The study of co-morbid conditions in children with allergic rhinitis, from Mumbai, Maharashtra, India

Asha Pherwani · Gauri Mankekar · Kashmira Chavan

Abstract

Allergic rhinitis (AR), an allergen-induced inflammation of the nasal mucosa, is frequently associated with co-morbid conditions. It is important to recognize the onset and existence of these co-morbid conditions, for adequate treatment and prevention of the development of new allergen sensitizations and air-way hypersensitivities. The aim of our study was to determine the prevalence of co-morbid conditions associated with AR, in Indian children. We selected 65 consecutive children below the age of 18 years, who attended the Allergy and Asthma Clinic of our hospital, between March 1, 2005 to November 30, 2006 and compared them with the available literature. The most common co-morbid condition with AR was asthma (75.4%), followed by urticaria (33.9%), conjunctivitis (29.2%) and sinusitis (23.1%) in that order. Two patients (3.1%) each, had adenoid hypertrophy and nasal polyps. Psoriasis was seen in 4/65 (6.2%). Four patients (6.2%) were free from any co-morbid conditions as opposed to 61/65 (93.8%), who suffered from one to three co-morbid conditions each. Co-morbid conditions are a rule rather than an exception, the most common association being asthma. Asthma often is asymptomatic and routine PFT testing is valuable. The association of psoriasis is interesting.

Keywords Rhinitis · Co-morbidity · India · Children · Adolescents

Introduction

Allergic rhinitis (AR) is an allergen-induced inflammation of the nasal mucosa. It is frequently associated with co-morbid conditions, as the mucosal structure, function and the immune responses to allergens are common to several organs [1–7]. Various studies have shown that the incidence of AR and its co-morbid conditions is increasing [8–11]. It is therefore not surprising that rhinitis, hyper-eosinophilic sinusitis, otitis, asthma, and conjunctivitis coexist. These diseases may develop concurrently or sequentially and have similar natural histories and exacerbations.

The implications of the prevalence of these co-morbidities are:

- Poorly controlled AR might contribute to the development or worsening of other co-morbid conditions eg. Asthma [12].
- Adequate treatment of AR can improve the symptoms of these co-morbid conditions, prevent the development of new sensitizations and its consequences of air-way hypersensitivities [13,14,15].

Objective

Our aim was to study the prevalence of the comorbid conditions along with AR, in children below the age of 18 years, and compare our data with other similar studies.

Material & methods

All consecutive children included in the present study were satisfying the criteria of chronic rhinitis [16] and atopy [17] who attended the Allergy and Asthma Clinic of our tertiary care hospital. The period of study was from March 1, 2005 to November 30, 2006. Those having any other respiratory

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Table 1 Mean Age of patients with co-morbid conditions in Allergic rhinitis.

COMORBID CONDITION	MEAN AGE (in years) $\pm$ SD
Asthma	8.41 $\pm$ 4.42
Urticaria	8.5 $\pm$ 4.0
Conjunctivitis	10.21 $\pm$ 4.3
Sinusitis	8.93 $\pm$ 4.11
Atopic dermatitis	4.56 $\pm$ 2.35
F/H of allergy or asthma	7.80 $\pm$ 4.0

SD = Standard deviation; F/H=Family history

ailment or AR of less than 4 weeks were excluded. A detailed history and examination findings were recorded on a preformed proforma. Radiographs of the paranasal sinuses or adenoids in younger children, skin prick tests in all the children and spirometric pulmonary functions (in children above 7 years) were done. Skin prick tests were done for all the patients. We selected the following common allergens such as Dermatophagocytes Farniae and pteronyssus, cotton dust, house dust, cockroach, Cynodon dactylon and Parthenium hysterophorus for testing. These were placed on the forearm which was washed with soap and water. The skin was pierced with a lancet through these drops. We also tested each patient with a positive (histamine) and a negative (buffer saline) control solution. We read the results after 15 minutes. A positive reaction should have both a wheal and a flare. The flare should be at least 3mm more than the negative control.

