ENT Physicians' Efforts to Treat Allergic Diseases at Schools

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Abstract

Recently Sinusitis is declining in severity, while allergic rhinitis is increasing in prevalence. Although improved nutrition and the spread of hygiene information have caused a decline of sinusitis, air pollution has caused an increase in rhinitis. Behind these changes, the first factor to consider is air pollution. While areas with no air pollution have more schoolchildren with infectious rhinitis, sinusitis and allergic rhinitis are both notably more prevalent among schoolchildren in air-polluted areas. In a nationwide survey, the prevalence of cedar and cypress pollen allergies was the highest at 26.9% in Yamanashi Prefecture, followed by Nagano, Kochi, and Shizuoka Prefectures. Although it is said that pollen allergies have come to affect children at younger ages, teenagers and younger children are also more likely to have perennial allergic rhinitis. Analysis of the association between allergic rhinitis and sports showed that the prevalence rate was higher among children playing indoor sports and lower among children playing outdoor sports or no sports. The prevalence rate was lower among children who received treatment, health management guidance, and hygiene management guidance. With respect to the association between allergic rhinitis and learning, healthy children had better academic performance records, while placebo-treated children performed worse, and those who received medication showed varying results, with some children performing well depending on what drugs were administered.

Key words Allergic rhinitis, School health, Health management, ENT physicians

A Shift from Sinusitis to Allergic Rhinitis

Before discussing allergic rhinitis, let us take a historical look at the changes in nose and sinus inflammations. Shortly after World War II, many children had purulent nasal discharge as a sign of so-called empyema. Nowadays, they present with watery nasal discharge and sneezing. Behind this change are factors reflecting the changing times, such as improved nutrition, the spread of hygiene information, air pollution, and lifestyle changes, and the progress of this gradual change can be traced through the records of school health screening. Sinusitis, which was relatively uncommon before World War II, increased in the postwar period, particularly in rural areas. A survey of one village showed that approximately 50% of students had sinusitis around 1950, and this rate dropped to 10% after 30 years.

In a survey of outpatients at a hospital in Tokyo where I worked, sinusitis decreased from 59.9% in 1963 to 34.5% in 1979, while allergic rhinitis increased from 14.5% to 24% during the same period. This trend is believed to have expanded further in later years. Considering changes such as this transition, the management of allergic rhinitis and patient support at schools is discussed below.

Epidemiology—Nose and sinus inflammations in school health screening

With respect to nutrition, there has been a decline in the severity of sinusitis associated with the

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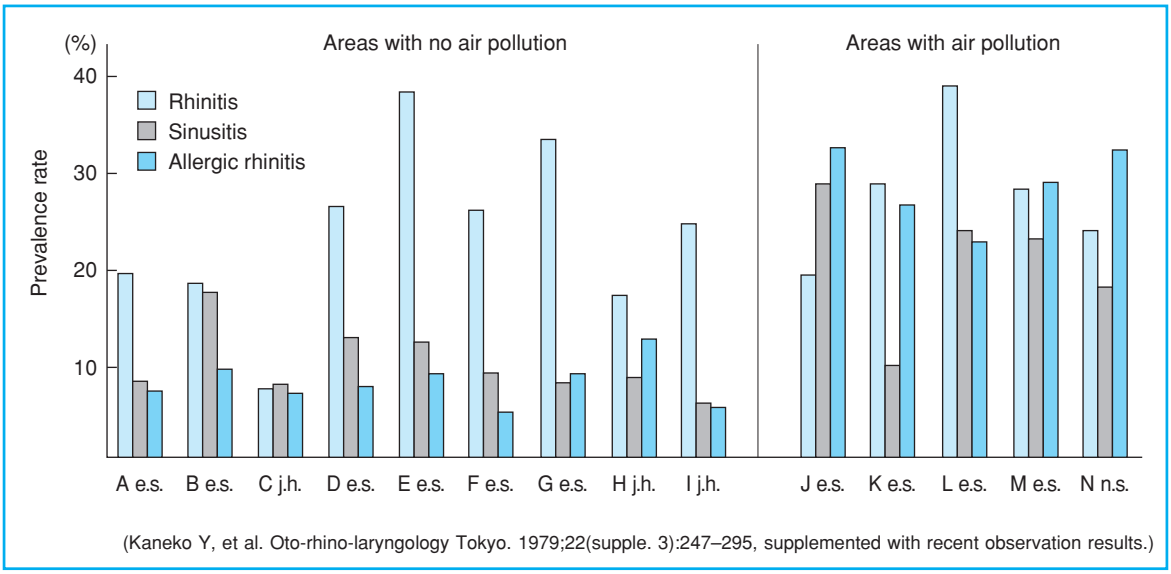

