

From the Institute of Hygiene, Department of Occupational Medicine,
Bucuresti, Romania.

WEAVERS' ASTHMA

By

L. PILAT, V. POPA, D. STĂNESCU & D. TECULESCU

In the etiology of weavers' occupational asthma, there have been incriminated many components of the textile airborne dust *i.e.* the textile fibre itself (2, 4, 5, 6) and its natural contaminants—bacteria and fungi (1, 3, 7).

The present work started from a fortuitous observation. During routine skin tests performed on an asthmatic weaver, it was noticed that the mixed animal inhalants (A₂, "Bencard"¹) elicited a strongly positive reaction. On separating the mixed allergen into its components, it appeared that rabbit fur was responsible for the positive reaction. At the beginning, the patient denied any contact with the rabbit, but later he remembered he had worked for 5 years, some 30 years ago at a weaving-loom having a small piece of rabbit fur included in the shuttle, in order to fix the textile fibres. Although this weaver's asthma, as was subsequently demonstrated by inhalation tests, was not induced by rabbit fur,—the positive skin reaction reflecting simply a latent allergy—, we decided to study weavers' allergy to animal hair and dander.

CASE MATERIAL AND METHODES

All the weavers attending the allergy in—and out—patient department of the Clinic for Occupational Diseases were asked about the presence of animal fur in their shuttle. In this study, we retained only those who had worked with such shuttles and who could produce an official confirmation of this fact from

¹ All allergens referred to throughout this article are "Bencard" allergens, if not otherwise mentioned.

the mill. In all, there were 11 weavers satisfying the above conditions, a relatively small group due to the criteria we adhered to.

The standard clinical and functional investigation methods used to assess a bronchial asthma patient were used: 1) the patient's history—the relation of the asthma attacks with the occupational environment being particularly stressed—, 2) a full clinical examination, 3) skin tests with the allergens suggested by the patient's history as well as compulsory skin tests with bacteria, fungi, textile fibres¹, animal fur and dander, 4) Inhalation test with a 1 per cent acetylcholine solution (2), 5) provocative inhalation tests with the allergens giving a positive skin reaction and substantiated by the patient's history. All subjects had to perform inhalation tests with the textile fibres handled and the animal hair included in their own shuttle. We also used a special provocative inhalation test performed at work, intending to make clearer the occasional bronchospastic effect of the occupational environment. The subject stayed 3 to 4 hours in his own work place (without working); before and after exposure to the occupational dust, he performed a F.E.V._{1.0} and a V.C. The F.E.V._{1.0} and V.C. were performed as usual (2, 4). The inhalation tests were considered as positive when F.E.V._{1.0} diminished by at least 10 per cent of its pre-test value and the patient had dyspnoea and wheezing.

RESULTS

Table 1 summarises our results. The allergic diseases of the eleven weavers fall into four groups.

Group A: Occupational asthma by sensitisation to the animal hair included in the shuttle.

1) All patients had a clear-cut history of bronchial asthma, the attacks occurring only at work. 2) The diagnosis of bronchial asthma was confirmed by examining the patients during an asthma attack. 3) The skin tests with the textile fibre handled by the weaver and the animal hair contained in the shuttle were always positive. Bacteria and house dust also, sometimes gave positive reactions. 4) The low bronchospastic threshold of the asthmatic patient was supported by the positive acetylcholine test; one patient refused to cooperate for this test but she performed correctly the other inhalation tests. 5) The provocative inhalation tests were positive for animal hair and, with one exception, negative for textile fibres; inhalation tests with other commune respiratory allergens were also negative. One

¹ Textile fibre extracts were prepared in the Rumanian Institute of Hygiene and Public Health and used in parallel with the Bencard textile allergens.

weaver was sensitised both to textile fibres and animal hair. The respiratory test performed at work was only once positive.

Group B: Occupational asthma by sensitisation to the textile fibres. The patients' history and the skin tests of this group, as well as the acetylcholine inhalation test and the respiratory test at work were quite similar to group A. The weavers of this group differ only from the above four weavers in that the inhalation tests were positive for textile fibres and negative for animal hair.

Group C: Consists of only two subjects: it illustrates the non occupational aetiology of the weavers' asthma. The patients gave a history of house dust sensitisation, correlated with positive skin and inhalation tests to house dust. There was no skin reaction to animal hair, and the textile fibres elicited in one patient a positive cutaneous test with a negative response to inhalation (latent allergy). One patient has had specific desensitisation to house dust, and is much better.

Group D: Occupational urticaria by sensitisation to animal hair. One patient experienced generalised urticaria only at work. While on medical leave and with no urticarial eruption, she was skin-tested with several allergens, including rabbit fur. The rabbit fur, house dust and bacterial antigens gave strong immediate positive reactions; two hours after the tests were finished, she developed a generalised urticarial eruption which lasted some hours. Two days later, we tested her only with rabbit fur; the wheal of the local reaction was soon accompanied by an urticaria involving the limbs and the trunk; the eruption subsided one hour later. She changed her work place and the urticaria never recurred.

DISCUSSION

The animal hair contained in the shuttle of weaving looms is responsible sometimes for occupational asthma or urticaria of some weavers. We think this new etiological aspect is important since: 1) In spite of negative inhalation tests with textile allergens, a diagnosis of occupational allergy can be made.

