

Allergic Rhinitis: An Updated Overview

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Abstract Allergic rhinitis is a major medical and socio-economic problem due to its troublesome local symptoms, negative impact on quality of life, association with reduced productivity and increased absenteeism, its widespread nature, and the rapidly rising medical costs associated with the disease. Its handling depends on improved understanding of genetic, biological, environmental, and lifestyle predisposing factors, and the development of new and effective treatment strategies, both medically and focusing on the way we are living.

Keywords Allergic rhinitis · Symptoms · Complications · Epidemiology · Investigation · Treatment

Introduction

Until a decade ago, allergic rhinitis was considered a relatively rare disease. Current data indicate that 40% of children and 10% to 30% of adults (ie, >300 million individuals) in industrialized countries suffer from the disease. It is further estimated that within the next 15 years, the prevalence of allergic rhinitis in the Western world will reach 50%. Besides being a debilitating disease

on an individual and social level, it has a major negative impact on national and global health economics due to direct and indirect costs [1, 2–7], thus reinforcing the need for an update on the topic.

Clinical Characteristics and Complications

The typical clinical manifestations of allergic rhinitis are as follows:

- Nasal itching
- Sneezing
- Nasal running
- Nasal obstruction

Some or all of these symptoms may also be seen in other disorders. A correspondence in time and place between allergen exposure and symptoms indicates an allergic etiology. Allergic rhinitis may be directly or indirectly complicated by other manifestations [8–13]:

- Asthma. The relationship between the two disorders is most convincingly demonstrated in several publications and may be considered to be different manifestations of the same inflammatory airway disease [4, 14–19].
- Sinusitis. Allergic rhinitis usually implies a congested nasal mucosa. Thus, the communication between the nasal cavity and the sinuses may be impaired, a feature that is the starting point for most cases of sinusitis [20].
- Impaired facial growth. Normal development of the facial skeleton during childhood presupposes contact between the teeth in the upper and lower jaws. Mouth

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breathing due to increased nasal resistance is a typical feature of allergic rhinitis. Accordingly, facial growth may be affected.

- Impaired ability to concentrate, learn, and perform is frequently a consequence of allergic rhinitis. It may have a major negative impact on educational, work, sports, and social activities [9, 11].
- Nasal obstruction is not compatible with good sleep quality. This refers to snoring and obstructive sleep apnea. Thus, daytime alertness may be affected [12, 13].

Prevalence, Epidemiology, and Background

Recent studies have demonstrated a rise in the prevalence of allergic rhinitis. Purported contributing factors include the following:

- Improved hygiene
- Increased exposure to allergens
- Changes in lifestyle

As to improved hygiene, the hygiene hypothesis postulates an inverse relationship between microbial exposure and the likelihood of developing allergic diseases [21, 22, 23]. It was based on a paper from 1989 in which a reduced rate of allergy was described in children with older siblings. In societies in which the incidence of allergy has increased, there has been a parallel change that implies a reduced exposure to microorganisms. This includes measures to eliminate bacteria from food and drinking water, and antibiotics and vaccines to control and prevent bacterial infections.

Regarding increased exposure to allergens, modern building techniques imply increased indoor temperature and humidity [24–26]. This favors the growth of the major indoor allergens, specifically mites and molds. The same buildings offer less ventilation, which further improves the conditions for indoor allergens. As this happens, carpets and other reservoirs for indoor allergens become more widespread, and the time spent indoors increases because of increased focus on electronic entertainment and communication such as TV and Internet. The sum of this is increased exposure and, thus, most likely, increased sensitization to indoor allergens [27, 28].

As to changes in lifestyle with consequences for allergy, this implies more time spent indoors and consequently more exposure to indoor allergens. Changes in lifestyle also include changes in diets and a general increase in body mass index [29, 30]. Decreased levels of vitamin D as a consequence of the former and the latter also represent a major concern as to the increase in the prevalence of allergic disorders [31].

Investigation

History

The key issue is a relationship between allergen exposure and one or more of the typical allergic rhinitis symptoms. If such a correlation does not exist, allergy is less likely. Other matters that should be disclosed include hereditary disposition; seasonal or perennial characteristics of symptoms; severity of disease; medical, social, educational, and professional complications; and effect of previous treatment.

Laboratory

Skin prick testing has a sensitivity and specificity greater than 90% for aeroallergens. It is safe, the costs are relatively low, and results are available within 15 min. Accordingly, this is a test to be recommended in routine allergy investigation [32, 33].

Provocation—conjunctival or nasal—will yield a local response within minutes in sensitized individuals. It has been shown to be useful in various settings. However, potential considerable discomfort and lack of standardized extracts and procedures limit its application [34–36].

In Vitro Tests

Total IgE As a majority of patients suffering from allergic rhinitis have a total IgE within the normal range, this has a limited value in verifying or dispelling allergy in the upper airways and is generally not recommended as a diagnostic aid in allergic rhinitis. However, serum IgE greater than 100 IU/mL before age 6 years may indicate an allergic predisposition [37].

