

Allergic conjunctivitis in children with asthma, rhinitis and eczema in a secondary outpatient clinic

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Little evidence is available on the prevalence of allergic conjunctivitis in pediatric populations. The objective of this study was to assess the cumulative prevalence of allergic conjunctivitis in children with rhinitis, asthma and eczema in a secondary pediatric outpatient clinic. Children aged 5–15 yr referred during the period of 2002–2004 in whom allergic conjunctivitis, asthma, allergic rhinitis or eczema was diagnosed were included in a retrospective survey. At referral patient characteristics, history, symptoms, signs and results of type 1 allergy tests were entered into an electronic form. Four hundred and fifty-eight children with a mean age of 9.4 yr were studied. Of 316, 324 and 149 children with rhinitis, asthma or eczema, respectively, 133 (42%), 78 (24%) and 45 (30%) had concomitant allergic conjunctivitis. One hundred and thirty-seven (30%) had allergic conjunctivitis, of whom 133 (97%) also had allergic rhinitis, 77 (56%) asthma and 45 (33%) eczema. One hundred and twenty-five (91%) of the children with allergic conjunctivitis had positive allergy tests to one or more allergens, sensitization to house dust mites being more frequent in chronic allergic conjunctivitis than in acute allergic conjunctivitis (95% vs. 53%; $p < 0.01$). Sensitization to grass was more frequent in children with acute allergic conjunctivitis (78% vs. 57%; $p = 0.03$). In a secondary pediatric outpatient clinic allergic conjunctivitis is a frequent co-morbidity to allergic rhinitis and to asthma and eczema. Allergic conjunctivitis need to be included as an important co-morbidity in future guidelines on asthma, rhinitis and eczema management.

Key words: allergic conjunctivitis; prevalence; allergen; asthma; rhinitis; eczema

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During the past decade several guidelines for treatment of asthma and rhinitis have been published (1, 2). New knowledge about the mechanisms underlying allergic inflammation of the airways combined with the fact that asthma and rhinitis are common co-morbidities have suggested the concept of 'one airway, one disease' (2). To which extent allergic conjunctivitis may be part of the entity, however, has not been rigorously evaluated and allergic rhinitis as co-morbidity may not have been sufficiently covered by the guidelines. As alluded to by the

allergic rhinitis and its impact on asthma (ARIA) state-of-the-art review this may have been due to a lack of evidence of allergic conjunctivitis as a co-morbidity potentially influencing treatment and outcome of rhinitis and asthma (2). Little, if any, focus has been on the impact of allergic conjunctivitis as a co-morbidity to asthma and rhinitis in specific pediatric populations. The aim of the present study was to assess the cumulative prevalence of allergic conjunctivitis in children with rhinitis, asthma and eczema in a secondary pediatric outpatient clinic.

Methods

Children aged 5–15 yr referred by general practitioners to the Children's Clinic Randers, a secondary general pediatric outpatient clinic, during the period 2002–2004 in whom allergic conjunctivitis, asthma, allergic rhinitis or eczema was diagnosed were included in a retrospective survey. At referral all children were diagnosed by the same pediatrician (ODW) and patient characteristics, history, symptoms, signs and laboratory findings were entered into an electronic form.

Ocular allergic disorders may be classified as allergic conjunctivitis [acute allergic conjunctivitis (seasonal or toxic induced); or chronic allergic conjunctivitis (perennial or toxic induced)], giant papillary conjunctivitis, vernal keratoconjunctivitis and atopic keratoconjunctivitis (3). Allergic conjunctivitis is characterized by itching, redness and tearing. Physical signs are injection of conjunctival vessels, chemosis and eyelid edema. As allergic conjunctivitis is the only one of the conditions that may be fully explained by type 1 IgE-mediated mechanisms the others were excluded from the study, i.e. patients with keratopathy and/or giant papillae were excluded. Asthma was diagnosed according to the Global Initiative for Asthma (GINA) guidelines (1). The diagnoses of rhinitis, conjunctivitis and atopic eczema were based on history and clinical examination. The diagnoses were recorded only when symptoms and signs were considered clinically significant, i.e. with duration of ≥ 1 yr or greater than or equal to two seasons. Type 1 allergy was tested by a standard skin-prick test (Soluprick®SQ; ALK-Abello, Hoersholm, Denmark) or a specific IgE antibody test in the blood (Pharmacia UniCAP1000®; Phizer, New York, NY, USA). Tested allergens were birch, grass, mugwort, dog, cat, horse, two house dust mites and two moulds. The skin-prick test was considered positive when the weal diameter was ≥ 3 mm. For the specific IgE 0.35 kU/l was used as cutoff level (4). The chi-squared test was used for the analysis of data.

Results

Four hundred and fifty-eight children with a mean age of 9.4 yr were included in the study. Two hundred and sixty-six (58%) were males, 192 (42%) were females. A total of 927 diagnoses were recorded. Of 316, 324 and 149 children with rhinitis, asthma or eczema 133 (42%), 78 (24%) and 45 (30%), respectively, and 74 (36%) of the children with both asthma and rhinitis ($n = 203$) had allergic conjunctivitis. One hundred and thirty-seven (30%), 86 (63%) males and 51

(37%) females, with a mean age of 10.4 yr had allergic conjunctivitis. One hundred and sixteen of them had acute allergic conjunctivitis, 21 chronic allergic conjunctivitis. All children with allergic conjunctivitis had other diagnoses. One hundred and thirty-three (97%) had allergic rhinitis, 77 (56%) had asthma and 45 (33%) had eczema (Fig. 1). Only three children (2%) with asthma and one (1%) with eczema had allergic conjunctivitis without concomitant rhinitis.

