Factors Affecting the Allergic Rhinitis Response to Ragweed Allergen

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Abstract

Background: Persons with seasonal allergic rhinitis (SAR) respond to allergen re-exposure differently. This study was designed to determine influences on rate and degree of symptom development to controlled ragweed pollen exposure.

Methods: Demographics, recent exposure history to household allergens and irritants, as well as rhinoconjunctivitis quality of life questionnaire (RQLQ) data were obtained from ragweed-allergic subjects who also underwent skin prick testing to selected aeroallergens. Nasal eosinophils were counted. Subjects returned for 3-hour ragweed pollen exposure in Environmental Exposure Unit (EEU) where a Total Symptom Score (TSS) curve was generated by rating rhinoconjunctivitis symptoms 0 to 3. A mixed-effects model for repeated measures compared TSS curves between baseline factors. Results: 123 subjects completed the study. Skin test reactivity to ragweed did not correlate with TSS curve generation. Significant differences were noted at 90 min between TSS curves for subjects with positive vs. negative skin test reactivity to dust mite, dog, and grass, as well as subject self-report of symptoms upon dog, cat, and a trend with other animal exposure. The TSS curves generated in these groups showed general trends towards the entire 3 hr pollen exposure being different. Visual analogue scale ratings of SAR symptoms during both ragweed and grass seasons and RQLQ scores were also positively associated with TSS curves. No other associations were detected.

Conclusion: This study indicates a relationship between the rate and degree of symptom development to controlled ragweed exposure and immediate skin test reactivity to dust mite, animals, and grass pollen. Symptom development also correlated with self-reported symptoms to animals, seasonal grass, and ragweed, as well as rhinitis-specific quality of life. No associations were shown with late-phase response, nasal eosinophils or degree of skin test reactivity to ragweed.

Objective

• This study aimed to determine factors responsible for clinical response to controlled ragweed pollen exposure in sensitized subjects

Methods

Inclusion Criteria:
• TSS of 1 or more with ragweed skin test

Exclusion Criteria:
• Allergists monitoring subjects during the pollen exposure period

Baseline Evaluation (Screening):
• Medication/histologic results and nasal exam performed by study physician
• Skin prick testing to the following allergens:
  - short ragweed
  - long ragweed
  - Aspergillus
  - Alternaria
  - Penicillium
  - mixed trees

• Questionnaire package completed for demographic data, self-report of hay Fever season symptomatology, other allergic history (food, drugs), exposure history to other allergens/irritants, QOL scales (RQLQ, quality of life specific) & EEU (day specific)
• Nasal smears for eosinophiles
• Subject measured the presence and size of late phase reactivity at 8-12 hours

Pollen Exposure:
• Subjects attended one 3-hour session of short ragweed pollen exposure in the EEU
• Symptoms were recorded on diary cards at the beginning of the session, and every half-hour
• Study physicians monitored subjects during the pollen exposure period

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Symptom evaluation:
Subjects rated symptoms of:
• itchy nose
• sneezing
• runny nose/watery/itrieth

According to scale of:
0 = None
1 = Mild (Symptom present, but not bothersome)
2 = Moderate (Symptom bothersome, but tolerable)
3 = Severe (Symptom hand to tolerate, desiring treatment)

Scores were summed to generate a Total Symptom Score (TSS)

Results

• 140 subjects screened, 123 qualified and attended the 3-hour pollen exposure session
• mean age of subjects was 37 (range 16-69)
• 76 (61.8%) were female

Results Summary

Present study indicates SAR symptom development is increased by priming effect of perennial allergens and multiple allergen sensitivity, specifically:
• dust mite, dog, cat and grass sensitivity showed trends towards increased rate and degree of symptom development on ragweed exposure
• self-report of dog, cat, grass and ragweed exposure were associated with increased rate and degree of symptom development on ragweed exposure
• poorer rhinitis-specific quality of Life (RQLQ) was associated with an increased rate and degree of symptom development

Conclusions

Allergic symptoms to ragweed are:
Increased by:
• concomitant sensitivity and exposure to perennial allergens (dust mite, dog, cat) and grass pollen
• poorer rhinitis-specific quality of life (RQLQ)

Unaffected by:
• degree of skin test reactivity to ragweed, irritant exposure, late-phase responses or nasal eosinophils