

Predictors of atopy in newborn babies

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The capacity of laboratory tests and clinical signs to predict allergic manifestations up to 18 months of age was assessed in 129 newborn babies, most of whom had family members with atopic disease. The parameters assessed included family history; skin dryness; erythema toxicum; skin reactivity to histamine and IgE levels; eosinophil counts; and peripheral white blood cell, leukocyte differential, and platelet counts in cord blood (CB). Erythema toxicum and white blood cell and platelet counts were of no value as predictors of allergy. The sensitivity of family history, skin dryness, and sensitivity to histamine, as well as IgE levels and eosinophil counts, varied 25–79%, and the specificity 40–74%. The efficiency was never higher than 58%. Logistic regression, applied in order to evaluate the joint predictive power of the five parameters, showed a *P* value of <0.001. The estimated probability for atopy before 18 months of age was 0.33 for neonates with normal skin texture, a CB IgE of less than 0.5 kU/l, and a history of fewer than two family members with atopy. The probability increased to 0.89 for babies with a dry skin, a history of two or more atopic family members, and a CB IgE of ≥ 0.5 kU/l. In conclusion, not one parameter nor any combination of them seems suitable for general screening. However, a combination of family history and CB IgE and skin assessment may be used to identify babies at high risk of allergy for participation in prevention studies.

The high and increasing prevalence of atopic manifestations such as atopic dermatitis (AD), bronchial asthma (BA), and allergic rhinitis/conjunctivitis (ARC) in children has led to attempts to prevent the development of atopic disease (3, 4). Several methods have been used to identify, among healthy babies, those at particularly high risk of later atopic manifestations ("atopy"). Cord blood IgE (CB IgE) concentration and family history (FH) of atopic/allergic disease are the variables most commonly used as predictors of atopy (1, 5, 6, 9, 19, 21). Many other parameters have also been tried as predictors of atopic diseases in infants and children, including peripheral blood eosinophil and platelet counts, skin histamine reactivity, basophil releasability, and immunologic tests (11, 15–18, 23). In this study, we have assessed several blood and serum elements, skin reactivity to histamine, and skin quality in neonates as possible predictors of atopic manifestations up to 18 months of age.

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Material and methods

Study group

From April 1986 to July 1989, pregnant women and their families were asked by the midwives of the well-mother clinics in the Western District, Östergötland County, Sweden, to participate in the study. Participation was accepted by 185 families, most of whom contained atopic members. Thus, we studied a selected group of families with parents concerned enough about atopic disease to be willing to take part in a prospective study.

Only children born from Monday to Friday morning were included, as there were no research laboratory facilities available during weekends; therefore, 27 of the 185 families were excluded. Similarly, mother-baby pairs were not included if delivery was complicated ($n = 12$), or for technical reasons ($n = 14$). Of the included 132 mother-baby pairs, two families decided to leave the study after about 4 months and another family did not complete the questionnaire at 18 months, although they had done

so at 3 and 12 months. Thus, the families of 129 children (57%, boys) completed all the questionnaires. Of the 129 children, 119 were born at term, six during the 37th, and four during the 33rd to 36th week of gestation. The birth weights were evenly distributed around a mean weight of 3464 g, ranging from 2140 to 4720 g. Six children had a birth weight below 2500 g.

Six of the 129 babies were not available for the examination at 18 months, leaving 123 children. Two families had moved to other parts of Sweden, and four refused for various reasons. One child refused to undergo the skin prick test (SPT). Thus, a complete clinical follow-up investigation was done in 122 of 132 children (92%).

At the 18-month examination, 218 parents (121 mothers and 97 fathers) were available for investigation.

At inclusion, an FH (FAS₀) was obtained from one of the parents, usually the pregnant mother, by one of us (H.O.) during a telephone call. At the 18-month examination, a new FH (FAS₁₈) was obtained both through a questionnaire completed at home and through an interview, with both parents present in 95 of the 123 infants. Considerable differences were found between the family histories obtained on the two occasions. A family allergy score (FAS) was used to classify the FH (13). Atopic disease in the mother, father, or siblings was given 2 points for obvious disease, 1 point for probable disease, and zero for no atopic disease. In case of more than one sibling, the highest score obtained for any of them was used. Thus, the maximum FAS was 6 points. An FAS ≤ 1 was present in 20 (16%) children, FAS 2–3 in 38 (29%), FAS 4–5 in 58 (45%), and FAS 6 in 13 (10%) according to FAS₁₈.

