

ORIGINAL ARTICLE

Links between Bronchial Asthma and Allergic Rhinitis in the Oita Prefecture, Japan

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Recent studies have strengthened the concept that bronchial asthma and allergic rhinitis are manifestations of an inflammatory process within a continuous airway. This study was performed to compare clinical findings in asthma with or without rhinitis in Japan. Nasal symptoms were present in 99.6% of asthma patients. The prevalence of allergic rhinitis in patients with asthma was 52.4%. Bronchial asthma attacks in one third of patients with rhinitis were coincident with worsening of nasal symptoms. In adults (>16 years of age), rhinitis frequently preceded asthma, whereas asthma preceded rhinitis in children (<16 years of age). The frequency of rhinitis in asthma decreases with increasing age. This study demonstrated a clear link between upper and lower airway disorders in Japan.

Keywords bronchial asthma, allergic rhinitis, one airway disease

INTRODUCTION

Bronchial asthma (BA) and allergic rhinitis (AR) often occur in the same patients. BA and AR are characterized by a similar inflammatory process in which eosinophils are important effector cells. The bronchial and nasal mucosa have similar presentations, and most patients with asthma also have AR, supporting the “one airway, one disease” concept (1, 2). However, there are few data on the epidemiologic relation between rhinitis and asthma, especially in Eastern countries (3). A study of the prevalence of asthma and AR in the Oita Prefecture, Japan, provided us the opportunity to investigate these problems further.

We administered a questionnaire and interviewed more than 200 outpatients with mild to severe asthma about their asthma and rhinitis symptoms. A significant relationship between asthma and rhinitis was found.

METHOD

The present study was performed between October and December 2004. Eight medical facilities, ranging from private clinics to university hospitals, participated in the study. We used a questionnaire to obtain information on the impact of both asthma and AR on everyday symptoms (Table 1). Outpatients ($n = 246$) with mild to severe asthma in the Oita Prefecture, Japan, were surveyed. Of all the patients who regularly attended these facilities, 246 outpatients answered the

questionnaire and were interviewed at each site. As shown in Table 2, the questionnaire consisted of 10 questions assessing asthma and rhinitis symptoms during the previous week.

Histories of BA and AR were obtained through personal contact with patients to complete an initial questionnaire of their personal history of allergy, and additional history was obtained through personal interviews of patients at the time of the consultation.

Rhinitis is characterized by chronic or recurrent sneezing and a runny or blocked nose, which might be seasonal or perennial. These symptoms might be labeled as “allergic” when a causative allergen is identified or “non-allergic” when it is classified according to whether nasal eosinophilia is present. The following criteria were used to classify the specific allergy diagnosis: BA—a history of recurrent, reversible episodes of wheezing and dyspnea not caused by any known organic condition. The severity of BA was classified according to the criteria of Japan Guide Line (JGL); AR—a history of watery, itchy eyes, rhinorrhea, and sneezing occurring both during the same seasonal period for at least 2 consecutive years and not seasonally and associated with exposure to particular antigens. AR was divided into two groups: definite AR was diagnosed by an otorhinolaryngologist, and probable AR was diagnosed by general or respiratory physicians. BA was diagnosed by respiratory physicians.

Significant difference were evaluated by Fisher’s test. A p value of less than 0.05 was considered to be statistically significant.

RESULTS

The characteristics of the analyzed subjects are shown in Table 2. The subjects comprised 32.1% men and 67.1%

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TABLE 1.—Subject characteristics.

	Asthma patients		Total
	With rhinitis	Without rhinitis	
Case (male/Female)	129 (40/88)	117 (39/78)	246 (79/165)
Age	49.9 ± 17.7	61.1 ± 16.3	55.2 ± 17.9
Duration of asthma	13.4 ± 12.2	13.1 ± 12.9	13.3 ± 12.5
Recent attack	30.18% (35/116)	19.8% (21/106)	26% (56/212)

TABLE 2.—Questionnaire on asthma and allergic rhinitis.

