Allergic Rhinitis: Update on Diagnosis

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By Robert S. Valet, MD [2] and John M. Fahrenholz, MD [3]

Allergic rhinitis is highly prevalent; about 20% of adults in the United States and 25% of children worldwide are affected. It is a major societal expense, with direct costs, attributable to physician visits and medications, of up to $5 billion per year, and indirect costs, mainly stemming from lost productivity, of up to $9.7 billion per year. In the United States, allergic rhinitis results in 3.5 million lost workdays and 2 million lost schooldays each year.

Key words: allergic rhinitis, nonallergic rhinitis, primary care

Allergic rhinitis is highly prevalent; about 20% of adults in the United States and 25% of children worldwide are affected. It is a major societal expense, with direct costs, attributable to physician visits and medications, of up to $5 billion per year, and indirect costs, mainly stemming from lost productivity, of up to $9.7 billion per year. In the United States, allergic rhinitis results in 3.5 million lost workdays and 2 million lost schooldays each year.

In addition to the nasal and ocular symptoms of the disease, allergic rhinitis is associated with a higher burden of asthma and sinusitis. It also affects multiple areas related to quality of life, including quality of sleep, mood and energy level, work effectiveness, and even sexual function. Because nearly all patients with allergic rhinitis who seek medical attention present first to their primary care physician, this 2-part series will focus on the diagnosis and management of allergic rhinitis in the primary care setting. Here we discuss issues related to diagnosis, including the various types of rhinitis, complicating factors, common physical findings, and allergy testing. In a coming issue, we will detail the treatment options.

ALLERGIC VERSUS NONALLERGIC RHINITIS

While the term “rhinitis” suggests that inflammation of the upper airway would be a cardinal feature, some forms of rhinitis do not involve inflammation. Rather, the term refers to the presence of one or more of the following:

• Nasal congestion.
• Pruritus.
• Sneezing.
• Anterior or posterior rhinorrhea.

Causes of rhinitis are divided most broadly into allergic and nonallergic (Table).
leading within minutes to an early response that consists of sneezing, itchiness, congestion, rhinorrhea, and even constitutional symptoms (hence the term “hay fever”). These cytokines also attract other inflammatory cells to the nasal mucosa, in what is referred to as the second, or late-phase, allergic rhinitis response, which prominently features nasal congestion.\textsuperscript{12}

**Nonallergic rhinitis.** This type of rhinitis does not involve IgE. Pure allergic rhinitis is thought to be about 3 times more prevalent than pure nonallergic rhinitis; however, a mixed picture of the two is quite common: it is estimated that 44% to 87% of patients with rhinitis have some component of mixed rhinitis.\textsuperscript{10} Nonallergic rhinitis has a slight female predominance and has a later age of onset, generally in adulthood, than allergic rhinitis.\textsuperscript{13} There are several subtypes of nonallergic rhinitis. \textit{Vasomotor rhinitis} is an incompletely understood entity thought to involve neurally mediated hypersecretion and hyperemia in the nasal mucosa; it is ultimately a diagnosis of exclusion in patients whose allergy test results are negative.\textsuperscript{10,13,14} Triggers for this subtype include exercise, changes in temperature or humidity, alcohol ingestion, and inhaled irritants, such as tobacco smoke, perfume, and chlorine gas.\textsuperscript{13}

\textit{Gustatory rhinitis} refers to rhinorrhea induced by eating; it is thought to be vagally mediated and not allergic. Although allergic reactions to food can induce rhinitis, such reactions are almost always seen in concert with an urticarial rash, respiratory symptoms, and/or GI symptoms.\textsuperscript{15} Gustatory rhinitis generally occurs in older patients, most commonly in reaction to spicy foods, but some patients have rhinorrhea in response to a wide range of foods.\textsuperscript{16} \textit{Drug-induced rhinitis} can occur with the use of a number of medications, including angiotensin-converting enzyme (ACE) inhibitors, hydrochlorothiazide, β-blockers, α₁-blockers, central α₂-agonists, and phosphodiesterase-5 inhibitors.\textsuperscript{13} When related to rebound congestion from overuse of nasal α-adrenergic agonists such as oxymetazoline, the syndrome is referred to as \textit{rhinitis medicamentosa}.\textsuperscript{13}

In contrast to drug-induced rhinitis caused by oral medications, which resolves promptly with cessation of the offending agent, \textit{rhinitis medicamentosa} can persist for prolonged periods and usually requires treatment with a burst of oral corticosteroids for 7 to 14 days for resolution.\textsuperscript{17} Patients with \textit{rhinitis medicamentosa} should be evaluated and treated for potential associated allergic or vasomotor rhinitis. Chronic sinusitis is another common complicating factor in such cases.

**COMPLICATING FACTORS AND ASSOCIATED CONDITIONS**

Other conditions can mimic or aggravate symptoms of rhinitis. These are often associated with structural issues, such as nasal septal deviation, nasal polyps or, rarely, nasopharyngeal tumors.\textsuperscript{1,10} Cerebrospinal fluid leak presents as clear rhinorrhea in the setting of recent regional trauma or surgery. Chronic sinusitis with or without nasal polyps usually presents in adulthood; it may occur in conjunction with allergic or nonallergic rhinitis. Consider the possibility of complicating sinusitis in patients who do not respond to standard rhinitis therapy.

