

Case report

Respiratory allergy and atopic eczema in a thatcher due to storage and house dust mite allergy

Vieluf D, Przybilla B, Baur X, Ring J. Respiratory allergy and atopic eczema in a thatcher due to storage and house dust mite allergy. Allergy 1993; 48: 212-214. © Munksgaard 1993.

D. Vieluf¹, B. Przybilla², X. Baur³, J. Ring¹

¹ Departments of Dermatology, University of Hamburg, ² Dermatology, Ludwig-Maximilians-University Munich, and ³ Pneumology Ruhr-University, Bochum, Germany

Dr. Dieter Vieluf
Department of Dermatology
University of Hamburg
Martinistr. 52
D-2000 Hamburg 20, Germany

Accepted for publication 3 March 1992

Whereas the concept of house dust mite allergy is well established, not many allergists are aware of the growing problem of storage mite allergy, which may also be an important occupational disease, e.g. in farmers, agricultural related jobs, grain handlers, bakers, and food industry and kitchen personnel (2, 5, 11, 15, 17, 21, 22). To illustrate the need to include storage mites in standard allergy diagnosis, we report the case of a thatcher suffering from allergic rhinoconjunctivitis, extrinsic allergic bronchial asthma, and atopic eczema, possibly aggravated by storage and house mite allergy.

Case history

The 32-year-old male patient, who was working as a thatcher, had suffered from atopic eczema since early childhood. Since the age of 17 years, he had a history of perennial rhinoconjunctivitis and bronchial asthma. The patient reported significant aggravation of his complaints, especially a flare up of atopic eczema and exacerbation of bronchial asthma, after occupational exposure or contact with his working materials, straw and straw dust.

Erythematous patches, with ill-defined margins, papules and partly lichenified and excoriated plaques, were found on the trunk and extremities, particularly

the flexures, and on the face and neck. There were several typical signs of atopy, such as dry skin, Dennie-Morgan's infraorbital fold, palmar hyperlinenarity and white dermographism.

Prick tests with a standard series of aeroallergens yielded strongly positive reactions (+ + + +) to *D. pter.*, *D. farinae*, *Acarus siro*, *Glycyphagus destructor*, cat dander and other aeroallergens. Patch tests with a standard series of the International Contact Dermatitis Research Group showed a contact allergy to wool-wax-alcohols.

The "atopy patch test" (i.e. epicutaneous application of aero- and food allergens known to elicit IgE-mediated reactions and evaluation of eczematous skin changes after 48 and 72 h) (20) with house dust mite, grass pollen and cat dander showed typical eczematous skin lesions to *D. farinae* and grass pollen after 72 h.

Total serum IgE was 21 300 kU/l. RAST was positive to *D. pter.*, *D. farinae*, *Acarus siro*, cat dander, grass pollen (class 4), *G. domesticus* (class 3), *G. destructor* and *T. putrescentiae* (class 2) as well as several other aeroallergens.

The bronchial provocation test with acetylcholine showed a marked bronchial hyperreactivity without late phase reaction. There was no evidence of an extrinsic allergic alveolitis.

Treatment

Allergen avoidance. The patient was advised to reduce mite exposure, especially during work. This was possible since the patient was independent and therefore able to delegate the work associated with extreme exposure to straw and straw dust.

Pharmacotherapy. Treatment with inhaled β_2 -mimetics, cromoglycate, beclometasone and oral ketotifen for respiratory symptoms, as well as topical glucocorticosteroids and water in oil emollients for the skin, led to an impressive amelioration of the patient's complaints.

Immunotherapy. The test results and the clear-cut history, with unequivocal exacerbation of both skin and respiratory symptoms during increased dust exposure, especially at work, and the impossibility of satisfactory allergen avoidance, indicated a specific hyposensitization. Due to the severity of the eczematous skin lesions and to avoid further exacerbation of the eczema, immunotherapy was started as oral hyposensitization using "SDL-oral" (*D. pter.*, *D. farinae*, *Acarus siro* and *Glycyphagus domesticus*) (Bencard-Beecham, Neuß) in increasing doses. This therapy was well tolerated; however, the dosage was occasionally reduced and slowly increased again due to an exacerbation of respiratory or skin symptoms.

Discussion

This case illustrates the importance of storage mites in the diagnosis of not only respiratory allergic disease but also atopic eczema. It may well be that other factors, including irritants during work, are also involved in these exacerbations. There is, so far, no routine provocation test for atopic eczema. The epicutaneous application of aeroallergens which lead to eczematous skin changes, "atopy patch test" (20) may be such an instrument; however, at the moment, this procedure has not been standardized for routine purposes (1, 3, 4, 8, 14, 20). The use of hyposensitization in atopic eczema is rather controversial. Severe exacerbations from increasing dose levels with subcutaneous immunotherapy have led some authors to regard AE as contraindication (16). However, there are studies showing a clear-cut benefit for the eczematous skin lesions (19). In our own experience (unpublished), oral hyposensitization was effective and well tolerated in a number of patients with AE.