1. When did the asthma begin?
2. Has or when has a doctor ever said that you had rhinitis or allergic rhinitis?
3. Of the asthma and the allergic rhinitis, which emerged first?
4. In the past 7 days, have you had nasal symptoms (nasal obstruction, nasal discharge, sneezing)?
5. In the past 7 days, have you ever had an attack of wheezing or received treatment for asthma?
6. At that time, was aggravation of BA synchronous with worsening of AR symptoms (nasal obstruction, nasal discharge, sneezing)?

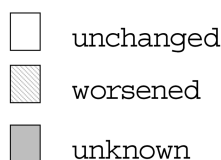
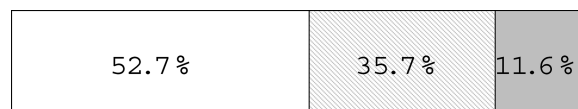


FIGURE 1.—Synchronous worsening of nasal symptoms in asthma with allergic rhinitis. Columns show percentage of change of nose condition in asthma patients with allergic rhinitis.

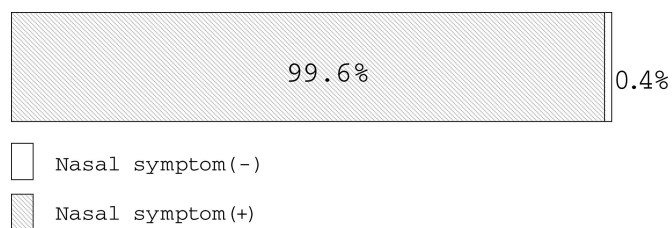


FIGURE 2.—Nasal symptoms in asthma. Columns show percentage of nasal symptoms in asthma patients.

women, with a mean age of 55.2 ± 17.9 years. The percentage of patients with AR among all patients with BA is 52.4%. In the present study, a higher percentage of patients had BA associated with perennial AR (67.4%) than with seasonal AR (23.3%). The contraction period of BA with AR was $13.4\% \pm 12.2\%$ and in BA without AR was $13.1\% \pm 12.9\%$. There were no significant differences in the incidence of AR according to BA severity. BA attacks tended to occur more frequently in BA with AR than without AR, but the difference was not significant.

Aggravation of 35.7% of those with BA and AR was synchronous with worsening of AR symptoms (Figure 1). Nasal symptoms were not only observed in BA with AR, but also in BA without AR (Figure 2). Surprisingly, 99.6% of BA had nasal symptoms, suggesting that nasal symptoms are closely related to BA.

Among subjects older than 16 years of age, 62.5% had AR first; 30.2% had BA first; and 7.3% had both diseases at the same time. In contrast, among those 16 years of age and younger, 13% had AR first, 78.3% had BA first, and 8.7% had both diseases at the same time (Figure 3). There was a significant difference between the two groups.

The relationship between the AR complications and age in BA is shown in Figure 4. The rate of complications decreased with age. There was significant difference in the rate of complications between subjects over 60 years of age and those 60 years of age and younger.

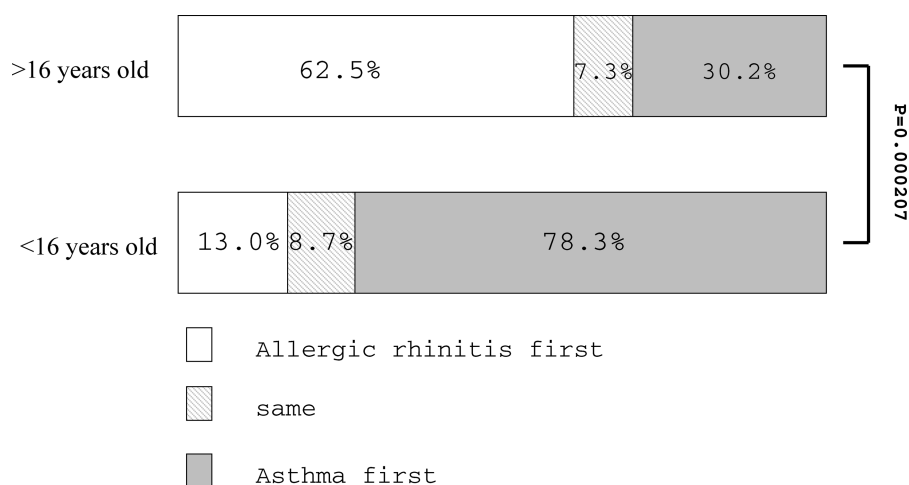


FIGURE 3.—Onset of asthma and allergic rhinitis.