Allergy preventive measures

In addition to recommendations regarding breastfeeding and a tobacco smoke-free home environment, families with babies at high risk, i.e., with two or more atopic family members, were given special advice. Thus, the high-risk families were recommended not to have pets at home, and not to introduce cow's milk until 6 months and not egg and fish until 10 months of age. In addition, a diet free from cow's milk and egg was recommended to the mothers of high-risk babies during lactation. The degree of success in following these recommendations was estimated by questionnaires without the use of any objective tests.

Procedures

Venous blood samples were taken from the mothers around the time of delivery. Umbilical cord blood

(CB) was obtained after thorough cleaning of the cord with a dry compress. A peripheral blood sample was also collected from the baby, during the first 3 days of life, when also physical examination and histamine skin prick tests were performed by one of us (H.O.). Serum samples were separated within 1–2 h and the samples were then kept frozen at -20°C until analysis.

The families completed a questionnaire regarding symptoms of allergy when the children were 3, 6, 12, and 18 months old. They were also offered free consultations and treatment if needed. At 18 months, 123 of the children underwent physical examination (by H.O.), and SPTs were performed by either of two trained nurses. A venous blood sample was obtained from the babies after topical administration of anesthetic ointment (EMLA[®], Astra, Södertälje, Sweden). Parents were skin prick tested, and venous blood samples were drawn from them. By questionnaire, they were asked for current or previous symptoms and signs of atopic disease, i.e., from early childhood to adulthood. The questionnaire also included questions regarding the health condition of siblings of the index cases, especially any sign of atopy. Available medical records of siblings were scrutinized with permission of the parents. The information obtained by the questionnaires was also orally confirmed during the visit to the doctor.

Laboratory investigations

White blood cell, leukocyte differential, and platelet counts were performed according to routine procedures. Total eosinophil counts were performed on samples stained with hematoxylin-eosin in a Fuchs-Rosenthal chamber (Scherf Präzision, Ostheim, Germany) at $\times 400$ magnification.

Serum IgE was determined with Phadebas IgE PRIST (Pharmacia, Uppsala, Sweden) in a modified version of the original procedure, permitting determination of low concentrations, with a detection limit at 0.1 kU/l, and a coefficient of variation of 20% (10). Blood samples were available from 94 neonates and 106 children at 18 months. CB IgE levels ≥ 0.5 kU/l were regarded as elevated (15, 19). At 18 months, a serum IgE above 25 kU/l was regarded as elevated.

To detect any contamination of the cord serum with maternal serum, radioallergosorbent tests (Phadebas RAST[®], Pharmacia, Uppsala, Sweden) were performed on cord sera when the IgE levels were ≥ 0.5 kU/l. This was done in 17 samples with allergens, giving a positive reaction in the SPT of the mother at the 18-month checkup, i.e., animal dander and pollen.

Parental venous blood samples were investigated

with Phadiatop® (Pharmacia, Uppsala, Sweden) in 51 parents (23%) with a doubtful history, and those with a positive test were classified as atopic.

Neonatal skin quality

The skin texture (SKT) and quality were examined (by H.O.) on day 1 or 2 in 71 of the 129 newborn babies. The skin was described as normal or generally dry (i.e., fine scaling, xerosis) or showing only dryness localized mainly to wrists and ankle joints. It was also noted whether erythema toxicum was present during the stay in the maternity ward (i.e., during the first 5 days of life). For various reasons, another 26 babies could not be examined until the third day or later, and due to possible postnatal changes in the skin, the results of these examinations were not included (18 nonatopic and 8 atopic infants, of whom 6 and 2, respectively, showed varying degrees of skin dryness). The remaining 32 children were born before this part of the study had started. There was no case of dysmaturity among the examined babies.

Skin prick tests

All skin prick tests were performed with Phazet® lancets (Pharmacia Diagnostics, Uppsala, Sweden). Phazet allergen-coated needles were used for tests with histamine and airborne allergens. Foods were tested with extracts 1:20 w/v (Bayer/Miles, Spokane, WA, USA) or natural raw food (potato and rice flour). Phazet uncoated lancets were used as negative controls in all tests utilizing food allergen extracts or raw food. The tip was pressed at a 90° angle against the skin surface for 1 s. The contours of any wheal were outlined with a felt-tip pen and transferred to a protocol by means of a tape strip. The mean values of two perpendicular diameters, one of which was the larger, were determined. The diameters were measured by a vernier caliper under a magnifying glass.

