

Occupational asthma due to the inhalation of cauliflower and cabbage vapors

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Key words: Cruciferae; food allergy; occupational asthma; specific inhalation challenge; vegetables.

Cauliflower (*Brassica oleracea* var. *Botrytis*) is a popular foodstuff. It belongs to the family Cruciferae that includes other plants such as cabbage, mustard, broccoli, and rape. Allergic reactions to vegetables occur usually after ingestion or skin contact, and less commonly through the inhalative route. Asthma as a result of inhalation of aerosols from vegetables, such as potato (1), carrot (2) and green bean (3) has been reported.

We report on a 41-year-old woman, a nonsmoker, with a past history of allergic rhinoconjunctivitis because of pollen. Her job consisted in supervising the restaurant kitchen of a hotel where she had been employed for 10 years. Since 1998, she had suffered recurrent episodes of ocular and nasal itching, sneezing, watery nose, tearing, dry cough, chest tightness, and dyspnea within a few minutes after inhaling cauliflower and cabbage cooking vapors in the hotel kitchen. In 1999, 6 h after eating cabbage she suffered an acute episode of generalized urticaria, facial and oropharyngeal angioedema that was treated in

the emergency room. She had not had problems upon eating these vegetables before. She was able to eat spinaches, Swiss chard, mustard, and lettuce as well as other vegetables without any ill effects.

The patient had positive skin prick tests to tree (olive, sycamore, and cypress) and grass pollen. Skin testing with the 'prick-by-prick' method elicited positive responses to raw (4 mm) and stewed cauliflower (3 mm), cabbage (4 mm) and radish (4 mm). The results were negative to turnip, Brussels sprouts, mustard, cress, and broccoli.

Total immunoglobulin E (IgE) was 65.4 IU/ml. Determinations of specific IgE (Pharmacia CAP system, Uppsala, Sweden) were positive to cabbage (0.77 kU/l), Brussels sprouts (0.74 kU/l), broccoli (0.63 kU/l), cauliflower (0.40 kU/l), and oilseed rape (0.46 kU/l), and was negative to mustard (<0.35 kU/l). Spirometry was normal. Methacholine inhalation test showed no airway hyperresponsiveness ($PC_{20} > 16$ mg/ml). A specific inhalation challenge test was carried out with cauliflower vapors in a 7 m³ challenge chamber. The patient was exposed to the vapors coming from the

boiling of 324 g of cauliflower in a glass containing 200 ml of distilled water. The concentration of aerosolized particles was measured with an aerosol monitor (DustTrack model 8520, TSI, St Paul, MN, USA). The time of exposure to cauliflower vapor was steadily increased (1, 3, 5 and 10 min). Forced expiratory volume during the first second (FEV₁) was registered with a spirometer at baseline and thence at every 5 and 10 min after each inhalation period, and then every 10 min during an hour. Subsequently, FEV₁ and peak expiratory flow were monitored with a computerized Asthma Monitor (AM1 Jaeger, Hoechberg, Germany) every hour for the following 24 h.

After exposure to cauliflower vapors at a concentration of 0.25 mg/m³ for 10 min, the patient experienced severe rhinoconjunctivitis and an early asthmatic reaction was observed (20% drop in FEV₁ 20 min after the challenge). A 15% drop in FEV₁ was also observed 10 h after the cauliflower challenge (Fig. 1). Twenty-four hours after provocation, the methacholine inhalation test became positive ($PC_{20} = 1.41$ mg/ml). A control patient with asthma caused by toluene