The case also shows that storage mite allergy is not restricted to the farming population. Recent data seem to indicate that storage mites may be the major cause of allergic sensitization in people working or living close to the agricultural environment (farmers,

agricultural related jobs, mill workers) and other occupations. In some countries, as much as 13% of the population work in farming and associated jobs (2, 11, 17, 18, 21).

In most of these occupations, exposure to other allergens may also be relevant for the patient's complaints, especially house dust mites, molds and animal dander. The possibility of polyvalent sensitization to different aeroallergens exists. Therefore, the usual diagnostic procedures (case history, skin test, *in vitro* diagnostics, provocation tests) should include all of them. There seems to be little cross-reactivity between house dust and storage mite allergens. The different storage mites produce a group of related antigens which are, however, distinct from house dust mite allergens (7, 12, 22, 26).

The storage mites are Acari, a subgroup of Arachnoidea (Table 1). About 30 000 different species of Acari can be distinguished (15, 16). Recent investigations in Scandinavia (10, 11, 12, 17, 21), the United Kingdom (6), France (9), and South-East Asia (26) as well as Canada (24) show that the most important and frequent species in agricultural buildings are Acaridae such as *Acarus siro* and *Tyrophagus putrescentiae*, Glycyphagidae, especially *Glycyphagus destructor*, and *G. domesticus*, as well as Cheyletidae like *Cheyletus eruditus*. The frequency of storage mites in house dust is normally small compared to the Pyroglyphid mites *D. pter.* and *D. farinae*. Storage mites develop most rapidly at high relative humidity (about 80%) or in materials of high moisture content, conditions which are less favorable for the growth of Pyroglyphid mites. Storage mites are extremely vulnerable to dry conditions. The majority of these mites can be detected between October and March. They are important allergens for people living and working in very damp environments, where the growth of molds may encourage the development of storage mites. Thus, storage mites occur predominantly in farm storages, barns, food

Table 1. Arachnoidea (according to Krantz)

Acari	
A. Parasitiformes	
1. Gamasida – Dermanyssidae – Dermanyssidae (e.g. <i>Dermanyssus gallinae</i>)	
2. Ixodida – Ixodidae (e.g. <i>Ixodes ricinus</i>)	
B. Acariformes	
1. Actinidea	– Cheyletoidea – Cheyletidae (e.g. <i>Cheyletus eruditus</i>)
(Trombidiformes)	– Demodicidae (e.g. <i>Demodex folliculorum</i>)
	– Trombidioidea – Trombiculidae (e.g. <i>Trombicula autumnalis</i>)
2. Acaridida	– Acaroides – Acaridae (e.g. <i>Acarus siro</i> , <i>Tyrophagus</i>)
(Sarcoptiformes)	– Glycyphagidae (e.g. <i>Glycyphagus domesticus</i> , <i>Glycyphagus destructor</i>)
	– Sarcoptidae – Sarcoptidae (e.g. <i>Sarcoptes scabiei</i>)
	– Psoroptoidea – Pyroglyphidae (e.g. <i>Dermatophagoides pteronyssinus</i> , <i>D. farinae</i> , <i>Euroglyphus maynei</i>)

stores with flour, grain, dried fruits and milk products, house dust (e.g. in farmhouses) and food or bedding of cattle or domestic pets. Insects, rodents, birds and humans are of great importance in the relocation of acariform populations to new areas (5, 6, 10, 17, 18, 24, 25).

If further epidemiological studies support the data of a study by van Hage-Hamsten et al. that storage mites are the most important cause of type I allergies in farmers (22), storage mite allergy is of great socio-economic importance. In our patient, exposure to storage mites in straw dust clearly aggravated not only asthma but also preexisting atopic eczema.

