Diagnosing and treating allergic rhinitis

Differentiation of allergic rhinitis from several other nasal and sinus conditions requires a careful history and examination and judicious use of special tests. Treatment options include antihistamines, corticosteroid sprays, allergen avoidance and immunotherapy.

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Allergic rhinitis is the second most frequently self-reported condition in Australia.[1] In some people it is a trivial disease. In others, it may be very intrusive, with a marked reduction in quality of life and loss of time from school[2] or work.[3]

Pathophysiology

Allergens

Allergic rhinitis may arise in response to seasonal allergens (pollens from grasses, trees or weeds) or perennial allergens (house dust mite, animal danders and mould spores). Some allergens have enzymatic activity – the major allergens of the house dust mite are digestive enzymes. The behaviour of allergens depends on their physical and chemical properties – for example, cat allergen comes in small particles that easily penetrate to all corners of the house; mite allergens tend not to be airborne unless the dust is disturbed during cleaning.

Mast cells

Mast cells are haemopoietically derived cells in connective tissue. Their cytoplasmic storage vesicles contain heparin, histamine and enzymes. Most of the immunoglobulin E (IgE) in the body binds to mast cell membranes via receptors for the constant (Fc) portion of the heavy chain of IgE. When allergen comes in contact with the nasal mucosa or conjunctiva, it may encounter

IN SUMMARY

- **History and examination are of prime importance for an accurate diagnosis of allergic rhinitis.**
- **Demonstration of specific IgE to relevant allergens is necessary (but not, by itself, sufficient) to make the diagnosis.**
- **Drug therapy usually gives the most rapid relief of symptoms and should be tailored to suit the severity and frequency of the patient's symptoms.**
- **Nasal corticosteroid sprays often provide effective and safe long term control of allergic rhinitis.**
- **Nasal decongestant sprays should be used cautiously for obstruction due to the common cold but avoided for allergic rhinitis.**
- **Allergen immunotherapy results in effective long term tolerance to the administered allergen. It should be carried out after careful assessment of indications and contraindications. It should be administered under the supervision of a medical practitioner trained to recognise and treat anaphylaxis, in premises equipped for the treatment of this condition.**

Definitions

Allergy
Allergy is an exaggerated or harmful response on second or subsequent exposure to an otherwise harmless substance.

Atopy
Atopy is the ability to raise a specific immunoglobulin E (IgE) response to common environmental antigens (allergens). Since it is specific IgE that is detected by skin prick tests or immunoassays, anyone with a positive test to even one common allergen is said to be atopic.

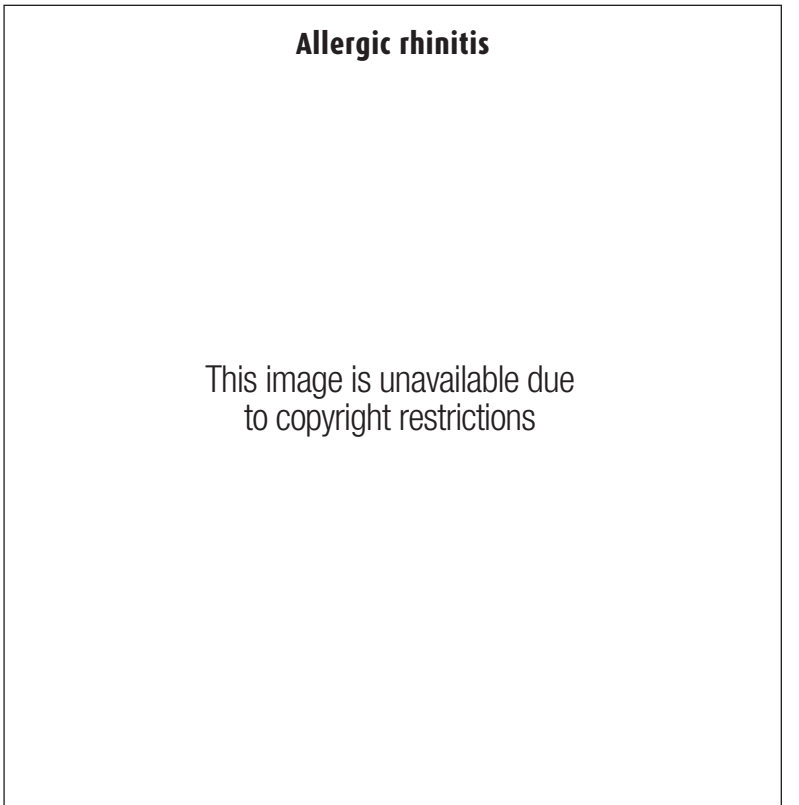
Rhinitis
Rhinitis refers to any inflammatory condition of the nasal mucosa. It is characterised by any or all of the following symptoms: nasal discharge, sneezing, nasal blockage, mouth breathing and impairment of olfaction. There may be associated conjunctivitis or sinusitis. Itch may also affect the ears and palate.

corresponding IgE antibodies on the mast cell surface. If so, it will bind to some of these antibodies. The resultant 'cross-linking' of the Fc receptors on the membrane leads to activation of the mast cell. Upon activation, the cells release histamine and other inflammatory mediators from the granules and synthesise other inflammatory mediators such as prostaglandins and leukotrienes. Histamine causes immediate vasodilation, exudation and itch.