A total of 435 (95%) of the included 458 children were tested for type 1 allergy and 278 (64%) of the tested children had a positive test. All children with allergic conjunctivitis were tested and 126 (92%) had positive test results to one to 10 allergens (mean 3.6 allergens). Three hundred and one of the children with rhinitis were allergy tested; 244 (88%) were positive. In children with asthma 185 (61%) of 303 tested were positive and in children with eczema 104 (73%) of the 142 tested were positive. Compared to children with chronic allergic conjunctivitis children with acute allergic conjunctivitis had a higher frequency of sensitization to grass: 78% vs. 57% ($\chi^2 = 4.45$, d.f. = 1, $p = 0.03$) and mugwort: 38% vs. 10% ($\chi^2 = 6.3$, d.f. = 1, $p = 0.01$), and sensitization to house dust mites were more common in chronic allergic conjunctivitis than in acute allergic conjunctivitis, 95% vs. 53% ($\chi^2 = 14.7$, d.f. = 1, $p < 0.01$). Table 1 shows the distribution of sensitizations by diagnoses. Children with allergic conjunctivitis were more frequently sensitized than children with rhinitis ($\chi^2 = 7.9$, d.f. = 1, $p < 0.01$), asthma ($\chi^2 = 40.1$, d.f. = 1, $p < 0.01$) and eczema ($\chi^2 = 24.8$, d.f. = 1, $p < 0.01$).

Discussion

Rhinitis is the most frequent manifestation of allergic disease and may affect up to 40% of

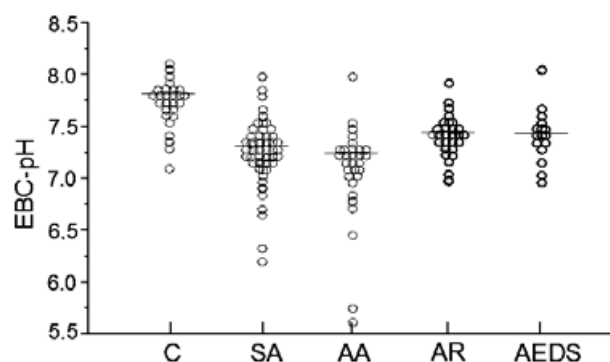


Fig. 1. Frequency of concomitant diagnoses in children with allergic conjunctivitis (C), rhinitis (R), asthma (A) and eczema (E), respectively.

Table 1. The distribution by diagnosis of sensitizations in children with a positive allergy test

	Conjunctivitis (%)	Rhinitis (%)	Asthma (%)	Eczema (%)
Positive allergy test (n)	125	244	185	104
Sensitizations (n)				
Dust-mites	81 (65)	178 (73)	147 (79)	81 (78)
Grass	102 (82)	163 (67)	114 (62)	71 (68)
Birch	65 (52)	94 (39)	60 (32)	53 (51)
Mugwort	46 (37)	72 (30)	42 (23)	37 (36)
Cat	50 (40)	95 (39)	83 (45)	52 (50)
Dog	58 (46)	108 (44)	82 (44)	55 (53)
Horse	27 (22)	50 (20)	46 (25)	32 (31)
Molds	17 (14)	43 (18)	43 (23)	26 (25)

children with a point prevalence of more than 20% (5–7). Since patients with allergic rhinitis often present with varying symptoms of conjunctivitis prevalence studies have usually not been specific with respect to allergic conjunctivitis, rather so, they have used unspecific terms such as hay fever or allergic rhinoconjunctivitis. To some extent a lack of consensus about the classification of allergic conjunctivitis may have contributed to this (3). It may be said that the present observation of a 97% co-morbidity rate of allergic conjunctivitis and rhinitis supports the terminology. However, being recruited from a secondary center the present population may have a higher prevalence of atopic co-morbidity than unselected populations. A questionnaire with a subsequent interview of 396 Swedish schoolchildren aged 12–13 estimated the cumulative prevalence of allergic conjunctivitis to be 19.1%. The prevalence of the combination of allergic conjunctivitis and allergic rhinitis was 17.6% suggesting a co-morbidity of approximately 92% (8). In a survey from a secondary ophthalmologic referral center 88% of the patients with perennial allergic conjunctivitis had associated allergic rhinitis (9). So, the findings do not rule out the possibility that in the unselected population the prevalence of allergic conjunctivitis may be less associated with rhinitis.

In finding chronic allergic conjunctivitis strongly associated with house dust mites allergy and acute allergic conjunctivitis to grass pollen allergy the present results were confirmatory to reports from Thailand and the UK (9, 10). Since as many as 24% of children with asthma in our

population had concomitant allergic conjunctivitis with rhinitis the allergens may be suggested to be triggers of common pathophysiologic inflammatory mechanisms in the conjunctiva and in the nasal and respiratory mucosa. Therefore, from a pathophysiologic point of view it may be important to assess the relevance of allergic conjunctivitis for the 'one airway, one disease' concept. From a therapeutic point of view, the present findings have elucidated the need for inclusion of allergic conjunctivitis as an important co-morbidity in future guidelines on asthma, rhinitis and eczema management. Finally, the results indicate that it may be important to consider allergic conjunctivitis in the evaluation of quality of life of allergic children.

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