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ORIGINAL ARTICLE

Effect of cigarette smoke on counts of immunoreactive cells to eotaxin-1 and eosinophils on the nasal mucosa in young patients with perennial allergic rhinitis[☆]

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KEYWORDS

Rhinitis;
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Abstract

Introduction: In teenagers with perennial allergic rhinitis, exposure to tobacco cigarette smoke increases the count of eosinophils in the nasal mucosa the recruitment of eosinophils arises from the combined action of a number of cellular and molecular signals, including eotaxina.

Objective: To assess the effect of exposure to tobacco cigarette smoke on the count of immunoreactive cells to eotaxin-1 and eosinophils on the nasal mucosa of children and teenagers with perennial allergic rhinitis.

Methods: In a cross-sectional study, forty-four patients were evaluated (aged 7–19 years old): 22 with and 22 with no exposure to tobacco cigarette smoke. After replying to 2 validated questionnaires, on Asthma and Allergies in Childhood and on the severity of nasal symptoms, nasal mucosal samples were obtained by scraping the middle one-third of the inferior turbinates. Then counts of immunoreactive cells to eotaxin-1 and eosinophils were assessed by immunohistochemistry.

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Results: Patients with exposure to tobacco cigarette smoke showed higher cell counts of both eotaxin-1 and eosinophils than patients with no exposure to the smoke, with no correlation between the two variables. However, both counts, of eotaxin-1 and eosinophils, were related to the cotinine/creatinine ratio.

Conclusions: Exposure to tobacco cigarette smoke can increase eotaxin-1 and the count of eosinophils in the nasal mucosa of young patients with perennial allergic rhinitis.

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PALABRAS CLAVE

Rinite;
Alérgico;
Tabaco;
Quimiocina CCL11;
Eosinófilos

Efeito do tabagismo nas contagens de células imunorreativas a eotaxina-1 e eosinófilos na mucosa nasal em pacientes jovens com rinite alérgica perene

Resumo

Introdução: Em adolescentes com rinite alérgica perene, a exposição à fumaça do cigarro de tabaco aumenta a contagem de eosinófilos na mucosa nasal. O recrutamento de eosinófilos surge da ação combinada de alguns sinais celulares e moleculares, incluindo a eotaxina.

Objetivo: Avaliar o efeito da exposição à fumaça do cigarro de tabaco na contagem de células imunorreativas a eotaxina-1 e eosinófilos na mucosa nasal de crianças e adolescentes com rinite alérgica perene.

Métodos: Em um estudo transversal, quarenta e quatro pacientes foram avaliados (com idade entre 7 e 19 anos de idade): 22 com e 22 sem exposição à fumaça do cigarro de tabaco. Depois de responder a 2 questionários validados, sobre Asma e Alergias na Infância e sobre a gravidade dos sintomas nasais, as amostras de mucosa nasal foram obtidas por meio de raspagem do terço médio dos cornetos inferiores. Em seguida, as contagens de células imunorreativas para eotaxina-1 e eosinófilos foram avaliadas por imuno-histoquímica.

Resultados: Os pacientes com exposição à fumaça do cigarro de tabaco apresentaram contagens de células mais elevadas tanto para eotaxina-1 como para eosinófilos em comparação com os pacientes sem exposição à fumaça, sem correlação entre as duas variáveis. No entanto, ambas as contagens, de eotaxina-1 e eosinófilos, foram relacionadas com a razão cotinina/creatinina.

Conclusões: A exposição à fumaça do cigarro de tabaco pode aumentar a eotaxina-1 e a contagem de eosinófilos na mucosa nasal de pacientes jovens com rinite alérgica perene.

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Introduction

Allergic diseases, such as allergic asthma, allergic rhinitis and atopic dermatitis are characterized by an increased number of eosinophils in the circulating blood, and degranulation in the target tissue is considered the major pathogenic event.¹ The recruitment of eosinophils arises from the combined action of a number of cellular and molecular signals, including eotaxin.^{2,3} Eotaxin-1 binds with high affinity to CC chemokine receptor 3, which is expressed by a variety of inflammatory cells.^{4–6} Blocking eotaxin or CCR3 has been proposed as a new approach to allergy immunotherapy.^{7,8} However, more information about the interaction between the ligands and their receptors is required.

Allergic rhinitis is a common condition affecting people of all ages, with peak lifetime prevalence occurring in teenagers.⁹ It has been shown that, in adult patients with allergic rhinitis, nasal allergen challenge may lead to parallel increases of the count of eosinophils and eotaxin levels in nasal lavage fluid, with a strong correlation between the two

variables.¹⁰ In natural conditions of disease, without nasal challenge, compared with controls, eotaxin-1 concentration in nasal lavage fluid from patients with allergic rhinitis is increased in both, the perennial and seasonal forms, and it is related to the percentage of lavage eosinophils and the severity of symptom expression.¹¹

Children exposed to environmental tobacco smoke have an increased risk of developing respiratory-tract illnesses. Experiments in murine models show that tobacco smoke can elicit a rapid and prolonged exaggerated immune response.^{12,13} In humans, the effects of tobacco smoke on the upper respiratory airways include the recruitment and activation of inflammatory cells.¹⁴ In teenagers with perennial allergic rhinitis, patients exposed to tobacco cigarette smoke, compared with those with no exposure, may have an increased count of eosinophils in the nasal mucosa.¹⁵ In patients with asthma smoking increases eotaxin levels.¹⁶

The purpose of this study was to assess the influence of exposure to tobacco cigarette smoke on the counts of immunoreactive cells to eotaxin-1 and eosinophils in the

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