Fig. 1 Prevalence rates of various nasal disorders by area and school
e.s.: elementary school, j.h.: junior high school, n.s.: nursery school

change from the postwar period when people combated hunger with carbohydrates to nowadays when plenty of protein (animal protein, in particular) and fat are consumed. A nutritional survey conducted by a university has shown that the areas in which people pay less for food have more sinusitis than the areas in which people pay more for food. In essence, these differences seem to have arisen because well-balanced, adequate nutrition enhances resistance to inflammation.

The next question is why allergic rhinitis has increased. In considering this problem, we should first look at air pollution. A comparison between the prevalence rates of allergic rhinitis at schools in areas with and without air pollution (Fig. 1) shows that the areas with no air pollution have more schoolchildren with infectious rhinitis, while sinusitis and allergic rhinitis are both remarkably more prevalent among schoolchildren in air-polluted areas.[1]

Classification

There are several types of rhinitis. Although allergic rhinitis is generally equated with pollen allergies, it is divided into perennial allergic rhinitis and seasonal allergic rhinitis, and pollen allergies are the typical form of seasonal allergic rhinitis. Because many people were sensitized to house dust in their childhood, a great majority of patients have perennial allergic rhinitis. Non-allergic diseases that need to be distinguished from allergic rhinitis include vasomotor rhinitis and eosinophilic rhinitis, which are subtypes of non-infectious hyperesthetic rhinitis, as well as infectious rhinitis and irritative rhinitis.

Allergic Rhinitis

Prevalence rate by prefecture

The most widely quoted data are those from the survey of ENT physicians and their families conducted by Baba,[2] and the following is based on these data. The survey found that among the types of seasonal allergic rhinitis, the prevalence of cedar and cypress pollen allergies was the highest at 26.9% in Yamanashi Prefecture, followed by Nagano, Kochi, Shizuoka, and Mie Prefectures; it was the lowest in Okinawa, Kagoshima, and Hokkaido Prefectures. Including allergy to other pollen species, pollen allergies as a whole, including those other than cedar and cypress pollen allergies, were the most prevalent in Nagano and Yamanashi Prefectures. In contrast, perennial allergic rhinitis was most common in Fukui and Gifu Prefectures. It was also relatively common in Hokkaido, Aomori, Yamagata, Miyazaki, and Kagoshima Prefectures, where cedar and cypress