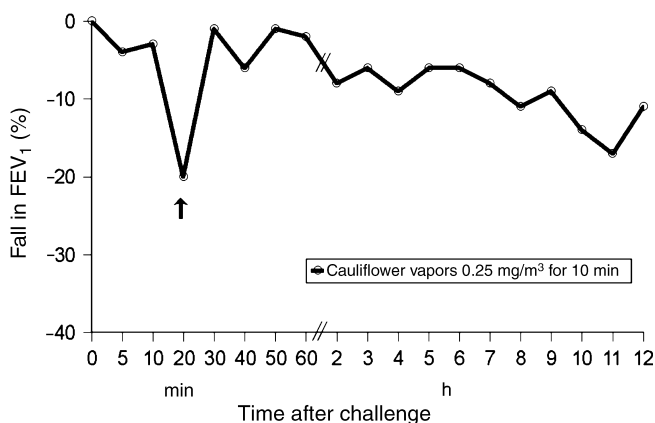


Figure 1. Exposure to cauliflower vapors elicited an early asthmatic reaction followed by a mild late asthmatic reaction. Arrow indicate inhalation of albuterol 200 µg.

diisocyanate was challenged with cauliflower vapors and showed no reaction.

Cruciferae vegetables are widely distributed. With the exception of food allergy to mustard and rape pollen hypersensitivity (4), allergic reactions to the *Brassica* genera are rarely documented. There are some reports of allergic reactions because of ingestion (5) or skin contact (6) with this family of vegetables. However, to the best of our knowledge, this is the first case report of IgE-mediated occupational asthma because of boiling vapors of cauliflower and cabbage, with associated food allergy to these vegetables.

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Occupational allergic conjunctivitis due to coconut fibre dust

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Key words: allergic conjunctivitis; coconut fibre; eosinophils; tears.

Coconut fibre is used in the manufacture of mattresses recommended as a hypoallergenic. To our knowledge, there are no published data on coconut fibre-induced occupational allergy.

We present the case of a 46-year-old nonsmoking man, who had been working for 10 years in the coconut fibre mattress factory in the exposure to coconut fibre dust. For the past 5 years, he had been suffering from conjunctivitis symptoms, occurring 20–30 min after beginning of tufting of mattress with coconut fibre. The patient reported only work-related symptoms. He claimed neither airway nor skin symptoms.

Clinical examinations, as well as routine laboratory parameters, remained normal. The total immunoglobulin E (IgE; CAP System, Pharmacia, Uppsala, Sweden) level was slightly higher (110,76 IU/ml). Skin prick tests to common allergens (Allergopharma, Hamburg, Germany) were negative.

A case confirmed by increase in eosinophil proportion in tears.

The patient was subjected to single-blind test at workplace-like conditions (handling with coconut fibre dust for 30 min) and placebo (potato flour). At the 15-min of test with coconut fibre, clinical symptoms of allergic conjunctivitis were observed. These symptoms persisted till 24 h after the provocation. It is surprising, but the other symptoms (including rhinitis) were not observed. Tear fluid was obtained 10 min before and 1, 6 and 24 h after the challenge with using capillary. The workplace test induced cellular changes in tear fluid. The increase in eosinophil proportion, from 1% before, up to 10% at 1 h, 6% at 6 h and 10% at 24 h were observed (Fig. 1). Test with placebo did not cause any clinical changes or changes in eosinophil proportion in tears.

The reason for recognition of coconut fibre dust-induced occupational allergic conjunctivitis in this patient was the clinical response during specific challenge test accompanied by changes in tear fluid. The conjunctival provocation test is approved model of ocular allergy (1–3), but our case confirmed that assessment of inflammatory cells in tears during test at workplace-like conditions might be also the valuable diagnostic procedure.

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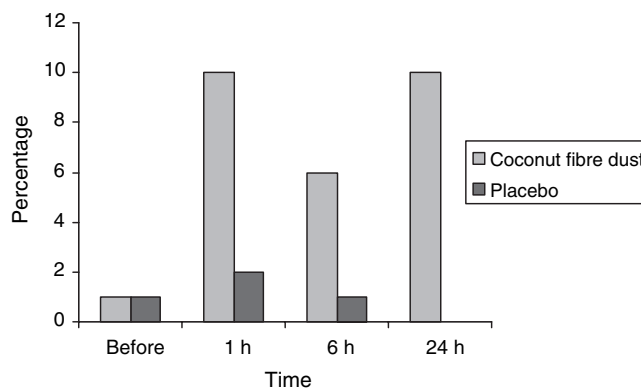


Figure 1. The proportion of eosinophils in tears after challenge tests.