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# Allergic Rhinitis

## Diagnosis, Treatment, and Its Effect on Asthma

Mary Lou Hayden, MS, FNP-BC, AE-C

**Abstract:** *Allergic rhinitis (AR) is a common chronic disease that can lead to medical complications and is associated with asthma. For a number of reasons, including cost of health care, many patients self-diagnose and self-medicate rather than present for evaluation by a health care provider. While some effective medications are transitioning from prescription to over-the-counter status, patients are not receiving proper education regarding environmental triggers and the consequences of untreated or undertreated rhinitis. Patients rarely appreciate the role AR plays in asthma. Furthermore, uncontrolled AR can result in reduced quality of life with impaired work and school performance and social functioning. This article will discuss the relationship between AR and asthma, summarize signs and symptoms of rhinitis, differentiate allergic from nonallergic rhinitis, and present optimal pharmacologic and nonpharmacologic treatments of rhinitis.*

**Keywords:** allergy; rhinitis; environmental control; asthma self-management; asthma

The prevalence of allergic rhinitis (AR) is 10% to 30% of the population and up to 40% of children, which represents as many as 40 million Americans.<sup>1</sup> While the highest prevalence for AR is during adolescence, symptoms may occur at any age, from toddlerhood through aging. The National Health and Nutrition Examination Survey reported 55% of study participants tested positive to at least 1 aeroallergen.<sup>2</sup> In addition, 1.5 to 3 million Americans have symptoms of nonallergic rhinitis (NAR).

The Allergies in America Survey is the largest survey to date assessing the prevalence, treatment, and impact of AR. Two thousand five hundred individuals with the diagnosis of AR, 300 physicians, 50 nurse practitioners, and 50 physician assistants were surveyed. According to the survey, 56% of respondents

described their symptoms as perennial and 43% as seasonal. The most commonly reported symptom, nasal congestion, was reported to be moderate to extremely bothersome by 80% of respondents with AR.<sup>3</sup>

The burden of AR is measured in direct costs and indirect costs. In 1993, AR accounted for 10 million office visits.<sup>4</sup> In 2002, total direct costs were \$7.3 billion, and indirect costs were \$4.28 billion, which also included the cost of lost productivity.<sup>5</sup> At least 2 million lost school days are attributed to AR and are associated with impaired performance. Furthermore, AR has a significant impact on quality of life, with negative effect on a variety of dimensions of health and well-being, including energy, fatigue, physical and social functioning, mental health, and pain. AR can also adversely affect sleep patterns, leading to daytime somnolence and irritability in children.<sup>6</sup>

A number of diseases are comorbid with AR and may be consequences of uncontrolled AR or mimickers of AR. Increased episodes of sinusitis and otitis media are associated with AR. More than 50% of children with recurrent otitis media with effusion have at least 1 positive skin test to an aeroallergen. Furthermore, AR is associated with nasal polyposis, obstructive sleep apnea, and craniofacial abnormalities (in chronic nasal obstruction).<sup>1</sup> AR also has a significant role in asthma. Assessment of factors associated with worsening asthma has reported AR to be an independent risk factor for asthma.<sup>7</sup> In addition, mediators of inflammation (Th2 lymphocytes, mast cells, eosinophils, cytokine profile) are similar in the nose and the lungs. When an allergen is introduced to the nose, mediators of inflammation can be detected in the lungs. The converse is also true. Because similar mediators are found in both the upper and lower airway, the lungs, nose, and sinuses are referred to as a unified airway. Thus, an important component of controlling asthma is to control AR.<sup>8</sup>

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Table 1. Signs and Symptoms of Rhinitis

| Characteristic   | Seasonal                                     | Perennial                        |
|------------------|----------------------------------------------|----------------------------------|
| Nasal congestion | Variable                                     | Predominant                      |
| Nasal drainage   | Common, watery, profuse                      | Variable, usually postnasal drip |
| Sneezing         | Usually present                              | Sometimes                        |
| Ocular symptoms  | Common, pruritis, injected, watery discharge | Watery, redness rare             |
| Hyposmia         | Variable                                     | Common                           |
| Asthma           | Variable                                     | Common                           |

Table adapted from Hayden ML, Hendeles L, Ortiz G. Diagnostic challenges in allergic rhinitis, an allied health monograph. Pragmaton Office of Medical Education, October 1, 2001.<sup>9</sup>

