SHORT REPORT

A half of schoolchildren with 'ISAAC eczema' are ill with allergic contact dermatitis

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Abstract

Background Similarity in clinical symptoms between atopic eczema (AE) and allergic contact dermatitis (ACD) may lead to misdiagnoses in both clinical practice and epidemiological studies. As patch testing for contact allergy does not seem popular among paediatric allergists, the resulting bias leads mainly to under diagnosing of ACD and over diagnosing of AE in children and adolescents.

Objectives To assess the frequency of AE and ACD among children and adolescents who answered affirmatively the eczema module of ISAAC questionnaire.

Methods Of 9320 schoolchildren involved in an allergy screening programme, 143 consecutive participants were recruited for the present study. The inclusion criterion was affirmative answers to questions from the eczema module of the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. The children were examined by two allergists: a paediatrician and a dermatologist, and the children underwent patch testing.

Results We diagnosed AE in 46 (55.4%) children and 18 (30.0%) adolescents, whereas 32 (38.6%) children and 31 (51.7%) adolescents were diagnosed with ACD, with a considerable overlap of both diseases. Nine of 46 (19.6%) children and 13 of 25 (52.0%) adolescents with affirmative answers to the question about flexural eczema were diagnosed with ACD, while lacking features sufficient for the diagnosis of AE according to Hanifin and Rajka. Based on the indices from the whole population tested (9320 pupils), a rough estimate of the general ACD prevalence was 5.8% for adolescents, and 8.5% for children, which is close to the figure of 7.2% observed previously in Danish schoolchildren.

Conclusions Our data demonstrate that 'ISAAC eczema' is an epidemiological entity that embraces comparable portions of cases of atopic eczema and allergic contact dermatitis, and possibly also other less frequent pruritic dermatoses. Each case of chronic recurrent dermatitis in children requires differential diagnosis aimed at allergic contact dermatitis and inflammatory dermatoses other than atopic eczema, even when predominantly localized in flexural areas.

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Keywords

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Conflict of interest

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The eczema module of the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire was intended by the authors for studying the epidemiology of atopic eczema.[1] However, while carrying out our previous studies,[2,3] we have noticed that a considerable number of children with allergic contact dermatitis (ACD) would also have fulfilled the ISAAC criteria, indicating that ACD may be responsible for a relevant fraction of 'ISAAC eczema'. To test this hypothesis, we prospectively analysed the frequency of atopic eczema (AE) and ACD in children and adolescents during an ISAAC-based allergy screening programme.

Patients and methods

Of 9320 schoolchildren involved in the screening programme, 143 consecutive participants were recruited: 83 children (7–8 years of age) and 60 adolescents (16–17 years). The inclusion criterion was at least one affirmative answer to questions 1 or either 7 (version for children) or 6 (adolescents) from the ISAAC eczema module (remaining questions are supplementary to question 1). The exact wording of the questions for adolescents is given in Table 1; the questionnaire for children aged 7–8 years was filled in by their parents and therefore the word 'you' was replaced by 'your child'. The children underwent patch testing with European Baseline Series supplemented with propolis and thimerosal (Chemotechnique Diagnostics, Vellinge, Sweden) with readings on days 3 and 4 according to standard procedures[4] and subsequently were examined by a team consisting of a paediatrician with subspecialty in allergy and a dermatologist with subspecialty in allergy, who issued a consensus diagnosis for each child. The diagnosis of AE was based on the classical criteria of Hanifin and Rajka[5] with a minimum of 3 basic plus 3 minor features present. ACD was defined as contact allergy confirmed by a clinically relevant positive patch test result in combination with exposure history, dermatitis history and dermatitis pattern (if present at the time point of the examination), as proposed by Mortz *et al.*[6] The clinical relevance was scored with the help of the COADEX system;[4] only positive patch test reactions marked as 'C' (current: patient has been exposed to this hapten prior to the current episode of dermatitis, improvement of the disease after cessation of exposure) and 'O' (old: past episodes of dermatitis caused by exposure to the hapten) were considered relevant.

Results

We have diagnosed comparable proportions of AE and ACD, with a considerable overlap of both diseases (Table 1), which demonstrate that atopic and contact sensitizations may coexist. There was a tendency towards decreasing AE and increasing ACD frequency with age. The distribution of flexural eczema among those with affirmative answers to the question about flexural eczema is shown in Table 2. Nine of 46 (19.6%) children and 13 of 25 (52.0%) adolescents with flexural eczema were diagnosed with ACD, while lacking features sufficient for the diagnosis of AE. The overall rate of positive answers to ISAAC eczema questions among adolescents involved in the screening programme was 10.6% (580 of 5474). An assumption that one-half of the cases were ACD leads to a rough estimate of the ACD prevalence at 5.8%, which is close to the prevalence of 7.2% observed in Danish schoolchildren.[6] The estimated prevalence of ACD in children (7–8 years) would be even higher (8.5%), mainly due to the higher frequency of positive answers to eczema questions (843 of 3846 children; 21.9%). This observation could be partly biased by the fact that adolescents might forget or conceal their symptoms, whereas the children's questionnaires were filled in by parents, who seemed more likely to report health problems of their offspring accurately.