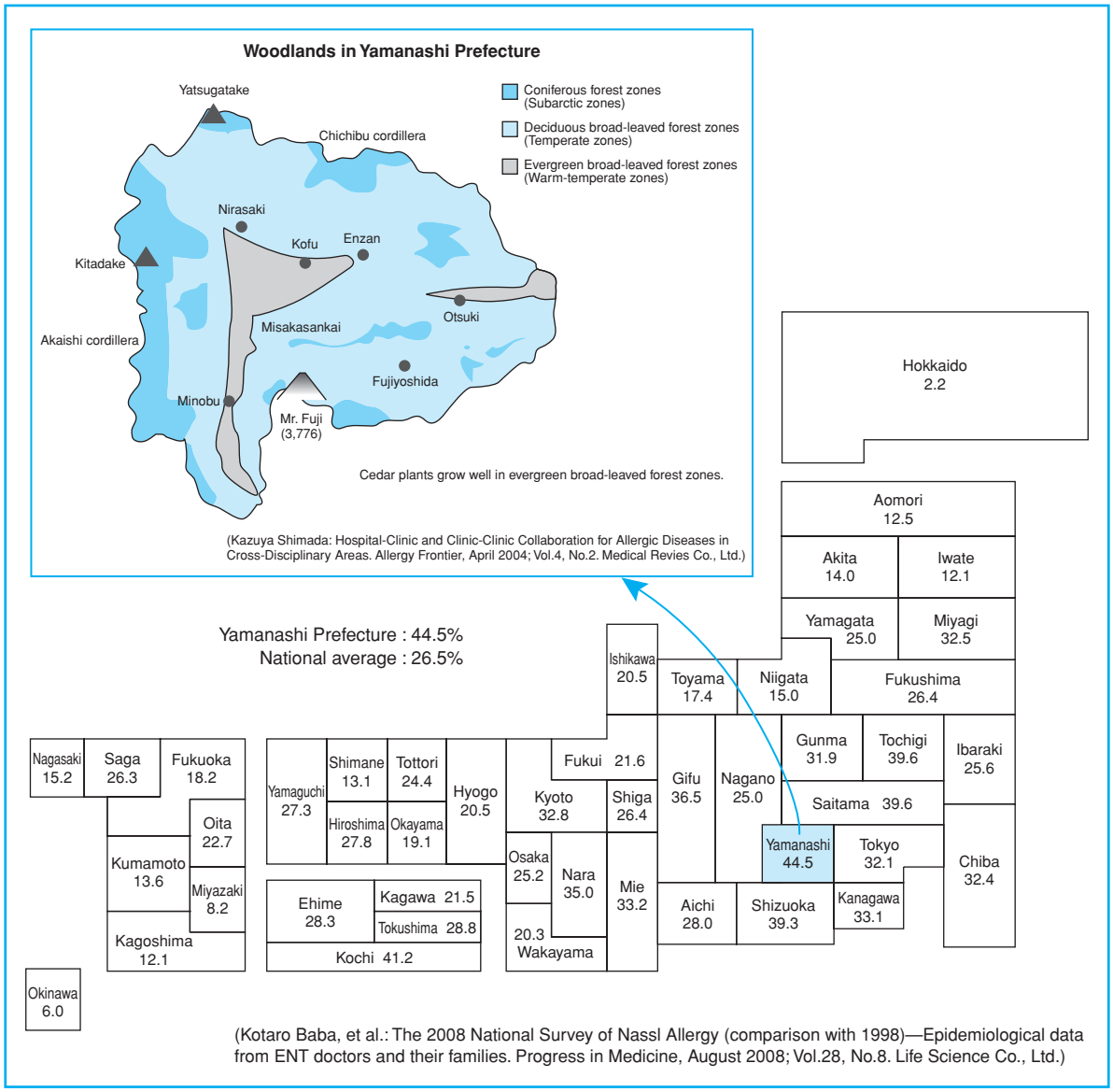

Fig. 2 Prevalence of cedar pollen allergy

pollen allergies were rare. This may reflect the fact that the Hokkaido and Tohoku regions have more house dust and mites, while the Chugoku and Kyushu regions have more varieties of pollen allergens. The national survey reported in 2007 by the Ministry of Education, Culture, Sports, Science and Technology[3] presented somewhat lower prevalence rates.

The survey conducted at my clinic also showed a predominance of cedar and cypress pollen and house dust irrespective of the time of examination, followed in decreasing order by ragweed, candida, mugwort, orchard grass and *Humulus scandens*, and Japanese red pine.

Allergic rhinitis and age

It is said that pollen allergies in general, including cedar and cypress pollen allergies, have started to affect children at lower ages. However, the prevalence of pollen allergies has become substantially high only in adults aged 30 years or over. It is uncommon among elementary school students in