Aspirin-exacerbated respiratory disease (AERD) consists of the triad of aspirin intolerance, chronic sinusitis with nasal polyps, and persistent asthma. Treatment of nasal polyps with nasal corticosteroids (with or without a brief initial course of oral corticosteroids), or alternately in the case of AERD, treatment by an allergist with aspirin desensitization followed by daily maintenance aspirin therapy, often will decrease the size of polyps and reduce the need for surgery.\textsuperscript{10}

**HISTORY**

The clinical history typically focuses on symptoms compatible with allergic rhinitis in the nose (congestion, rhinorrhea, pruritus), eyes (itching, redness), and ears (congestion). Pruritus and sneezing are more common in allergic rhinitis, particularly in seasonal allergic rhinitis,\textsuperscript{11} whereas congestion and rhinorrhea are the most salient features of nonallergic rhinitis.\textsuperscript{18} Among the types of nonallergic rhinitis, vasomotor rhinitis may have irritant triggers (scents, tobacco smoke), but it should be pointed out that this is frequently reported by patients with allergic rhinitis as well.\textsuperscript{18} Patients with long-term use of intranasal decongestants or cocaine may have rhinitis medicamentosa.

In addition, the history focuses on symptoms that raise suspicion of other diagnoses, such as pain,
bloody or purulent discharge, fever, headache, and unilateral symptoms. Include questions to detect comorbid conditions (sinusitis, obstructive sleep apnea, asthma, eczema, otitis media).^{19}

Gendo and Larson^{20} calculated likelihood ratios for previous studies, looking at the clinical performance of various aspects of the allergic rhinitis history. Particularly helpful were questions about triggers (pollen and animals), which had high positive likelihood ratios, and to a lesser extent, questions about particular symptoms in the nose or eyes, seasonality of symptoms, and patient or family history of atopic disease. Overall, none of the history items that they examined had low negative likelihood ratios, so while the patient history can build a good case for allergic rhinitis, the lack of individual items in the history is not as helpful for ruling out allergic rhinitis.

**PHYSICAL EXAMINATION**

The targeted physical examination for patients with suspected allergic rhinitis typically includes examination of the eyes for conjunctival swelling and erythema, eyelid swelling, or lower eyelid venous stasis (“allergic shiners”). The nose may have a lateral crease (“allergic crease”) from rubbing it in an upward direction because of itching. Nasal turbinates are typically swollen; additional findings to be ruled out by nasal speculum examination include septal deviation, granulomas, polyps, or tumors. Examination of the ear may reveal a middle ear effusion, with clouding of the tympanic membrane or a visible air fluid level.

**DIAGNOSTIC TESTING**

Given the relatively high pretest probability of allergic rhinitis in patients with rhinitis-type complaints, the even higher post-test probability when factoring in a compatible history and physical findings, and the minimal adverse effects of current allergic rhinitis medications, initial empiric therapy is recommended. In patients who do not respond well to empiric therapy, testing for specific allergens provides greater diagnostic certainty and helps identify allergic rhinitis triggers for avoidance and/or for consideration for allergen immunotherapy.

Skin testing can be either puncture or intradermal. Puncture skin testing is performed by placing a drop of each of a number of standardized allergen extracts on the skin and then puncturing the skin with a needle at each drop, to insert the allergen into the epidermis.^{21} False-negative results can be seen in patients who are currently taking antihistamines, which should be discontinued for approximately 5 days before testing.^{22} False-positives can be seen in patients with dermatographism; thus, drops of saline (negative control) and histamine solution (positive control) are included in the panel. Wheal and flare diameter is read at 15 to 20 minutes.^{21}

Intradermal skin testing has higher sensitivity than puncture skin testing (a 1000-fold lower concentration of allergen will produce the same size wheal in intradermal compared with puncture skin testing),^{21} so intradermal skin testing is often performed to gain additional sensitivity in the case
of negative puncture tests that are thought to be falsely negative based on a convincing history. Positive puncture tests do not require further confirmation by intradermal testing.

Intradermal tests are performed by injecting extract directly into the dermis with a 26- to 27-gauge needle to form a 2- to 3-mm bleb. Wheal and flare results are measured at 15 to 20 minutes. Although both types of skin tests rarely cause systemic reactions, physicians who perform them need to be able to treat anaphylaxis emergently should it occur.

In vitro detection of allergen-specific IgE antibody is an alternate method of allergy testing. These tests expose patient sera to bound allergen and then use radiolabeled anti-IgE antibody to detect specific IgE from patient sera, and radioactivity is quantified to give the test result. Given that specific IgE immunoassays are only 70% to 75% sensitive compared with puncture or intradermal skin testing, and given the ease and lower cost of skin tests, skin tests are preferred over IgE immunoassays. Reasons for obtaining specific IgE immunoassays include greater ease for physician and patient, current antihistamine use or dermatographism, and lack of patient cooperation with skin testing (eg, in young children).

A positive puncture or intradermal skin test or a positive immunoassay test indicates sensitization, which must be considered in clinical context. For example, a patient with perennial symptoms whose tests are negative for indoor and perennial aeroallergens (mite, roach, pet dander, and so forth) and positive for grass pollen in an area where grass pollen is seasonal does not have confirmatory evidence of seasonal allergic rhinitis; the patient may have nonallergic rhinitis.

In a patient whose history and examination findings—and possibly confirmatory allergen test results—have helped clarify the type of rhinitis present, appropriate therapy can be undertaken. This will be discussed in Part 2 of this article, which will appear in a coming issue.

References: REFERENCES:

**Therapeutic Agents in This Article**
Aspirin
Oxymetazoline

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