Table 2 Localization of eczema in the studied group of children and adolescents

	7–8 year olds		16–17 year olds	
	N	%	*N*	%
Total flexural eczema, including:	46	100%	25	100%
Folds of the elbows	22	47.8%	12	48.0%
Behind the knees	21	45.7%	9	36.0%
Front of the ankles	4	8.7%	4	16.0%
Under the buttocks	5	10.9%	1	4.0%
Around the neck	12	26.1%	9	36.0%
Around the eyes	14	30.4%	7	28.0%
Around the ears	8	17.4%	3	12.0%

Discussion

It is an actual problem to differentiate between allergic contact dermatitis and atopic eczema on morphological grounds. Also, the

Table 1 Responses to the eczema questions of the ISAAC questionnaire and the physician diagnoses of AE and ACD

	7–8 year olds	16–17 year olds
Total	83 (100%)	60 (100%)
Positive answer to question 1: 'Have you ever had an itchy rash which was coming and going for at least 6 months?'	57 (68.7%)	37 (61.7%)
- including positive answer to question 3: 'Has this itchy rash at any time affected any of the following places: the folds of the elbows, behind the knees, in front of the ankles, under the buttocks, or around the neck, ears or eyes?'	46 (55.4%)	25 (41.7%)
Positive answer to question 6/7: 'Have you ever had eczema?'	75 (90.4%)	53 (88.3%)
Positive patch tests	56 (67.5%)	34 (56.7%)
Diagnosis of AE alone	31 (37.3%)	5 (8.3%)
Diagnosis of AE and ACD	15 (18.1%)	13 (21.7%)
Diagnosis of ACD alone	17 (20.5%)	18 (30.0%)
No (or other) skin diseases diagnosed	20 (24.1%)	17 (28.3%)
Children with flexural eczema (question 3) who were ultimately diagnosed with ACD, but not AE	9 out of 46 (19.6%)	13 out of 25 (52.0%)

AE, atopic eczema; ACD, allergic contact dermatitis.

distribution pattern of eczema in our study group seemed comparable to previous studies of European children and adults with AE.[7,8] This lack of clear differences poses a considerable problem in both epidemiological studies and clinical practice. Therefore, morphological features and localization of eczema must always be carefully considered in the broad context of the patient's history and present status (stigmata of atopy, features of contact sensitization or irritation, comorbidities, functional status of the skin, etc.). Another source of clinical and epidemiological dilemmas is the question of coexistence of AE and ACD: In the literature, a spectrum of conflicting opinions regarding the possible relationship can be found, with conclusions ranging from the one that presence of AE would prevent the development of ACD, to the conclusion that AE would actually promote the development of ACD, which was discussed in detail elsewhere.[9] A prospective study[9] demonstrated that atopy and contact sensitization are independent phenomena, which indicate that independent may also be the diseases arising from these pathologies – AE and ACD respectively. The present study demonstrates a higher frequency of ACD and a lower frequency of AE in adolescents as compared with children (Table 1), which is consistent with the previous studies indicating that 40% children with infantile AE show a complete clearance before the age of 5 years.[10,11] Less is known about the frequency of ACD and its possible relationship with age in the general population: We are aware of only two studies based on patch testing and medical examination – one[6] of schoolchildren aged 12–16 years with point prevalence of ACD estimated at 0.7% and lifetime prevalence at 7.2%, and another[12] of vocational students aged 18–19 years with respective indices being 1.6% and 10.9%. More data are available on the prevalence of contact hypersensitivity – the pathology underlying ACD, which is estimated at 13.3–24.5% of all children,[13] and 17.3–40.0% of adults.[14,15] In our recent study[3] of children with affirmative answers to ISAAC eczema questions and atopy confirmed by positive skin prick tests, 48.5% of 7–8 year olds and 52.9% of 16–17 year-olds reacted to at least one hapten of the European Baseline Series. Altogether, these observations indicate a possibility of a 'replacement' of AE by ACD (probably with a considerable period of comorbidity) in the course of life. In individual cases, such 'replacement' might remain unnoticed by the treating doctors, contributing to the risk of sustaining the skin inflammation, e.g. by continued use of external drugs or emollients to which the child became sensitized in the course of the eczema.[16] However, there are documented cases[17,18] of contact allergy in newborns and young infants, indicating that for some infants, ACD can actually be the first and only form of eczema. Unfortunately, patch tests in children are carried out too rarely, and the classic sentence written over 50 years ago by Lewis Webb Hill[19] 'Too many children are dieted for eczema when the cause is really something which contacts the skin from the outside', seems to remain relevant until today.

Our study revealed that among children and adolescents who affirmatively answer the ISAAC eczema questions, the frequencies of ACD and AE are comparable. Thus, ISAAC questionnaire, although generally considered an epidemiological indicator of AE, seems to be not specific enough to differentiate between AE, ACD and possibly also other eczematous dermatoses in children. It should be stressed that an affirmative answer to ISAAC question 3 (flexural localisation of eczema) is also not sufficient for the diagnosis of AE. Flexural eczema may be due to textile dyes, cosmetics; eczema around ankles due to sensitizing components in shoe upper; eczema around the eyes due to ophthalmic drugs or mascara; eczema around the neck and behind the ears may be seborrhoeic, etc. Previously, Haileamlak *et al.*[20] reported that the ISAAC questionnaire did not perform well in predicting cases of AE. Flohr *et al.*[21] observed up to 4-fold differences between answers filled out on the questionnaire by the participants and symptoms revealed by medical examination. Together with the present study, these data demonstrate that ISAAC eczema questions should not be regarded as an 'epidemiological substitute' for the diagnosis of atopic eczema, as a half of the cases are in fact ill with allergic contact dermatitis.

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