Specific IgE The sensitivity and specificity are comparable with skin prick testing. However, the cost per allergen is considerably higher, and it takes days before patients can get results [38].

Treatment

Allergen Avoidance

Allergen avoidance is appropriate in patients with symptoms of allergic rhinitis and in whom allergen sensitization has been documented through positive skin prick tests or in whom levels of specific IgE antibodies are above normal. Measures of avoidance should be taken against all relevant allergens [20].

As to mites, this implies detailed information about how to modify the indoor environment in a way in which there will be less areas in which the mites can habitate (ie, less for the mites to eat, cleaning in its broadest sense, and reduced temperature and humidity). It must be pointed out that the effects of measures such as this are disputed (eg, the effect of chemicals such as benzyl benzoate and tannic acid in controlling the mite concentration have not been convincingly demonstrated and should not be recommended) [39].

With regard to pets, in individuals with symptoms and documented sensitization against certain animals, avoidance measures should be taken. Principally, that means no pets of that kind should be kept indoors or outdoors. One allergy-causing pet should not be replaced by another, as sensitization will reoccur. Generally, allergy-secure pets or animals do not exist, except for reptiles. Symptoms may be reduced by aggressive cleaning of the animal itself and the environment in which the animal lives [40–42].

As to pollen and molds, contact is generally difficult to avoid [43–45]. Some measures to reduce exposure and reduce its consequences are as follows:

- Follow pollen warnings and avoid areas with high pollen concentrations.
- Consider staying indoors with doors and windows closed on days with high pollen concentrations.
- Irrigate eyes and nose with saline and clean the hair when exposure is unavoidable.
- Install pollen filters in cars' ventilatory systems.
- Use sunglasses in high pollen concentration environments.
- Avoid outdoor drying of cleaned textiles.
- Avoid irritants such as tobacco smoke, pollutants, and perfumes.

Pharmacotherapy

The ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines offer recommendations about pharmacologic treatment of allergic rhinitis related to symptom severity and symptom duration (Fig. 1) [46•].

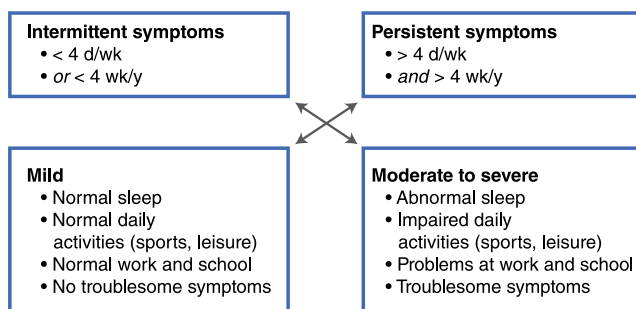


Fig. 1 The ARIA (Allergic Rhinitis and its Impact on Asthma) classification of allergic rhinitis

Recommendations for the Treatment of Mild Intermittent Symptoms

To treat mild intermittent symptoms, the following is recommended:

- New-generation oral H₁-antihistamines that do not cause sedation or interact with cytochrome P450
- In adults with severe nasal obstruction, very short courses—no longer than 5 days—with intranasal decongestants may be useful
- Oral leukotriene receptor antagonists.

Recommendations for the Treatment of Mild Persistent Symptoms

To treat mild persistent symptoms, the following is recommended:

- Intranasal glucocorticosteroids, for both adults and children
- New-generation oral H₁-antihistamines that do not cause sedation or interact with cytochrome P450

Recommendations for the Treatment of Severe Intermittent Symptoms

To treat severe intermittent symptoms, the following is recommended:

- Intranasal glucocorticosteroids, for both adults and children
- New-generation oral H₁-antihistamines that do not cause sedation or interact with cytochrome P450
- Intranasal H₁-antihistamines
- Intranasal chromones

Recommendations for the Treatment of Severe Persistent Symptoms

To treat severe persistent symptoms, the following is recommended:

- Intranasal glucocorticosteroids, for both adults and children
- New-generation oral H₁-antihistamines that do not cause sedation or interact with cytochrome P450
- Intranasal H₁-antihistamines
- Intranasal chromones
- Oral steroids in short courses in cases not controlled with other treatments
- Intranasal ipratropium bromide for the treatment of extensive rhinorrhea

- Subcutaneous or sublingual specific immunotherapy for adults and children with insufficient effect of symptomatic treatment against seasonal pollen allergies and perennial allergic rhinitis against house dust mite [47, 48].

Conclusions

Allergic rhinitis represents a major and growing medical, quality-of-life, and socioeconomic problem in more and more parts of the world today. Large and immediate efforts are urgently needed to stop this development. These include measures to reduce indoor and outdoor allergen exposure; measures to prevent allergy-predisposing lifestyle; research on the genetic, biological, and environmental mechanisms behind allergy; and translating this knowledge into improved options and recommendations for treatment.

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