To study the skin reactivity to histamine as a possible atopy predictor, SPT was performed in 101 babies with Phazet® Histamine. Each test was done in duplicate on the forearms and read after 10 min.

At 18 months, 122 children (95%) were subjected to SPT on the volar aspect of the forearms with a panel of nine allergens (cow's milk, hen's egg, wheat, rye, *Dermatophagoides pteronyssinus* and *D. farinae*, birch pollen, potato, and rice flour), negative and positive (Phazet Histamine) control. Other relevant allergens were tested when indicated. A mean wheal diameter equal to or greater than that of the histamine control, and/or ≥ 3 mm, was regarded as positive.

In addition, 121 mothers and 97 fathers were tested with a panel of 11 allergens, i.e., birch, timothy, rye-grass, mugwort, horse, dog, cat, *Cladosporium*, *Alternaria*, *D. pteronyssinus* and *D. farinae*, together with histamine and a negative control. Antiallergic medication was avoided for at least 72 h before SPT (20).

Clinical classification of atopy at 18 months

The diagnosis of atopy in infants was based on the clinical findings, presence of positive SPT(s), and the information obtained from the questionnaires and after scrutiny of any medical records. Infants with two or more diagnoses were classified according to the most prominent disease. The diagnosis of AD was based on the guidelines given by Hanifin & Rajka (7) with modified criteria for young infants (22). Bronchial asthma was defined as three episodes of bronchial obstruction verified by a physician. Allergic rhinitis/conjunctivitis was defined as rhinitis and/or conjunctivitis appearing at least twice after exposure to a particular allergen and unrelated to infection. Gastrointestinal allergy was defined as acute onset of vomiting and/or diarrhea on at least two occasions after ingestion of the offending food. Allergic urticaria was defined as generalized urticaria, appearing at least twice within 1 h after exposure to a particular allergen.

Obvious atopic disease was defined as typical symptoms and/or signs of AD, ARC, allergic urticaria, BA, or gastrointestinal allergy. *Probable atopic disease* was diagnosed when there was a history of any of the following symptoms and/or signs: itching eczema, wheezing during two respiratory infections verified by a physician, a constant nasal discharge or attacks of sneezing, and nasal itching without respiratory infections. In the statistical calculations, the obvious and the probable atopic groups were combined with an atopic group.

Children with no, or only minor symptoms of possible atopic etiology, were considered to be non-atopic. Thus, nonitching eczema, erythema around the mouth on direct contact with certain foods, vomiting and/or diarrhea of unknown etiology, wheezing during one respiratory infection (even if diagnosed by a physician), and positive skin prick test(s) without any history of atopic disease were referred to the nonatopic group.

Statistical methods

Sensitivity:

$$\frac{\text{No. of atopic children with true positive test}}{\text{No. of atopic children}} \times 100$$

Specificity:

$$\frac{\text{No. of nonatopic children with true negative test}}{\text{No. of nonatopic children}} \times 100$$

Efficiency:

$$\frac{\text{No. of children with true positive plus true negative tests}}{\text{Total no. of children}} \times 100$$

The chi-square test with continuity corrections and Fisher's exact test were performed to compare the diagnostic capacity of the various parameters taken singly or in combinations.

The results were also analyzed using logistic regression in an effort to predict the occurrence of symptoms of atopy up to 18 months of age by the five explanatory variables in combination, i.e., FAS₁₈, CB IgE, CB total eosinophil count (CBEOS), histamine SPT (HSPT), and SKT. In the final analysis, the values obtained in each of our explanatory variables were classified into one of three groups: low, intermediate "normal", and high (Table 1). For each explanatory variable, indicator variables were introduced in order to distinguish children that diverged from the intermediate group (24). Such indicators were then dropped from the complete regression model if the corresponding regression coefficient was small enough to make the indicator have practically no influence on the values predicted by the regression model. The coefficients of indicators that were dropped differed from zero by less than one-fifth of the amount observed for the least coefficient of an indicator that was retained. All indicators dropped had large *P* values, at least 0.80.

The final analysis was made on data from 77 cases with complete records in at least four of five explanatory variables. In this 77-case data set, missing values were replaced by using either the average values observed among the 27 cases with complete records, or values as predicted by regression relationships obtained between explanatory variables obtained in

studying the subset of complete records (24). The latter method was preferred when a significant, or almost significant, relation was obtained in the regression analysis.