## Differential Diagnosis of Rhinitis

Rhinitis caused by non-IgE-mediated inflammation/symptoms is classified as NAR. The most common nonallergic causes of nasal symptoms include infectious (viral or bacterial), vasomotor (exposure to airborne irritants and pollutants such as odors, perfumes, and tobacco smoke), atrophic, drug induced (eg, topical decongestant sprays, birth control pills/patches), hormones (eg, pregnancy, thyroid disease), laryngeal-pharyngeal reflux, ingesting foods or beverages (gustatory), and structural (eg, nasal septal deviation, nasal polyps, nasal turbinate hypertrophy, adenoid hypertrophy, immotile cilia), or idiopathic.<sup>1</sup>

AR is an IgE-mediated disease in which exposure to a specific allergen results in sensitization and production of specific IgE antibodies, which are attached to mast cells and basophils. With reexposure, the allergen attaches to the IgE antibody, causing degranulation of mast cells and basophils and the release of mediators such as histamine, prostaglandins, chemokines, and proinflammatory cytokines, which promote vascular permeability, edema, and mucus secretion. Itching and sneezing result from neural activation. Symptoms may be perennial or seasonal, or perennial with seasonal exacerbation (Table 1).

The Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines classify AR according to the duration and severity of symptoms. Rather than either seasonal or perennial, the guidelines further define AR as mild or moderate-severe intermittent (<4 d/wk or <4 wk/y) or mild or moderate-severe persistent (>4 d/wk or >4 wk/y), depending on the duration and severity of symptoms, and link classification to medication recommendations.<sup>10</sup>

## History

The history is critical to the diagnosis of AR. Recurrent symptoms at the same time of the year suggest a seasonal or intermittent rhinitis. Chronic nasal symptoms, especially congestion, suggest perennial or persistent rhinitis. Components of the history include the following<sup>11</sup>:

- symptoms: timing, duration, and magnitude
- triggers/precipitating factors
- exposures at home, work/school, indoors/outdoors
- response to treatments
- quality of life

## Physical Examination

The physical exam may provide findings supporting a diagnosis of AR. However, an asymptomatic patient may have a normal exam. Components of the exam include the following:

- skin (evidence of urticaria, eczema, Dennie Morgan lines, transnasal crease)
- eyes (shiners, lid edema, conjunctival infection/edema, cobblestoning of conjunctiva)
- ears (scratching of the external auditory canal, serous otitis)
- nose (noisy breathing, turbinate edema, drainage, nasal polyps)
- oral pharynx (gaped mouth, postnasal drainage, cobblestoning post pharynx)
- chest (wheezing)

## Diagnostic Testing

Specific IgE testing will help identify potential allergen triggers for symptoms and confirm suggestive history and physical findings. It is important to relate testing results to the patient's history of exposures and symptoms. Skin testing is the preferred method of testing because of its high sensitivity and specificity. However, radioallergosorbent testing (RAST) may be requested with patients with diffuse skin disease or with patients dependent on medications that prevent interpretation of skin testing. Interpretation of RAST results must be considered in the context of patient exposures and symptoms and its decreased sensitivity and specificity compared with skin testing.<sup>1</sup> Other tests that may also aid in diagnosis include fiberoptic rhinoscopy, nasal cytology (eosinophils), and rhinometry.

## Treatment of AR

A management plan for AR should include both pharmacologic and nonpharmacologic elements. Central to any plan is patient education, including information about specific allergen sensitivities and exposures, the allergic process and sequelae if undertreated, and appropriate treatments. Nonpharmacologic approaches include allergen/trigger avoidance, saline nasal sprays, and nasal sinus rinse. Saline nasal irrigation with a Nettie pot, manual rinse bottle, or pressurized spray (with either physiologic or hypertonic saline) may reduce symptoms and improve normal function of the nasal/sinus mucosa.<sup>1</sup> Environmental control is in itself anti-inflammatory. That is, reducing exposures can result in decreased allergic response and fewer symptoms. In brief, environmental control recommendations for AR include the following<sup>1</sup>:

Table 2. Medications for Treatment of Allergic Rhinitis

| Medication                       | Sneezing | Rhinorrhea | Nasal Congestion | Nasal Itch | Eye Symptoms |
|----------------------------------|----------|------------|------------------|------------|--------------|
| Oral antihistamine               | Yes      | Yes        | ±                | Yes        | Yes          |
| Nasal antihistamine              | Yes      | Yes        | Yes              | Yes        | No           |
| Eye antihistamine                | No       | No         | No               | No         | Yes          |
| Nasal steroid                    | Yes      | Yes        | Yes              | Yes        | ±            |
| Nasal cromolyn                   | ±        | ±          | ±                | ±          | No           |
| Leukotriene receptor antagonists | Yes      | Yes        | Yes              | ±          | ±            |
| Oral decongestant                | No       | No         | Yes              | No         | No           |
| Nasal decongestant               | No       | No         | Yes              | No         | No           |
| Nasal anticholinergic            | No       | Yes        | No               | No         | No           |

Table adapted from Hayden ML, Hendeles L, Ortiz G. Diagnostic challenges in allergic rhinitis, an allied health monograph. Pragmaton Office of Medical Education, October 1, 2001.

