Prevalence of Fungal Allergy in Patients with Allergic Rhinosinusitis

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June 5, 1999
Hypothesis

- Subset of patients with signs and symptoms of allergic rhinosinusitis (ARS) may have an early form of allergic fungal sinusitis (AFS).
- Initiating early immunotherapy may prevent development of classic AFS.
Objective

- Determine prevalence of hypersensitivity to fungal allergens among ARS patients using standard Skin Endpoint Titration (SET) testing
Background

- Fungal spores ubiquitous
- Subset of healthy, immunocompetent, atopic patients with ARS develop classic AFS
- Treatment of AFS requires endoscopic sinus surgery for debridement and topical/systemic corticosteroids
- Systemic antifungals not indicated
- Serious sequelae with delayed Dx/Tx
Background

- Diagnostic criteria for AFS
  - Type I hypersensitivity
  - Nasal polyposis
  - Characteristic CT/MRI findings
  - Positive fungal stain of sinus contents
  - Allergic mucin with absence of tissue invasion
Background

Pathogenesis of AFS

- Gell and Coombs Type I (IgE-mediated) and Type III (IgG-mediated) hypersensitivity
- Relative spore size (fungal spores smaller than those of pollen)
Background

- Underlying untreated component of fungal hypersensitivity in ARS patients not responding to standard Tx
- Mabry and Folker suggest immunotherapy helpful in resolution of disease
- Subset of patients with thick, inspissated mucus at operation without characteristic histopathologic findings of AFS and positive fungal allergy by SET
Background

- Spectrum of disease from ARS to AFS
Background

- Identification of ARS patients in pre-AFS stage with SET using specific fungal allergens
- Intervene with early immunotherapy to avoid development of frank AFS with its associated complications
Patient Population

- Patients at least 18 y/o with signs/symptoms of ARS
- Testing performed after oral consent
- Goal of approximately 100 patients 20-70 y/o with 20 patients per decade of life
Patient Population

Exclusion criteria

- History of anaphylaxis
- Poorly controlled asthma
- Evidence of dermatographism
- Therapy with beta-blocker medications
Material and Methods

- Prospective study
- Oral consent and IRB approval
- Testing offered in manner similar to that for routine diagnostic evaluation of any patient with ARS
- Standard SET testing with panel of fungal allergens, nonfungal allergens, and controls
Material and Methods

- Fungal allergens
  - Aspergillus
  - Curvularia
  - Fusarium
  - Mucor
  - Hormodendrum
  - Cladosporium
  - Alternaria
  - Helminthosporium
  - Pullularia
  - Epicoccum
  - Stemphyllium
  - Penicillium
Method and Materials

- Nonfungal allergens
  - Short Ragweed
  - Marsh elder
  - Timothy
  - Live oak
  - Dust mite
  - Cat
  - False Ragweed
  - Bermuda
  - Mountain cedar
  - Cockroach
  - Dog
Method and Materials

- **Controls**
  - Glycerine
  - Histamine
  - Saline
Material and Methods

- Dilution of antigens (wt/vol)
  - #6 = 1:312,500
  - #5 = 1:62,500
  - #4 = 1:12,500
  - #3 = 1:2,500
  - #2 = 1:500
  - #1 = 1:100
  - Concentrate = 1:20
Material and Methods

- Determination of endpoint in SET
  - Example 5-5-7-9
  - Example 5-7-7-7-9
  - Example 5-5-9-13
Material and Methods

- Presence and degree of hypersensitivity for each allergen noted
- Positive response determined by presence of an endpoint at any dilution from #6 to #2
- Percentage of ARS patients with hypersensitivity to fungal allergens based on these findings
Results

- 12 patients
- 3 male and 9 female
- Age range 18-57 years
- 10/12 (83%) with positive response to at least one fungal allergen
- 12/12 (100%) with positive response to at least one nonfungal allergen
- 10/12 (83%) with positive response to both
Results

Positive response to fungal allergens

- Aspergillus 7/12 58%
- Alternaria 7/11 64%
- Curvularia 6/11 55%
- Helminthosporium 4/9 44%
- Fusarium 7/12 58%
- Pullularia 7/11 64%
Results

Positive response to fungal allergens

- Mucor 5/12 42%
- Epicoccum 4/10 40%
- Hormodendrum 3/10 30%
- Stemphyllium 2/4 50%
- Cladosporium 2/3 67%
- Penicillium 1/3 33%
Results

Positive response to nonfungal allergens

- Short Ragweed 4/9 44%
- False Ragweed 1/3 33%
- Marsh elder 4/4 100%
- Bermuda 3/8 38%
- Timothy 2/4 50%
Results

Positive response to nonfungal allergens

- Mountain cedar  3/6  50%
- Live oak 3/3  100%
- Cockroach 2/2  100%
- D. pteronyssinus 11/11  100%
- Dog 1/2  50%
- Cat 2/3  67%
**Predicted Outcome/Significance**

- Substantial number of ARS patients with positive response to at least one fungal allergen
- Positive response in patients with both minimal and severe symptoms
- Challenge to establish means of identifying those at risk for development of AFS to allow early intervention