

compare the duration of the bronchodilator and blocking agents on bronchial responsiveness in subjects with asthma assessed on two occasions because it can be postulated that the duration of the blocking effect can be longer than the bronchodilator effect. Discrepancies between the bronchodilator and the bronchoprotective effects can be related to the number of available β_2 -receptors.

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Papain-induced allergic rhinoconjunctivitis in a cosmetologist

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Papain is a proteolytic enzyme extracted from the sap of the papaya tree and fruits (*Carica papaya*). Papain has been widely used in medicine as a digestive, in treatment of insect and jelly-fish stings, in intradiscal therapy of lumbar disc protrusions, and in debridement of ulcers and necrotic tissue. Papain can be found in digestive aids, douche powders, meat tenderizers, and in beer chill-proofing agents. Additionally, papain

Abbreviation used
SPT: Skin prick test

can be used in tanning of skins and hides, in chewing gum manufacture, and in caroid tooth powder.¹

Papain is highly immunogenic in both human beings and animals. Papain has caused allergic asthma, rhinitis, and even a case of lethal anaphylaxis.¹⁻⁴ Here we report the first case of papain-induced hypersensitivity associated with cosmetics in a beauty salon worker after use of abrasive cream containing papain on her clients.

CASE REPORT

The patient, a 30-year-old nonatopic woman, had been the owner of a beauty salon for 5 years. The patient had used an abrasive cream, which was prepared by mixing two powders into a moisturizing cream (Piana Cosmetici, Bologna, Italy). One powder in-

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cluded talc, bentonite, iron oxide, and papain; the other included corn meal, barley flour, almond meal, and wheat bran.

One year after the patient had opened the beauty salon, she experienced conjunctival irritation, rhinorrhea, and itching of nose. At the beginning the symptoms were mild and occurred only during the working hours and disappeared during the weekends and while she was on vacation. Clinical examination in January 1991 revealed conjunctival injection and edematous nasal turbinates. Results of chest auscultation and examination of skin were normal. Eosinophils and mast cells could be detected in her nasal cytologic specimens. The total serum IgE level was 187 IU/ml. Specific IgE to papain was 52.5 kU/ml (RAST test; Pharmacia Diagnostics, Uppsala, Sweden).

Skin prick test (SPT) results with wheat flour were weakly positive, whereas barley, corn, almond, talc, bentonite, iron oxide, and the common aeroallergens in SPT produced no reactions. Results of SPTs with papain (Fluka Chemie AG, Buchs, Switzerland) diluted from 10 to 0.01 mg/ml were positive. Nasal challenge was performed by inserting a small piece of cotton moistened with either 100 ml of sterile saline solution (as placebo) or papain (1 mg/ml) in the nasal cavity between the inferior turbinate and the septum. The response was monitored with anterior rhinoscopy and active anterior rhinomanometry. No change in the nasal challenge was detected with the placebo. After the challenge with papain, the patient experienced itching in the nose. Several sneezes, runny nose, and congestion of nasal turbinates were detected by means of anterior rhinoscopy. Rhinomanometry revealed an increase of more than four times in nasal resistance.

After the clinical examination, the patient was asked to avoid the abrasive cream. The symptoms disappeared after she ceased to use the cosmetic on her clients.

DISCUSSION

Abrasive creams with proteolytic enzymes have been used by cosmetologists in treatments to remove cell debris from the epidermis of the face. To achieve the creamy form of the abrasive cream, two powders had to be mixed with a moisturizing cream in the present case. The patient mixed the powders in a small room where there was no artificial ventilation. Thus the concentration of dust particles and papain in the breathing zone was obviously high. In earlier studies the concentration of papain, rather than the length of the exposure, has been the most important factor in the development of clinical symptoms.⁵ In this case the patient had been irregularly exposed to papain one or two

times weekly for 5 to 10 minutes each time during a few months before she noticed the symptoms.

The clinical diagnosis of occupational rhinoconjunctivitis in this case was based on typical symptoms after the papain exposure, clinical findings, positive SPT, papain-specific IgE, and nasal challenge results. The patient never had signs of bronchial obstruction, shortness of breath, dyspnea, or coughing at work.

Papain is a widely used enzyme in medicine, industry, and research, and according to the literature it is a potent allergen, which can cause different allergic diseases, even a lethal form of asthma, both in occupational and domestic settings. According to previous studies 17 of 33 workers exposed to airborne papain at work experienced asthmatic symptoms, and the incidence of IgE-mediated sensitivity was 34.5% among the same group of workers. At a pharmaceutical plant that manufactures a product containing papain, 12 of 23 workers had asthmatic symptoms.^{1, 5}

According to the previous findings, we can conclude that papain has to be added to the skin testing panels when clinical suspicion of papain allergy exists. Further studies are needed, however, to characterize the antigenic features of papain and the pathogenesis of different disorders caused by this enzyme. Although in this case the symptoms occurred in a beautician, there is a risk that hypersensitivity will develop in clients on whom the proteolytic enzyme treatment is performed.

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