Cutoff points in the regression analysis were set so as to obtain 10–25% of the cases in both the low value and the high value groups for each explanatory variable. The only exceptions were FAS₁₈, for which the high value group was permitted to contain 60%, and the group without dryness of the skin which contained 45% of the babies. The low cutoff level of CB IgE was set to 0.1 kU/l, and this group contained slightly more than 25% of the children. The borders between low, intermediate, and high value groups for the five explanatory variables are shown in Table 1.

Ethics

The study was approved by the Human Research Ethics Committee at the University Hospital, Linköping, Sweden. The participating families entered the study after receiving written and verbal information and giving written consent.

Results

In all, 54 children were classified as atopic, 16 (30%) of whom had two atopic diseases, mostly AD and BA. The atopy diagnosis was based on AD in 44 children, on BA in seven, on FA with gastrointestinal symptoms in two, and on urticaria in one child. The cumulative prevalence of atopy was similar in boys and girls (41 and 43%, respectively).

The number of siblings was none in 38 (29%) families, one in 59 families (46%), two in 23 families (18%), and three in eight (7%) families.

In 51 of the 129 children (40%), FAS₀ and FAS₁₈ did not agree. In 46 children FAS₁₈ was higher than FAS₀ (1 point in 12 children, 2 points in 27 children, 3 points in five children and 4 points in two children). In five infants, FAS₁₈ was 1 point lower than FAS₀. Onset of atopic manifestations during the follow-up period was reported for three mothers, one father, and five siblings. In the other 42 cases, differences between FAS₀ and FAS₁₈ were due to forgetfulness (eight cases), ignorance, e.g., of the husband's disease (16 cases), or minor differences in the classification of disease (18 cases).

Assuming an FAS ≥ 4 to be "high", 18 infants had FAS below that level at birth and above it at 18 months, while the reverse was true for three children.

The cumulative incidence of atopy increased with increasing FAS₁₈: FAS 0–1: 25%, FAS 2–3: 39%, and FAS 4–6: 48%. Neither FAS₁₈, SKT, HSPT, CBEOS, nor CB IgE alone differed significantly between the atopic and the nonatopic groups. When we selected a cutoff level at 4 points, the sensitivity

Table 1. Range limits of three levels for five neonatal atopy predictors used in logistic regression analysis

	Low	Intermediate	High
FAS ₁₈	0	1–3	4–6
CB IgE (kU l ⁻¹)	0–0.10	0.11–0.49	≥ 0.50
CBEOS ($\times 10^3$ l ⁻¹)	0–0.19	0.20–0.79	≥ 0.80
HSPT (mm)	0–2.9	3.0–4.9	≥ 5.0
SKT (dryness)	None	Localized [†]	General

[‡] Detection limit = 0.1 kU l⁻¹.

[†] Localized mainly to wrists and ankle joints.

FAS₁₈ = family allergy score at 18 months of age (see text for explanation). CB = cord blood. CBEOS = cord blood total eosinophil count. HSPT = mean histamine skin prick test wheal diameter. SKT = skin texture.

Table 2. Evaluation of five possible neonatal predictors of atopy in 129 children at 18 months of age

Predictor	Nonatopic n (%)	Atopic n (%)	Total n (100%)	SENS %	SPEC %	EFF %
FAS ₁₈						
< 3	30 (68)	14 (32)	44			
≥ 3	45 (53)	40 (47)	85			
Total	75	54	129	74	40	54
SKT						
Normal	23 (55)	19 (45)	42			
Generally dry	5 (33)	10 (67)	15			
Total	28	29	57	34	82	58
CB IgE						
< 0.5 kU/l	40 (57)	30 (43)	70			
≥ 0.5 kU/l	14 (58)	10 (42)	24			
Total	54	40	94	25	74	53
CBEOS count						
< 0.3 × 10 ⁹ /l	14 (70)	6 (30)	20			
≥ 0.3 × 10 ⁹ /l	21 (48)	23 (52)	44			
Total	35	29	64	79	40	58
HSPT						
< 4 mm	24 (65)	13 (35)	37			
≥ 4 mm	34 (53)	30 (47)	64			
Total	58	43	101	70	41	53

SENS=sensitivity, SPEC=specificity, EFF=efficiency. Other abbreviations according to Table 1.

of FAS₀ was 56% (30/54) and for FAS₁₈ it was 63% (34/54). The cutoff levels (Table 2) were obtained by trial and error in an effort to attain the best sensitivity and acceptable specificity. Neither erythema toxicum, white blood cells with differential count, nor platelet counts in peripheral blood differed neonatally between infants with and without atopic disease up to 18 months of age (data not shown). Ten of 71 neonates examined had erythema toxicum. At 18 months of age three of them were atopic and seven nonatopic, as compared to 31 and 30, respectively, of the 61 infants without erythema toxicum. Neonates with and without positive FH had similar basophil as well as platelet counts. This was also the case for the other parameters taken individually.