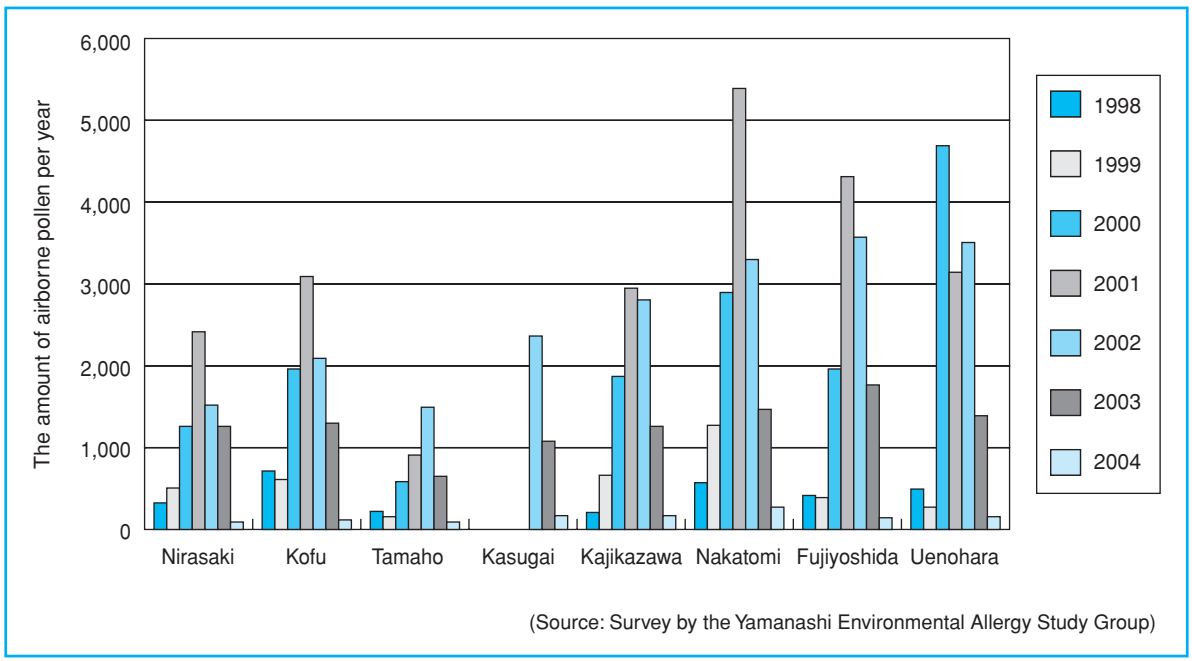

Fig. 3 Variations in the amount of cedar pollen in the air in various areas of Yamanashi Prefecture

lower grades. Teenagers are more likely to have perennial allergic rhinitis.

Allergic rhinitis and swimming

Because allergic rhinitis develops through complex disease mechanisms, various factors affect its onset and symptoms. As a result, there is no universal rule for deciding whether a patient should or should not be allowed to swim, and this causes considerable difficulties in teaching swimming classes. Our survey showed that the prevalence rate was high in the swimming group and the indoor sports group, but low in the outdoor sports group and the no sports group. Allergen tests revealed no difference in the percentage of positive results, but the occurrence of symptoms was high in the swimming group and low in the outdoor sports group.[4]

In a comparison between elementary schools in Shinagawa Ward, Tokyo and those in a medium-sized city in Yamanashi Prefecture, the above results were more notable in Shinagawa Ward. This observation supports the view that swimming may not be responsible for the development of allergic rhinitis and the onset of symptoms, and the influence of automobile emissions and other environmental factors may be involved. The prevalence rate for allergic rhinitis was lower among children who received treatment, health management guidance, and hygiene management guidance based on the results of health screening than among those who did not.

Y-G test and nose and sinus inflammations

Due to discomforting symptoms such as nasal obstruction and rhinorrhea, patients with nose and sinus infections often show a lack of mental stability. The relationship between nose and sinus disorders and the Yatabe-Guilford Personality Inventory (Y-G test) was examined. The most prevalent personality type overall was the stable and active D (director) type (diagonal pattern from top-left to bottom-right). Sinusitis was associated with an excess of the emotionally unstable, socially inadaptable, and extroverted B (black list) type (right-skewed pattern), while the combination of sinusitis plus allergic rhinitis was associated with an excess of the stable, adaptive, and passive C (calm) type (left-skewed pattern). The A (average) type and the E (eccentric) type (diagonal pattern from top-right to bottom left) were seen in a minority of cases in every disease pattern.