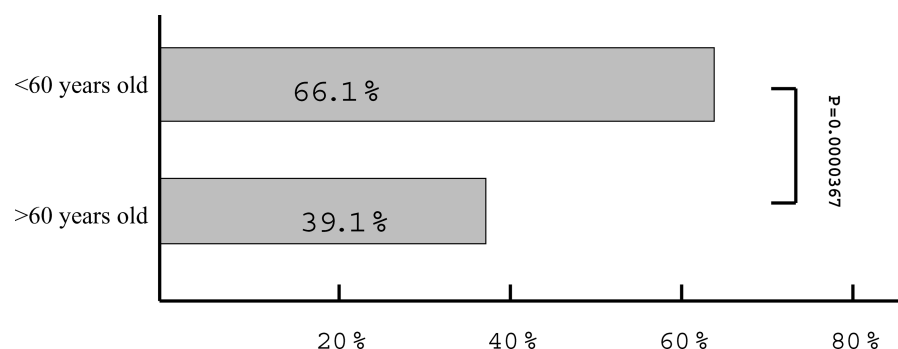


FIGURE 4.—Rate of complications of asthma and allergic rhinitis between those over 60 years of age and under 60 years of age. Bars show percentage of allergic rhinitis in asthma patients.

DISCUSSION

AR is part of a systemic disease complex. The close relation between AR and BA led to the concept of “one airway, one disease.” Both conditions share common immunopathology and pathophysiology. Increasing evidence on the link between AR and BA comes from epidemiologic, immunologic, and clinical studies. Epidemiologically, approximately 80% of patients with asthma experience nasal symptoms (4). Seasonal and nonseasonal AR continue to be significant risk factors for developing asthma (5). AR occurs in 28% to 77% of patients with BA in Western countries (6–8). There are only a few epidemiologic reports in the English literature regarding the prevalence of BA in AR in Eastern countries (9). In the present study, the percentage of patients with AR among all patients with BA was 52.4%. There was a higher percentage of patients associated with perennial AR (67.4%) than patients with seasonal AR (23.3%). Concomitant AR and BA result in a higher rate of BA attacks and more emergency room visits than BA without concomitant AR (10). In the present study, BA attacks occurred more frequently in BA with AR than in BA without AR, although the difference was not significant. Additionally, aggravation of one third of BA patients with AR was synchronous with worsening of AR symptoms.

All but one subject in the present study had nasal symptoms, which is a surprisingly high rate. Non-AR is also associated with asthma (11). Sinusitis and asthma were also frequently associated in the same patient (12), but we did not conduct interviews about the sinusitis. Therefore, the high prevalence of nasal symptoms in BA indicates the possibility of underestimating AR, non-AR, and sinusitis complications.

The influence of the condition of the upper airway on the lower airway, the condition of the upper airway on the lower airway, and vice versa, is age dependent. In adults, AR frequently precedes BA (5, 7). The present findings are consistent with previous reports. In contrast to adult cases, our data demonstrated that BA precedes AR in children. Outbreak of the illness sequence is significantly different between adults

and children. In addition, the rate of complications of BA and AR decreased with increased patient age.

The findings of the present study are consistent with reports published on subjects from Western countries. In addition, most people had nasal symptoms, and BA and AR became worse simultaneously in one third of the asthmatic cases. Our epidemiologic studies in BA patients provide evidence that BA and AR are strongly associated with each other in the Oita Prefecture, Japan.

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