

Modifications of PC20 and maximal degree of airway narrowing to methacholine after pollen season in pollen sensitive asthmatic patients

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Summary

We examined the effect of cessation of exposure to pollen on non-specific airway responsiveness in 10 grass and/or parietaria pollen sensitive asthmatics. Three methacholine inhalation challenges were performed, the first during pollen season (seasonal period), the second 2 months after the end of season (short time after seasonal period), and the third 5 months after the end of season (long time after seasonal period). The dose-response curves to methacholine were characterized by the PC20 (provocative concentration of methacholine required to produce a 20% fall in FEV₁) and maximal response plateau, if possible. A maximal response plateau on the dose-response curve was considered to be present if three or more data points for FEV₁ fell within a 5% response range. The challenge was stopped when FEV₁ dropped more than 50% or the highest concentration of methacholine (200 mg/ml) was reached. The geometric mean (range) methacholine PC20 increased from 1.08 (0.18–37.22) in the seasonal period to 4.67 (0.71–200) mg/ml during the long time after seasonal period ($P < 0.01$). On the other hand, in six subjects in whom it was possible to obtain a plateau on at least one challenge, the level of the maximal response decreased from (mean $\pm$ s.e.m.) 44.1 ± 4.9 in the seasonal period to 30 ± 4.4 during the long time after seasonal period ($P < 0.05$). These results suggest that in pollen sensitive asthmatic patients, the cessation of exposure to pollen is associated with a reduction of non-specific bronchial responsiveness (PC20 and maximal degree of airway narrowing to methacholine).

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Introduction

Several studies [1–7] have shown that non-specific airway responsiveness increased during the pollen season in sensitized asthmatic patients, although other studies [8,9] have not. On the other hand, there are now several studies [10,11] showing that removal of asthmatic patients from exposure to allergens reduces the severity of non-specific bronchial responsiveness. In these studies, the bronchoconstriction induced by the pharmacological agent was measured in a dose-response fashion, and the airway responsiveness was expressed as the concentration of agonist to produce a fall of 20% in FEV₁ (PC20). At

present, there is accumulating evidence [12,13] that airway hyperresponsiveness is a more complex functional abnormality. Other indices of the dose-response curve, such as the maximal response plateau [12], is likely to be of importance in characterizing the effects of inhaled bronchoconstrictor agents. However, the effect of the reduction of natural antigenic exposure on the maximal response plateau to pharmacological agents in sensitized asthmatic subjects has not yet been studied.

In order to investigate the effect of cessation of exposure to pollen on non-specific airway responsiveness (PC20 and maximal response) of sensitized subjects, we performed methacholine inhalation challenges in 10 patients with pollen-induced asthma both during pollen season and after cessation of exposure to pollen.

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