Ocular Allergen Exposure: A Naturalistic Environmental Exposure Chamber Model versus a Direct Instillation Model

Maria J. Tort, 1 Richard Ornberg, 1 Bruno Lay, 2 Fiona Soong, 3 Anne Marie Salapatek 3

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Abstract

Background

- Environmental Exposure Chamber (EEC) testing:
  - mimics a natural environment and a typical exposure experience; however, unlike ocular allergen exposure chamber models.
  - has had an important role in the evaluation of allergic rhinitis.
  - delivers a level of allergen exposure that can maximize a patient's clinical response; however, this has facilitated research into the therapeutic effects of systemic, nasal, and ophthalmic anti-allergy medications.
  - signs and symptoms were evoked more quickly by the CAPT than by the EEC.
- Concomitant Allergen Provocation Testing (CAPT):
  - has had an important role in the evaluation of allergic conjunctivitis; and has been a mandatory test for patients with allergic rhinitis.
  - uses a concentrated liquid allergen that is instilled directly into the eye in a manner that is similar to natural allergen environments.

Purpose

This study was designed to compare CAPT versus EEC testing for the evaluation of the signs and symptoms of allergic conjunctivitis.

Methods: Subjects and Outcomes Assessment

- Subjects: 
  - n = 13 in-gross general health who had a history of allergic conjunctivitis and had not received any systemic or ocular medications prior to the study.

- Signs and symptoms were assessed on scales from 0 (none) to 4 (severe) units.

- The EEC allowed simultaneous allergen exposure to multiple subjects at once, unlike the CAPT.

- The EEC was better than the CAPT at mimicking everyday airborne allergen exposures that elicit ocular responses.

- Ongoing work will study these EEC versus CAPT models for the evaluation of ophthalmic anti-allergy medications.

Results: Hyperemia Scores Over Time

- Before exposure, hyperemia scores were low and similar between CAPT and EEC conditions.
- After exposure, the EEC and CAPT criteria induced different allergen response profiles but similar maximum hyperemia scores, representing approximately moderate itching.
- With EEC, the increase in itching was gradual, and hyperemia scores appeared to be increasing at the end of the observation period with continual allergen exposure.
- With CAPT, the itching was quickly after allergen instillation and began decreasing after 30 minutes, as allergen began to be cleared from the eyes.

- Longer than 3 hours of EEC testing might be required to observe maximum allergen-induced ocular itching and hyperemia, but 3 hours was sufficient to elicit a response with EEC that was similar to the response elicited by CAPT.

- The two models had different relative advantages and drawbacks:
  - Signs and symptoms were evoked more quickly by the CAPT than by the EEC.
  - The EEC allowed simultaneous allergen exposure to multiple subjects at once, unlike the CAPT.
  - The EEC was better than the CAPT at mimicking everyday airborne allergen exposures that elicit ocular responses.

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References and Disclosures


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