patient's desire to avoid long-term pharmacotherapy
- Reduction of the risk of future asthma
- Presence of comorbid conditions such as sinusitis or asthma


Treatment Thresholds for Rhinitis

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Benefit</th>
<th>NNT</th>
<th>Harm</th>
<th>NNH</th>
<th>Rx Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antihistamines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cetirizine</td>
<td>0.112</td>
<td>8.9</td>
<td>0.030</td>
<td>33.3</td>
<td>21%</td>
</tr>
<tr>
<td>Fexofenadine</td>
<td>0.066</td>
<td>15.2</td>
<td>0.013</td>
<td>76.9</td>
<td>16%</td>
</tr>
<tr>
<td>Desloratadine</td>
<td>0.056</td>
<td>17.9</td>
<td>0.021</td>
<td>48.0</td>
<td>27%</td>
</tr>
<tr>
<td>Loratadine</td>
<td>0.029</td>
<td>34.5</td>
<td>0.015</td>
<td>66.7</td>
<td>34%</td>
</tr>
<tr>
<td>Class Mean</td>
<td>0.066</td>
<td>15.2</td>
<td>0.020</td>
<td>50.7</td>
<td>23%</td>
</tr>
<tr>
<td>Nasal Sprays</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triamcinolone</td>
<td>0.211</td>
<td>4.7</td>
<td>0.019</td>
<td>52.6</td>
<td>8%</td>
</tr>
<tr>
<td>Fluticasone</td>
<td>0.168</td>
<td>6.0</td>
<td>0.015</td>
<td>66.7</td>
<td>8%</td>
</tr>
<tr>
<td>Budesonide</td>
<td>0.207</td>
<td>4.8</td>
<td>0.030</td>
<td>33.3</td>
<td>13%</td>
</tr>
<tr>
<td>Mometasone</td>
<td>0.330</td>
<td>3.0</td>
<td>0.019</td>
<td>52.6</td>
<td>5%</td>
</tr>
<tr>
<td>Class Mean</td>
<td>0.229</td>
<td>4.4</td>
<td>0.021</td>
<td>48.2</td>
<td>8%</td>
</tr>
<tr>
<td>Nasal Antihistamines</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azelastine Qday</td>
<td>0.160</td>
<td>6.3</td>
<td>0.031</td>
<td>32.3</td>
<td>16%</td>
</tr>
<tr>
<td>Azelastine BD</td>
<td>0.200</td>
<td>5.0</td>
<td>0.046</td>
<td>21.7</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montelukast</td>
<td>0.070</td>
<td>14.3</td>
<td>0.006</td>
<td>166.7</td>
<td>8%</td>
</tr>
<tr>
<td>Omalizumab</td>
<td>0.081</td>
<td>12.3</td>
<td>0.080</td>
<td>12.5</td>
<td>50%</td>
</tr>
<tr>
<td>Immunotherapy</td>
<td>0.218</td>
<td>4.6</td>
<td>0.072</td>
<td>13.9</td>
<td>23%</td>
</tr>
</tbody>
</table>
Allergies in America Survey: Many Nasal Allergy Sufferers Are Dissatisfied With Their Current Allergy Medication

Reasons for dissatisfaction with allergy medicine

- Not Sure: 12%
- Other: 4%
- Hard to Administer: 1%
- Cost/Copay: 1%
- Not Covered: 1%
- Did Not Provide 24-Hour Relief: 10%
- Effectiveness Wore Off: 21%
- Bothersome Side Effects: 66%
- Was Not Effective: 0%

Percentage of Patients (%)

Increasing Adherence to Treatment

- Keep it simple
- Deliver it effectively
- Avoid its problems
- Call it medicine
- Provide it readily
- Review its usage
- Link it with lifestyle
- Put it in writing
- Support it psychosocially
- Minimize the cost


When to Consider Referral

- Question as to etiology of the rhinitis
- Symptoms not adequately managed
- Multiple complications or comorbidities
- Management of immunotherapy, if indicated

AR Management: 
2008 Practice Parameters

• Individualize management of AR, considering:
  – Symptom spectrum, duration, severity
  – Physical exam findings
  – Comorbidities
  – Patient age
  – Patient preferences

• Use step-up and step-down approaches
  – Step-up when therapy is inadequate
  – Step-down after symptom relief achieved or maximized


Conclusions

• Allergic Rhinitis is not a trivial condition
• It can lead to significant comorbidities and poor quality of life for the patient
• Proper management starts with a good history and physical examination
• Education, avoidance procedures, proper medication, and possibly allergen immunotherapy are the pillars of treatment
• The bottom line is no person with AR should suffer with their condition