An IgE level of > 0.5 kU/l was recorded in 24 of 94 tested CB samples. When RAST was run in 17 of the 24 samples with elevated IgE, only one serum was positive for the same three allergens that generated positive SPT in the mother, i.e., against cat (1.40 PRU), dog (1.47 PRU), and birch (1.47 PRU), indicating contamination with maternal blood.

Serum IgE at 18 months of age was elevated in 25% of the atopic and in 21% of the nonatopic children (NS). At least one positive SPT was recorded in 20% of them, most commonly against hen's egg (11%). Ten of the 13 infants with positive SPT to egg were classified as atopic on clinical grounds, four of whom were allergic to hen's egg according to the history.

As shown in Table 3, some combinations of FAS₁₈, CB IgE, CBEOS, HSPT, and SKT showed a certain predictive capacity, while the remaining possible 19 combinations of two to five of these predictors did not reach a sensitivity or specificity above 85% and/or comprised fewer than 20 infants.

Logistic regression analysis offered further predictive possibilities. The complete regression model, including all the five explanatory variables as represented by two indicators each, had a *P* value of 0.001. Regression coefficients close to zero were obtained for both high and low values of HSPT, for low values of CB IgE, and for high values of CBEOS. On the other hand, none of them taken individually in the model differed significantly from zero. All the regression coefficients associated with the other indicators in the model were of a size deserving attention.

The predicted probability of atopic disease ranged between 0.33 and 0.89 in children with both an FH of atopy and CBEOS of ≥ 0.2 × 10⁹/l (Table 4). The value 0.33 was obtained for children with normal skin texture, CB IgE < 0.5 kU/l, and FAS₁₈ ≤ 3. The highest value, i.e., 0.89, was obtained in children with FAS₁₈ ≥ 4, CB IgE ≥ 0.5 kU/l, and dry skin texture.

Table 3. Atopy-predicting capacity of two to three parameters in combinations (family history, CB eosinophil count, skin histamine wheal size, and skin texture) in neonates in whom all combined predictors showed values above, compared to neonates with all values below cutoff levels. Cutoff levels according to Table 2

Predictor					n	SENS %	SPEC %	EFF %	P value
FAS ₁₈	CB IgE	CBEOS	HSPT	SKT					
x		x			34	95	27	65	NS
x		x	x		24	92	33	63	NS
x			x		59	92	34	58	< 0.05
x				x	23	80	85	83	< 0.01
	x			x	26	36	100	73	< 0.05
			x	x	27	55	81	70	NS
		x	x		39	94	39	62	< 0.05

Abbreviations according to Tables 1 and 2.

Table 4. Atopy predictive value of four neonatal variables in different combinations, expressed as probabilities, provided CBEOS of at least $0.2 \times 10^3/\text{l}$. Logistic regression was used (24)

SKT	CB IgE < 0.5 kU/l		CB IgE ≥ 0.5 kU/l	
	FAS ₁₈ 1-3	FAS ₁₈ 4-6	FAS ₁₈ 1-3	FAS ₁₈ 4-6
Normal	0.33	0.53	0.48	0.68
Localized dry [†]	0.45	0.65	0.60	0.77
Generally dry	0.66	0.81	0.78	0.89

[†] Localized mainly to wrist and ankle joints.

Abbreviations according to Table 1.

Neither feeding measures, daily pet contacts nor environmental tobacco smoke differed significantly between high and low atopy risk infants, nor between atopic and nonatopic infants (data not shown).

Discussion

The estimated probability for atopic disease up to 18 months of age was almost 0.9 for infants with elevated IgE levels and eosinophil counts in CB, a strong family history of allergy, and generally dry skin in the neonatal period. The probability of future atopic disease was close to 0.8 in children with CB eosinophilia, combined with high levels in two or three other factors. Thus, combinations of various diagnostic methods were fairly powerful for prediction of atopic disease.

None of the parameters alone, however, were in fact useful as a predictor for the development of allergic manifestations during the first 18 months of life. Only the combination of FAS₁₈ and SKT had a screening efficiency over 75% (83%). The findings of Magnusson & de Weck on the atopy-predictive value of platelet counts were not confirmed (17). The follow-up in that study did not include a clinical investigation but was merely done by a questionnaire or a telephone interview by a secretary.