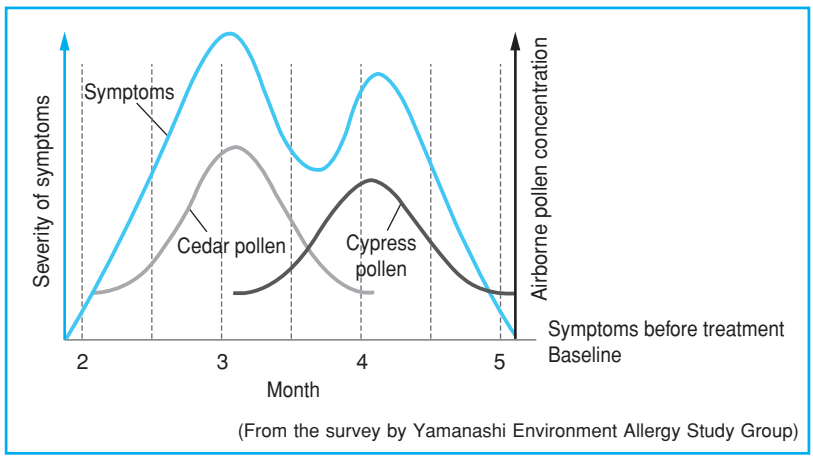

Fig. 4 Relationship between pollen concentration and symptoms

General learning score

Some people talk about an association between academic achievement and nasal disorders. A previous survey conducted by us showed that students with sinusitis had somewhat poorer performance records for science and mathematics, and we concluded that the annoyance caused by nasal occlusion and rhinorrhea might affect the students' ability to think. In a study, 10 to 12-year-old healthy students and students with seasonal allergic rhinitis (treated with placebo or medication) played a computer simulation game and then were evaluated using paper tests and games 2 weeks later. The results indicated that healthy children performed better. While placebo-treated children performed worse, those who received medication showed varying results depending on what drugs were administered.[5]

Pollen monitoring in Yamanashi prefecture (Fig. 2)

Pollen monitoring has been continued at 8 locations in Yamanashi Prefecture. At the beginning of monitoring, we did not expect to find large regional differences within the limited area of Yamanashi Prefecture. However, actual monitoring results revealed high pollen concentrations in former Nakatomi Town (presently part of Minobu Town), located along Route 52, Fuji River, and the Japan Railways Minobu Line, an area where many cedar trees grow in the surrounding mountains and some pollen is carried by the wind from Shizuoka Prefecture. Pollen levels were also high in the areas around Fujiyoshida City and Uenohara Town, which receive wind-borne pollen from the Sagami area. (Fig. 3)

In an ordinary year, cedar pollen and cypress pollen become airborne in a bimodal pattern, and the severity of symptoms follows this pattern, as shown in Fig. 4. However, this year, the low temperatures and snowfall in January and February retarded the flowering of cedars, and the flowering of cypresses will take place as usual. It is therefore probable that both cedar pollen and cypress pollen will be airborne at the same time.

Oral allergy syndrome

Oral allergy syndrome is estimated to occur in about 20–30% of patients with cedar and cypress pollen allergies. Individuals who are positive for birch allergens are considered more likely to develop this syndrome. Many birch-positive individuals are found even in the Kofu Basin, where birch does not grow naturally. We are instructing birch-positive individuals to avoid peaches, apples, cherries, pears, and other rosaceous fruits, as well as melons, kiwi fruits, and pineapples.[6]

Treatment of pollen allergies

Skipping the discussion of treatment after the development of symptoms, here we will focus on prophylactic treatment or early treatment, which has been attracting much attention recently. By commencing medication early, this treatment aims to suppress the rise of hypersensitivity, delay the development of symptoms, and reduce the severity of symptoms during the peak pollen

season. Because there are individual differences in the timing of symptom onset, treatment should be administered with consideration given to test results and while maintaining sufficient communication with the patient. In treatment, attention should be paid to the fact that pollen concentrations in areas with many cypress trees change in a bimodal pattern, in which cypress pollen increases after cedar pollen decreases.

Cedar and cypress pollen prediction for this year

High temperatures and long hours of sunshine in July are considered to promote the formation of male flowers. Last year, temperatures rose in the latter half of July. Although there are difficulties in predicting how this may influence pollen production, the current forecast is for 2 or 3 times the amount of pollen last year. Because the pollen concentration was low last year, the level this year is expected to be largely the same as or somewhat higher than that in an ordinary year. There are also forecasts that pollen levels will be high in the Pacific coast areas of the Kanto region, similar to last year's levels in the Kansai region, and lower than last year's levels in the Hokuriku and Kyushu regions.

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