

Environmental factors in the first months of life and the possible relationship to later development of hypersensitivity

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The results of skin prick test (SPT) with common aeroallergens (in 870 severely asthmatic children, average age at testing 8.1 years) were analysed and compared with the results of a questionnaire about pets and smoking habits in the children's homes during the first 6 months of life. The study indicates a possible correlation between early massive exposure to certain allergens (cat, timothy) and later development of hypersensitivity. No conclusion can be drawn about a possible role of tobacco-smoking.

Key words: allergen; children; environmental factors; hypersensitivity; tobacco smoke. .

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Allergen exposure and environmental tobacco smoke are thought to be important factors for the development of hypersensitivity in genetically predisposed children. The results of several studies suggest that children are particularly vulnerable to sensitization through allergen exposure during the first months of life (2, 5, 6, 7). It has also been suggested that environmental tobacco smoke in the home of the child increases the risk of development of hypersensitivity (4).

MATERIAL AND METHODS

Data were collected retrospectively from the records of 870 children with bronchial asthma, usually severe, admitted to our clinic, Voksentoppen, during the period 1971-1986. Our clinic serves as a national centre for children with severe atopic diseases and chronic chest diseases. All the children included in this study suffered from asthma, usually of severe degree.

At an age of 2-15 years (average 8.1) the patients had been tested at our clinic for immediate skin reactivity to one or more of the following aeroallergens: dog and cat danders, timothy and birch pollens. The results were

compared with information on a questionnaire sent to the children's parents during spring 1987, containing questions about dog- and cat-keeping as well as smoking habits in the home during the children's first 6 months of life, and the presence of atopic airway disease in the parents. 689 (79 %) of the questionnaires were answered.

Skin tests were performed with the skin prick test method (SPT) (1). Pet dander extracts were bought from Nyegaard & Co (Nycomed) and Allergologisk Laboratorium (ALK) in concentrations corresponding to 1-5 HEP in SPT. Pollen extracts were from Nycomed, Pharmacia and ALK. A cutaneous reaction ++, half the size of the histamine reference wheal, was considered significant for all allergens.

Statistical method: A two-sided exact Fisher-Erwin test was used, with a 5 % significant level.

Definitions

Airway atopic parents: Parents who answer in the affirmative to whether one or both have allergic rhinitis and/or bronchial asthma.

Table 1

Immediate skin reactivity in relation to cat- or dog-keeping in the child's home during the first 6 months of life

A) SPT reactivity to dog dander in children from dog-keeping homes

Dog-keeping in the home	No. children tested	No. SPT positive children (%)
Yes	100	55 (55.0)
No	553	276 (49.9)

No significant correlation.

B) SPT reactivity to cat dander in children from cat-keeping homes

Cat-keeping in the home	No. of children tested	No. SPT positive children (%)
Yes	63	40 (63.5)
No	578	342 (59.1)

No significant correlation.

RESULTS

Allergen exposure in the home during the child's first 6 months of life

Dog- or cat-keeping was not significantly correlated to immediate skin reactivity to dog- or cat dander some years later (Table 1).

Taking separately the children of parents with airway atopy, however, cat-keeping in the child's home was found to be significantly correlated to immediate skin reactivity to cat dander. A similar relation was not found for dog dander (Table 2).

Exposure to pollens in the first months of life

Children born during the pollen season or the 4 months previous to it were found to have immediate skin reactivity to pollen more often than children born at other times of the year. This correlation was statistically significant for timothy pollen (Table 3), but not for birch pollen.

Tobacco smoking in the child's home during the first 6 months of life

Smoking habits in the home during the first 6 months of the child's life were not significantly

correlated to presence of immediate skin reactivity to dog- and cat-dander later in childhood in children from dog- or cat-keeping homes.

DISCUSSION

A significant correlation between month of birth and hypersensitivity to timothy or birch pollen is found in some (2, 3, 5, 7), but not in other studies (4).

A significant correlation between domestic exposure to dog dander in the first months of life and a later hypersensitivity was found in unselected asthmatic children by Vanto & Koivikko (8). Suoniemi et al. (7) found a similar correlation for cat dander, but not dog dander, in unselected adolescents, as was found also in children of airway atopic parents in this study.

The relation between possible risk factors was not found to confound the results; no significant correlations were found between smoking habits at home and atopic airway disease in parents or pet-keeping.

This study is retrospective and the information from the records and questionnaires may be inexact. This applies, for example, to questions about parents' smoking habits at the time the child was born, on average 15.2 years ago. People may forget or conceal the truth.

Table 2

Children of airway atopic parents. Immediate skin reactivity in children from dog- or cat-keeping homes

A) SPT reactivity to dog dander in children from dog-keeping homes

Dog-keeping in the home	No. children tested	No. SPT positive children (%)
Yes	49	18 (36.7)
No	241	110 (45.6)

No significant correlation.

B) SPT reactivity to cat dander in children from cat-keeping homes

Cat-keeping in the home	No. of children tested	No. SPT positive children (%)
Yes	26	20 (76.9)
No	245	132 (54.3)

Significance of correlation: $P = 0.04$.

Table 3

A) SPT reactivity to birch pollen in relation to month of birth

	Children of parents with airway atopy		Children of parents without airway atopy		Total No. children tested	
	Pos. SPT	Total	Pos. SPT	Total	Pos. SPT	Total
Jan.-June	57 (37.3)	153	56 (34.4)	163	113 (35.8)	316
July-Dec.	54 (36.7)	147	50 (29.8)	168	104 (33.3)	315

No significant correlation.

B) SPT reactivity to timothy pollen in relation to month of birth

	Children of parents with airway atopy		Children of parents without airway atopy		Total No. children tested	
	Pos. SPT	Total	Pos. SPT	Total	Pos. SPT	Total
March-Aug.	61 (42.7)	143	74 (49.3)	150	135 (46.1)*	293
Sept.--Feb.	58 (37.9)	153	62 (34.9)	178	120 (36.3)	331

*Significant of correlation: $P < 0.01$.

In parenthesis: percent SPT positive children of total number of children tested in the different groups.

The patient population in question represents the most severely affected patients. It is possible that the presence of allergy in this group of children is mainly determined by a strong genetic disposition readily activated by trace amounts of allergens or adjuvant factors not investigated. If so, the importance of prominent exposure to allergens, such as cat/dog dander, or tobacco smoke, on the later development of hypersensitivity, may be more difficult to discern than in a group with less strong genetic impact.

Further studies are needed, preferably prospective.

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