Most of the infants in this study belonged to families with atopic family members. Although the study population was not a representative sample from a normal population of infants, it was a medically relevant and interesting group, as awareness of allergy and motivation for preventive measures would be higher in atopic families than in the general population. The size of the study population was calculated so as to provide reasonable chances of revealing strong and clinically relevant combinations of predictors.

There are many studies in which the allergy-predictive capacity of individual symptoms and tests have been evaluated. The purpose of our study was not to repeat these studies, but to include several variables, each of them with a limited predictive value

per se, into a logistic model. There are two main reasons for seeking a screening tool for the prediction of future atopy. On one hand, a main reason is related to the need of *individuals*, i.e., for use in clinical practice in order to provide recommendations of preventive measures in appropriate high-risk cases. On the other hand, researchers may want to identify a *risk population*, e.g., for allergy-prevention studies. In the former case, the predictors have to be strong with high sensitivity and specificity in a clinical setting, while, in the latter case, tools defining a high-risk group are wanted in order to minimize the number of subjects needed for a particular study. Our study indicates that combinations of tools may help to identify a high-risk group. However, the study did not demonstrate any single allergy-predictive parameter.

The lack of predictive capacity of CB IgE was not due to contamination with maternal blood. In only one of the 17 CB serum samples with an IgE level of > 0.5 kU/l (with a CB IgE of 0.83 kU/l) were there IgE antibodies against allergens to which the maternal SPT was positive, indicating a contamination by maternal serum. The low level of contamination is in accordance with our previous experience (13) and a study of Hansen et al. (8) in which CB IgA was used as marker of maternal blood contamination.

In our previous study, an elevated CB IgE was shown to predict atopy (5, 6). However, the sensitivity was only 26% for any atopic disease developing up to 11 years of age (6). No predictive capacity of CB IgE was found here and in several other recent studies (15, 21). Large and unselected study populations are needed to demonstrate a relationship which may be more obvious for subsequent IgE production than for atopic disease in general (2, 9, 15). Recently, we concluded that neonatal IgE determination is not suitable for allergy-risk screening in order to give advice on an individual basis, mainly due to its low sensitivity (15).

From previous studies, we knew that the family history has a rather low sensitivity and a low specificity for predicting future atopic manifestations (5, 6, 14). There are also considerable difficulties in obtaining a valid family history (1). This was confirmed and extended in the present study in which the FAS₁₈ was considerably higher than the FAS₀. The differences between FAS₀ and FAS₁₈ were mostly due to forgetfulness or ignorance (19%), and they appeared on onset of atopic disease in family members during the follow-up period in a limited number of patients (7%), most of whom were siblings. Information about FAS₀ was obtained during the latter half of the pregnancy, when one of the parents (usually the mother) had to describe the whole family health situation in a few minutes, as in clinical practice. This

interview was performed as a screening, waiting for a more detailed recording of FH at the examination of the infant together with the parents at 18 months of age. At the examination, more information was available, i.e., questionnaires, case records from siblings and/or parents, SPTs, and, in doubtful cases, Phadiatop results from the parents. Because of its superior reliability, FAS₁₈ was selected as an expression of the FH of atopic diseases; therefore, FAS₁₈ was used in most of the statistical calculations. However, it was time-consuming to establish FAS₁₈, and this technique is hardly suitable for a clinical setting. Our study confirms that there is a need of a thorough and detailed recording of the family atopy situation before any preventive measures are recommended (1). It is necessary to interview both parents, or to add a questionnaire to be filled in by both parents, when assessing the allergy risk of a baby.

When one uses the FH for prediction of allergy, the presence or absence of siblings in the family is important. With one sibling or more suffering from atopic disease, the risk for development of atopic disease in a newborn baby is 33%, as compared to 20% if one of the parents suffers from atopic disease (12). It may be relevant to construct a scoring system which takes the presence or absence of siblings into account.

In conclusion, when assessing several potential predictors of atopy, no single test nor any combination of tests was suitable for routine screening of allergy risk at birth. However, assessment of FH, dryness of the skin (xerosis), CB total IgE, and CB total eosinophils in newborn infants in combination (but not individually) seems to be of value for selecting candidates for prevention studies (estimated probability of approximately 0.8–0.9). Sex, erythema toxicum, wheal size of SPT with histamine, peripheral white blood cell with leukocyte differential count, and peripheral platelet count were poor predictors of atopy development. Recordings of FH must include thorough and detailed information from both parents, preferably both oral and written.

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