- pollens (windows closed, air conditioning on recycle; nightly rinse off of hair and body)
- dust mites (allergen-proof encasings, weekly hot water wash of bed linens, eventual removal of carpeting and upholstered furniture)
- animals (removal of pets from home or at least from bedroom, HEPA air cleaner)
- mold (dehumidification to 45% relative humidity indoors, repair leaks, discard moldy furnishings)
- cockroach (cleaning, daily garbage removal, pest control)

## Pharmacologic Treatments

Medications recommended for the treatment of AR may be systemic or topical and include H1 antihistamines (oral, intranasal), the mainstay of treatment; intranasal corticosteroids (INS), leukotriene modifiers, cromolyn, oral and nasal decongestants, and combination drugs (antihistamines/decongestants). Medications selected are determined by the type of rhinitis, severity of symptoms, and age of the patient. Table 2 presents categories of medications and their effect on symptoms of AR.

Oral antihistamines may be classified as sedating or low to nonsedating. The ARIA guidelines recommend using non or low sedating.<sup>10</sup> The second-generation antihistamines are as effective as older oral antihistamines but are associated with fewer side effects. First-generation antihistamines are associated with anticholinergic effects (dry mouth/eyes, palpitations, blurred vision, constipation, dysuria) as well as central nervous system effects (sedation, loss of concentration, insomnia, dizziness, irritability, nervousness). Sedating antihistamines can adversely affect learning, performance at work, and safely driving a vehicle. Intranasal antihistamines have shown a clinically significant reduction in nasal congestion but are associated with bitter taste (azelastine, 19.7%; olopatadine, 12.8%) and sedation (azelastine, 11.5%; olopatadine, 0.9%).<sup>1(p552)</sup>

INS are effective against all nasal symptoms except pruritis. Oral decongestants cause vasoconstriction and reduce conges-

tion but are not recommended in certain populations, such as elderly patients and young children. This group of medications must be used with caution with various medical conditions (eg, hypertension, cardiac dysrhythmias, coronary artery disease, closed-angle glaucoma, and prostatism), and they have significant side effects. Nasal decongestants are effective, but chronic use can result in rebound congestion, known as rhinitis medicamentosa. Leukotriene modifiers are effective in the treatment of AR but less effective than INS. Cromolyn nasal spray is less effective than INS.<sup>1(p557)</sup>

The ARIA guidelines recommend medications according to severity and duration of disease. Nonsedating antihistamines (NSA) are recommended for mild to intermittent AR. Moderate-to-severe intermittent and mild-persistent AR can be treated with oral/topical NSA, with/without decongestants, INS, or leukotriene receptor antagonist (LTRA). Moderate-to-severe persistent AR is treated preferably with INS, and the addition of oral/topical NSA or LTRA.<sup>10</sup> Regardless of the approach, medication therapy should be stepped up or down according to control of symptoms, and the role of avoidance should be stressed.

Allergen immunotherapy (AIT) is a key component of treatment of AR in many patients. Those who cannot avoid allergen exposures or who are unable to control their symptoms with avoidance and medications may benefit from AIT. AIT alone among the treatments of AR is considered disease modifying. That is, AIT may reduce the risk for development of asthma and further allergen sensitivities.<sup>12</sup> With a gradual increase in allergen concentration over weeks, allergy injections result in the production of blocking IgG antibodies, reduced specific IgE, and tolerance to specific allergens. AIT had been proven effective in AR and allergic asthma.<sup>1</sup>

As one can see, management of allergic rhinitis is multifaceted. For patients and families, the treatment plan is summarized as an allergic rhinitis action plan (ARAP). The ARAP should be part of the patient/family's education to optimize, control, and improve outcomes. The ARAP should include

the patient's/family's goals for treatment, allergens to which the patient is sensitized and where he or she is exposed to these allergens, evidence-based allergen avoidance measures, and nonpharmacologic and pharmacologic treatments. Medication dosages, schedule, and potential side effects should also be discussed.

In summary, AR and nonallergic rhinitis are common chronic diseases and affect all ages. AR is an important risk factor for asthma and is considered part of the unified airway, which extends from the tip of the nose to the base of the lungs. Treatment of AR is multifaceted and centered on appropriate patient education. The care plan may include allergen avoidance, pharmacologic and nonpharmacologic elements, and immunotherapy. Appropriate diagnosis and a patient-centered treatment plan could lead to symptom control and improved quality of life.

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