Results

Sixty-nine patients were enrolled with us. The data sample consists of a total of 65 children of which 66.2% (n=43) were males and 33.8% (n=22) were females. Four children did not consent to the allergy tests. They were excluded. Table 1 gives the mean ages of patients with various co-morbid conditions in AR. Thus the mean age of patients with asthma (8.41 $\pm$ 4.42 years), urticaria (8.5 $\pm$ 4.0 years) and sinusitis (8.93 $\pm$ 4.11 years) is almost same while that

of conjunctivitis (10.21 $\pm$ 4.3 years) is higher. Table 2 gives the sex-wise prevalence of co-morbid conditions in AR. The prevalence of asthma and conjunctivitis was found to be higher amongst males than females. The percentage of males and females with urticaria and sinusitis was almost similar, while atopic dermatitis was found to be present in a higher percentage of females than males. Table 3 gives a comparison between the present study and that of Ratagiri [18]. Table 4 compares the findings in children below and above 6 years of age. The most common co-morbid condition with AR is asthma (75.4%), followed by urticaria (33.9%), conjunctivitis (29.2%) and sinusitis (23.1%). Table IV shows that there was no difference in symptoms of asthma between children below and above the age of 6 years (73.2 % v/s 76. 9%). Psoriasis was detected in 4/65 (6.15%) patients. Only four patients (6.2%) were without any co-morbid conditions.

Discussion

The study emphasizes the high association of co-morbid conditions in patients with AR. Less than 10% children were free of any co-morbid condition. Asthma (75.4%) is the most common co-morbid condition. This is not surprising as the mucosa lining the upper and the lower respiratory tracts are continuous and are governed by similar genetic, immunologic and environmental factors, resulting in similar inflammatory and immune responses. The two conditions may manifest together or sequentially. An acute attack of AR may precipitate acute attacks of asthma as shown in Eastern India [5] on 7208 adults and children with asthma. In an oft-quoted earlier report [16], 40% of children with AR had associated asthma, while 50% to 80% cases of asthma had AR. The authors report that even these figures appear to be gross underestimates, as on direct questioning of parents of 516 asthmatic children in that study (between 1998-1999), over 98% admitted to the presence of AR earlier or concurrently with asthma.

From India, Ratageri [18] has observed that among 711 children, who presented with asthma, 32% were below and 68 % were above the age of 5 years. In the present study, the percentage of children with AR who had symptoms

Table 2 Sex-wise prevalence of co-morbid conditions in Allergic rhinitis.

COMORBID CONDITION	TOTAL	MALE	FEMALE
Asthma	75.38% (n=49)	80 % (n=34)	68.18 % (n=15)
Urticaria	33.85 % (n=22)	32.56 % (n=14)	36.36 % (n=8)
Conjunctivitis	29.23 % (n=19)	34.88 % (n=15)	18.18 % (n=4)
Sinusitis	23.08 % (n=15)	23.26 % (n=10)	22.73 % (n=5)
Atopic dermatitis	13.85 % (n=9)	11.63 % (n=5)	18.18% (n=4)
F/H of allergy or asthma	46.15 % (n=30)	51.16 % (n=22)	36.36 % (n=8)

Table 3 Comparison of present study with Ratageri's study [16]

Study	Year	No. of pts. With asthma	Mean Age + SD	AR	F/H asthma or Allergy	Urticaria	Conjunctivitis	Sinusitis	Atopic Dermatitis
Present Study	Mar 2005–Oct 2006	49 cases	8.41 ± 4.42	100% (n=49)	55.10% (n=27)	26.93% (n=13)	30.61% (n=15)	16.33% (n=8)	12.24% (n=6)
Ratageri	May 1996–April 1998	120 cases 60 control	5-15 yrs	15.83% (n=19)	42.5 % (n=51)	-----	-----	-----	5 % (n=6)

SD: Standard deviation, AR: Allergic rhinitis

Table 4 Presence of asthma and other comorbid conditions in children with AR below and above the age of 6 years