TABLE
The Allergic Diseases and their Etiology in 11

	Patient and allergic disease	Sex	Age	Length of employment to onset of symptoms (years)	Textile fibre woven	Animal hair included in the shuttle
1.	D. I. asthma	♀	28	3	silk, cotton, rayon	rabbit fur
2.	G. F. asthma	♀	37	13	silk, rayon	cat fur
3.	S. C. asthma	♀	40	22	cotton, hemp, flax	rabbit fur cat fur
4.	S. M. asthma	♂	35	10	cotton	rabbit fur cat fur
5.	C. A. asthma	♂	55	41	cotton	rabbit fur
6.	C. M. asthma	♀	40	15	cotton, flax	cat fur (occasionally)
7.	G. S. asthma	♀	38	11	flax, hemp	horse hair rabbit fur
8.	C. A. asthma	♀	41	10	cotton	cat fur
9.	S. E. asthma	♀	34	13	cotton, flax, hemp	horse hair

Feavers Using Shuttles with Animal Hair.

Positive skin tests			Inhalation tests				
Textile fibre	Animal hair	Other allergens	Acetylcholine	Textile fibre	Animal fur	Respiratory test performed at work	Others
cotton silk	rabbit	house dust	uninterpretable	negative: cotton silk	positive	negative	negative: house dust
negative	cat	negative	positive	negative	positive	positive	negative
cotton hemp flax	rabbit	bacteria	positive	negative	positive: rabbit	not performed	negative
cotton	rabbit cat	bacteria house dust	positive	positive	positive: cat negative: rabbit	negative	negative: bacteria house dust
cotton	rabbit	house dust	positive	positive	negative	negative	negative: house dust
cotton flax	negative	negative	positive	positive: flax	negative	positive	negative: cotton
flax hemp	horse rabbit	house dust	positive	positive: hemp negative: flax	negative	positive	negative: house dust
cotton antigens	cat	bacteria house dust	positive	positive: cotton	negative	negative	negative: house dust
cotton flax hemp	horse	house dust	positive	negative: mixed textile allergen	negative	positive	positive: house dust

	Patient and allergic disease	Sex	Age	Length of employment to onset of symptoms (years)	Textile fibre woven	Animal hair included in the shuttle
10.	T. A. asthma	♀	38	4	cotton	horse hair
11.	M. E. urticaria	♀	32	12	cotton, rayon	rabbit, fur

The occupational character of a disease has serious financial implications for the patient. 2) Therapeutically the avoidance of the animal allergen could be completed by specific desensitisation. The results of such therapy are much better than allergen elimination policy alone, because sometimes it may be ineffective (it is impossible to avoid every contact with such animals as cats, horses, etc.).

Provocative inhalation tests are invaluable in the diagnosis of the occupational allergy, since in these patients, provocative inhalation tests were the only tests able to discriminate bronchial allergen from the numerous allergens giving positive skin reactions. The results of the provocation test at work are difficult to interpret when the allergen is also an irritant (as it is the case with textile fibres—2—), when the airborne particles of the allergen are in a very low concentration (in the shuttle

(cont.)

Positive skin tests			Inhalation tests				
Textile fibre	Animal hair	Other allergens	Acetylcholine	Textile fibre	Animal fur	Respiratory test performed at work	Others
negative	negative	bacteria house dust	not performed	not performed	not performed	not performed	positive: house dust negative: bacteria
cotton	rabbit (urticaria elicited during skin testing with rabbit fur)	not performed	not performed	not performed	not performed	not performed	not performed

there is only a small piece of fur) and finally when the test is not performed at work.

The present paper emphasises also the great allergenic potential of animal hairs, even in small concentrations.

For efficient prophylaxis, the animal fur in the shuttles should be replaced by non allergenic synthetic fibres.

SUMMARY

Four cases of occupational asthma in weavers, induced by the animal hair contained in the shuttle are reported. These cases of asthma should be distinguished from others of similar occupational character but resulting from sensitisation to textile fibres (4 cases reported) and from nonoccupational asthma (two cases). The patients' history and the skin tests do not

help in the differential etiological diagnosis of occupational asthma; inhalation tests are the only valuable tests for this purpose. The allergenic importance of the fur included in the shuttle, is further exemplified by a case of occupational urticaria by sensitisation to such a fur.

REFERENCES

1. *Collis, E. L. cit. in Hunter, D.:* The diseases of occupations, Little Brown & Co., Boston, 1962.
2. *Gavrilesco, N., Popa, V., Teculescu, D. & Preda, N.:* Studii asupra patogeniei îmbolnăvirilor astmatiforme la textiliști - *Simpozionul de astm bronșic*, Bucurest, 1963.
3. *Murray, R., Dingwall-Fordyce, I. & Lane, R.:* An outbreak of weaver's cough associated with tamarind seed powder. *Brit. J. Industr. Med.* 14, 105-112, 1957.
4. *Pasteur Vallery-Radot, Wolfrohm, R., Charpin, J. & Halpern, B.:* Maladies allergiques, Flammarion, Paris, 1963.
5. *Preda, N., Popa, V. & Teculescu, D.:* Imbolnavirile respiratorii ale textiliștilor. *Simpozionul de astm bronșic*, Bucharest, 1963.
6. *Sheldon, J., Lowell, R. & Mathews, K.:* A manual of clinical allergy W. B. Saunders, Philadelphia and London, 1953.
7. *Vigliani, E., Parmeggiani, L. & Sassi, C.:* Studio di un epidemia di bronchite asmatica fra gli operai di una tessitura di cotone *Med. d. Lavoro* 45, 349-378, 1954.

Dr. L. Pilat,
Spital Colentina,
Sos. Stefan cel Mare 89,
Clinica Boli Profesionale,
Bucuresti, Rumania.

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.