References

- ADINOFF AD, TELLEZ P, CLARK F. Atopic dermatitis and aeroallergen contact sensitivity. *J Allergy Clin Immunol* 1988; 81: 736–42.
- BLANEY AD, TOPPING MD, OLLIER S, DAVIES RI. Allergic respiratory disease in grain workers: The role of storage mites. *J Allergy Clin Immunol* 1989; 84: 196–203.
- BRUYZEL-KOONEN CAFM. Patch test reactions to aeroallergens; a working model for the pathogenesis of atopic dermatitis. Dissertation, University of Utrecht, 1989.
- CLARK RAF, ADINOFF AD. Aeroallergen contact can exacerbate atopic dermatitis: Patch tests as a diagnostic tool. *J Am Acad Dermatol* 1989; 21: 863–9.
- CUTHBERT OD, BROSTOFF J, WRAITH DG, BRIGHTON WO. "Barn allergy": asthma and rhinitis due to storage mites. *Clin Allergy* 1979; 9: 229–36.
- EATON KK, DOWNING PS, GRIFFITHS OA, LYNCH S, HOCKLAND S, MCNULTY DW. Storage mites: culturing, sampling technique, identification and their role in house dust allergy in rural areas in the United Kingdom. *Ann Allergy* 1985; 55: 62–7.
- GRUFFEN P, FORD AW, ALTERMAN L, et al. Allergenic and antigenic relationship between three species of storage mite and the house dust mite, *Dermatophagoides pteronyssinus*. *J Allergy Clin Immunol* 1989; 84: 108–17.
- GONDO A, SAKI N, TOKUDA Y. Challenge reactions in atopic dermatitis after percutaneous entry of mite antigen. *Br J Dermatol* 1986; 115: 485–93.
- HARDEL PJ, DE LAJUDIE JP, PORTAL B, VILLE G, GUILLOUX L, D'ATHIS P. L'allergie à *Tyrophagus putrescentiae* et à *Lépidoglyphus destructor* dans une population d'adultes jeunes asthmatiques. *Allergie Immunol* 1986; 18: 25–32.
- HILLERDAL G, ZETTERSTRÖM O, JOHANSSON SGO, ENGSTRÖM B, WIRÉN A. Mites living in hay: an important allergy source? *Allergy* 1982; 37: 475–9.
- IVERSEN M, KORSGAARD J, HALLAS T, DAHL R. Mite allergy and exposure to storage mites and house dust mites in farmers. *Clin Exp Allergy* 1990; 20: 211–19.
- KORSGAARD J, DAHL R, IVERSEN M, HALLAS T. Storage mites as a cause of bronchial asthma in Denmark. *Allergol Immunopathol* 1985; 13: 143–9.
- KRANTZ GW. The biology and ecology of granary mites of the Pacific northwest. I. Ecological considerations. *Ann Entomol Soc Am* 1961; 54: 169–74.
- LANGELAND T, BRAATHEN LB, BORCH M. Studies of atopic patch tests. *Acta Derm Venereol (Stockh)* 1989; Suppl. 144: 105–9.
- MUMCUOGLU Y. Dermatologische Entomologie. In: MUMCUOGLU Y, RUFLI TH, eds. Beiträge zur Dermatologie. Vol. 9. Erlangen: Perimed-Fachbuch-Verlagsgesellschaft, 1982.
- MIDDELTON E, REED CE, ELLIS EF, eds. *Allergy. Principles and practice*. 3rd ed. St. Louis: Mosby, 1988.
- REVSBECH P, ANDERSEN G. Storage mite allergy among grain elevator workers. *Allergy* 1987; 42: 423–9.
- REVSBECH P, DUEHOLM M. Storage mite allergy among bakers. *Allergy* 1990; 45: 204–8.
- RING J. Successful hyposensitization treatment in atopic dermatitis: result of a trial in monozygotic twins. *Br J Dermatol* 1982; 107: 597–602.
- RING J, KUNZ B, BIEBER T, VIELUF D, PRZYBILLA B. The "atopy patch test" with aeroallergens in atopic eczema. *J Allergy Clin Immunol* 1989; 83: 195.
- VAN HAGE-HAMSTEN M, JOHANSSON SGO, HÖGLAND S, TÖLL P, WIRÉN A, ZETTERSTRÖM O. Storage mite allergy is common in a farming population. *Clin Allergy* 1985; 15: 555–64.
- VAN HAGE-HAMSTEN M, JOHANSSON SGO, JOHANSSON E, WIRÉN A. Lack of allergenic cross-reactivity between storage mites and *Dermatophagoides pteronyssinus*. *Clin Allergy* 1987; 17: 23–31.
- VIELUF D, PRZYBILLA B, RING J. Storage mite allergy – an important allergic occupational disease? *N E R Allergy Proc* 1988; 9: 294.
- WARREN CPW, HOLFORD-STREVS V, SINHA RN. Sensitization in a grain handler to the storage mite *Lepidoglyphus destructor*. *Ann Allergy* 1985; 56: 23–6.
- WOODLOCK AA, CUNNINGTON AM. The allergenic importance of house dust and storage mites in asthmatics in Brunei, S.E. Asia. *Clin Allergy* 1980; 10: 609–15.
- WRAITH DG, CUNNINGTON AM, SEYMOUR WM. The role and allergic importance of storage mites in house dust and other environments. *Clin Allergy* 1979; 9: 554–61.

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.