	Age < 6 yrs	Age > 6 yrs
Total (n)	23	42
Mean Age + SD	3.78 + 1.35	11.14 + 3.17
Asthma	73.91% (n=17)	76.19 % (n=32)
F/H allergy or asthma	47.83 % (n=11)	45.24 % (n=19)
Urticaria	34.78 % (n=8)	33.33 % (n=14)
Presently suffering from or P/H/O Atopic dermatitis	30.43 % (n=7)	4.76 % (n=2)
Sinusitis	17.39 % (n=4)	14.29 % (n=6)
Conjunctivitis	17.39 % (n=4)	35.71 % (n=15)

SD: Standard deviation, AR: Allergic rhinitis

of asthma was similar in those below and above 6 years (73.9 v/s 76.2%). The mean age of children having asthma with AR in our study was 8.41 yrs (SD=4.42). This could mean that, asthma develops earlier or simultaneously in these patients. We have chosen 6 years as the cut off value because a subset of children becomes free of asthma by this age.

We could perform spirometry in 29/65 (44.6%). Of these 9/29 (31%) did not give a history or give symptoms of asthma. All the 29 however had mild to moderate airway obstruction on spirometry including those who did not have any history or symptoms of asthma. In Thiruvengadam's [19] study, 62% had bronchial hypersensitivity in the absence of symptoms of asthma. This could be due to difference in the age groups studied, as the present study included only children. Importantly asthma is not necessarily clinically manifest in AR patients. There is, therefore a need to diagnose airway hypersensitivity as early as possible in children with AR, to prevent or delay the development of asthma and other co-morbid conditions and allergen sensitizations. This has been proved by various studies [12-15]. However, the tests available for detecting airway hyper-reactivity, at younger age are not easily available and difficult to perform. Hopefully in the future easy availability of pulmonary function testing in younger children would be available.

Dermatological involvement was present in 53.5% of AR. Urticaria was seen in 33.85 % and atopic dermati-

tis in 13.85%. Atopic dermatitis was seen with a greater frequency in children below the age of six years as compared to those above the age of six years. This is because atopic dermatitis is mainly a disease of infancy and early childhood. An unexpected finding was that psoriasis was recorded in 4/65 (6.2%) cases of AR. The reported incidence of psoriasis in the general population is 0.5% [20].

The incidence of sinusitis in our study was 23.1%. This figure is much lower than that of Verghese [21] (69%) In our study the mean age of children suffering from sinusitis was 8.9 years (SD=4.11). The onset of symptoms indicating sinusitis in these patients was between 2-4 years prior to presentation. Two patients each (3.1%) had adenoid hypertrophy and nasal polyps. An important feature was that majority of these children did not give a history of symptoms suggestive of sinusitis. On enquiry three had a history of headache and /or throat clearing and mouth breathing. We found halitosis in 4 patients and swelling of the face in two cases. Conjunctivitis was noted in 29.2% (n=19) patients with a mean age of 10.2 yrs (SD=4.3). We have primarily studied children with a history of AR. It is quite likely that some of the children may visit ophthalmologists and may also be having AR.

As shown in Table IV, family history of allergy or asthma was present in 44.62% children against 76.9% reported by Verghese [21].

PROFORMA

NAME :

AGE:

SEX :

HH NO.:

SYMPTOMS of :

Yes/No

Duration

I ALLERGIC RHINITIS

1. Nose leak
2. Nose block
3. Sneezing
4. Sore throat

II ASTHMA

1. Cough
2. Breathlessness
3. Wheezing

III URTICARIA / ATOPIC DERMATITIS

1. Skin rash
2. Swelling of face / body
3. Pruritis

IV CONJUNCTIVITIS

1. Watering of eyes
2. Eye redness
3. Itchy Eyes

V SINUSITIS / ADENOID HYPERTROPHY

1. Headache
2. Throat clearing
3. Snoring

VI H/O any other illness :

VII F/H of asthma / allergy

VIII INVESTIGATIONS :

1. Skin prick tests to 10 common allergens
2. Pulmonary Function tests
3. X-Ray Paranasal Sinuses

Conclusions

Only 4 patients (6.2%) were free from any co-morbid condition as opposed to 61/65 (93.8%), who suffered from one to three co-morbid conditions each. Co-morbid conditions are a rule rather than an exception, the most common association being asthma. Asthma often is asymptomatic and routine PFT testing is valuable.

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