

Occupational asthma caused by vetch (*Vicia sativa*)

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The patient of this study is a farmer who developed occupational asthma by sensitivity to vetch grain with late response to the BPT.

A 37-year-old nonsmoking male farmer with a family history of atopy has been studied at our clinic. For the last 10 years, he presented cough, wheezing, and shortness of breath 5 hours after work. The symptoms persisted at night and sometimes required emergency hospital treatment. Those symptoms began when he was exposed to vetch grains during the summer months with the harvest and during the rest of the year with the exposure to animal feed containing these legumes. He was asymptomatic when he was not working. Our patient gave informed consent, and the study was approved by the Investigation Hospital Committee.

SPTs with the standard battery of 30 antigens were negative. To make vetch extract, 5 gr of vetch grain was incubated in 25 ml of phosphate-buffered saline (pH 7.3) for 18 hours at laboratory temperature. After the solution was stirred for 90 minutes and passed through filter paper, it was filtered through Millipore filter (Millipore Corp., Bedford, Mass.) (0.22 μ m) for sterilization. The SPT with vetch extract (1:5 wt/vol) was positive with a 6 mm wheal compared to a 5 mm wheal for histamine. Intradermal tests were negative to 1/10,000 and 1/1000 dilutions. The higher concentration of 1/100 elicited a wheal of 7 mm. The patient exhibited a later reaction with a similar wheal.

None of the tested control subjects (10 nonexposed atopic subjects and 10 exposed asymptomatic individuals) demonstrated any skin reactions.

With an agar-diffusion method,¹ precipitating antibodies were found to be 1:5 wt/vol in vetch extract but not to the rest of extracts tested (mold extract, *Thermoactinomyces vulgaris*, *Micropolyspora faeni*, and storage mite extracts). Total IgE was 177 IU/ml.

Abbreviations used

BPT: Bronchial provocation test

SPT: Skin prick test

Determinations of specific IgE levels to cereal flours, storage mites, and molds were negative (Pharmacia Diagnostics, Uppsala, Sweden).

Passive transfer test (Prausnitz-Küstner) was positive with vetch extract (1/100) eliciting a 7 mm wheal after 15 minutes and 6 hours. A similar response was obtained with the heated sera (56° C for 60 minutes).

BPTs were always performed during asymptomatic periods, and the patient was not receiving any medication at the time of the study. Methacholine inhalation was performed according to the method of Cockcroft et al.² with a continuous pressurized nebulizer (model No. 646, DeVilbiss Co., Somerset, Pa.) with a fitted output of 0.280 ml/min. This demonstrated bronchial hyperreactivity with a provocative concentration causing a 20% decrease in FEV₁ values of 1.60 mg/ml.

Specific BPT was performed with the vetch extract, inhaling the allergen in progressive concentrations for 2 minutes in normal breathing volume with the same nebulizer model at 2-day intervals. A control challenge with phosphate-buffered saline was carried out before antigen challenge. The starting dilution for the inhalation test was onefold higher than the dilution that induced a wheal 5 mm larger than the negative control wheal in intradermal testing. The concentrations of the extract were increased progressively. FVC and FEV₁ were measured before and at intervals of 5, 10, 20, 30, and 60 minutes, and 2, 4, 6, 8, 10, 12, and 24 hours. A positive response was defined as a decrease of at least 20% in the FEV₁.

The inhalation of a 1/1000 dilution of the vetch extract did not cause significant changes in FEV₁. After challenge with 1/100 disolution, no immediate reaction was observed. Eight hours later the patient suffered from shortness of breath and wheezing. A drop in FEV₁ of 30% and in FVC of 15% was ob-

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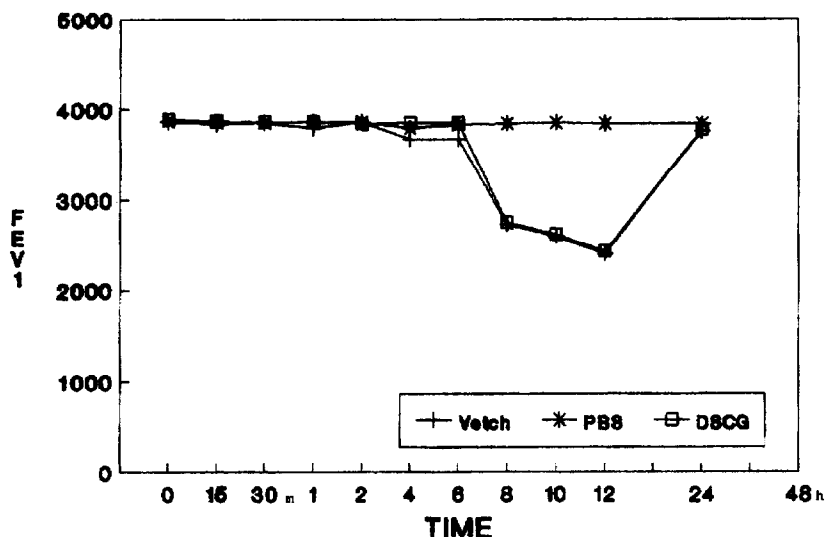


FIG. 1. Bronchial provocation test with vetch 1/100.

served, with a further decrease of 36% in FEV_1 at 12 hours. These measurements returned to baseline 24 hours later. Pretreatment with disodium chromoglycate failed to inhibit the late asthmatic response (Fig. 1).

Two nonexposed patients with asthma with similar nonspecific bronchial reactivity were also challenged with the same vetch extract; neither of these patients demonstrated any reaction to bronchial challenge to a 1/100 dilution.

Vetch is a legume of the genus *Vicia*. About 150 species are known. A few species are cultivated as fodder and cover crops and as green manure. We have only found one bibliographic reference to the bronchial asthma caused by *Lathyrus sativus* flour,³ a legume belonging also to the genus, *Vicia*. However, in this case, cutaneous testing and specific bronchial provocation induced an immediate positive reaction and not a late response, as observed in our patient. We have demonstrated an immunologic mechanism that may be implicated in the pathogenesis of this

occupational asthma. Positive SPTs provide evidence of an immediate and late response. The presence of specific IgG against vetch extract in the patient was demonstrated by agar gel diffusion methods and by the passive transfer test (Prausnitz-Küstner), positive with the heated sera. The bronchial challenge test provoked a late response not modified by pretreatment with disodium chromoglycate. To our knowledge, this is the first study to be published on occupational asthma caused by vetch and, likewise, the first case of late reaction to this genus of legume.

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