Clinical features

Symptoms
Allergic rhinitis is usually easy to recognise. Nasal discharge is generally watery. Sneezing is frequent and bouts are often prolonged. There may be associated allergic conjunctivitis with red, watery, itchy eyes. There may also be itching of the palate, ears, mouth and body in general. Mucosal swelling may result in nasal blockage (unilateral, bilateral or alternating; constant or intermittent), with mouth breathing, sinus involvement (discomfort in the cheeks, forehead and between the eyes) or impairment of olfaction. When severe, the swelling may impair sinus drainage, leading to bacterial infection.

Allergic rhinitis



Allergic rhinitis may arise in response to seasonal allergens (pollens from grasses, trees or weeds) or perennial allergens (house dust mite, animal danders and mould spores). Pollen-related rhinitis may be of much greater significance to those whose work or hobbies keep them outdoors.

Relieving factors
Patients will often have already tried proprietary antihistamine eyedrops, nasal sprays or tablets, decongestant tablets or sprays, or corticosteroid nasal sprays (either on prescription or over the counter). It is important to note their response to these.

Exacerbating factors
Patients may also note an association between their symptoms and some other factor, such as the season, exposure to animals or exposure to dust (when cleaning, using stored clothing or blankets, or moving into a previously neglected

house or a holiday house). Grass-pollen-related rhinitis tends to commence just after the beginning of spring and extend for a variable time during summer. Tree pollens may cause symptoms a few months earlier.

Other aspects of an allergy history

Past and family history and concurrent medications

There is often a personal or family history of the other diseases of atopy; enquire about asthma and eczema. Hypertension should prompt caution in the use of pseudoephedrine. Coronary artery disease increases the risks associated with allergen immunotherapy.

Beta adrenergic receptor antagonists (beta blockers) may worsen the symptoms of allergic diseases, and they contraindicate allergen immunotherapy. Aspirin and nonsteroidal anti-inflammatory drugs may cause or worsen rhinitis.

Home environment

Wall-to-wall carpets, feather bedding and indoor pets promote dust mite exposure. Rising damp, a leaking roof and poor indoor ventilation favour the growth of moulds and worsen mite levels.

Occupation and hobbies

Pollen-related rhinitis may be of much greater significance to those whose work or hobbies keep them outdoors. Some industrial workplaces or laboratories may expose workers to other organic (e.g. animal danders) or inorganic causes of rhinitis.

Examination

The patient's voice has a characteristic dull quality when the nose is severely blocked. The eyes may be red and watery. In children and some adults there may be 'allergic shiners' – dark circles below the eyes due to nasal venous congestion. The nose must be inspected for deviation of the septum and allergic creases (from frequent nose-wiping or 'allergic salutes').

The nasal mucosa is usually inspected directly. Anterior rhinoscopy allows inspection of the distal 1 to 2 cm of the nostril. I use an otoscope with a wide bore (8 mm) speculum and magnification. A thin, flexible fibreoptic nasendoscope will give a more comprehensive view of all of the nasal mucosa, sinus meati, turbinates and vocal cords.

General examination is needed when there is suspicion of asthma, eczema or other concurrent condition.

Figures 1a and b. Skin prick test. a (left). Drops of test allergens and controls are placed on the skin. b (right). This view, in a different patient, shows how the skin is pricked through the droplet to introduce the test substance into the skin.

Special tests

Skin prick testing

Skin prick testing demonstrates the presence of allergen-specific IgE. It may be used to guide the avoidance of allergens and to plan allergen immunotherapy.

A minute amount of allergen is introduced into the skin (Figures 1a and b). If IgE specific for the tested allergen is present on the local mast cells, contact between the allergen and the cell-bound antibody results in activation of the mast cell and release of histamine and other mediators, causing pruritus, redness (flare) and swelling due to extravasation of fluid (wheal).

The wheal diameter is measured 15 minutes after the skin prick. A positive test result is one with a wheal diameter of 3 mm or greater.

For each patient, a panel of appropriate allergens must be selected in light of the history. Positive and negative controls are included in the panel to help interpret the test. If the saline (negative) control gives a wheal of 3 mm or greater, the patient is said to have dermographism ('skin writing') due to the nonspecific activation of mast cells by pressure on the skin. Of course, in such a case, many of the other allergens tested will also give false positive results.

The positive control in the panel may be histamine acid phosphate 10%, histamine chloride 1% or codeine 9%. If the control does not give a wheal of 3 mm diameter or more, it suggests that the patient has used drugs with histamine-antagonising properties (antihistamines, tricyclic antidepressants) and this negates other negative results obtained in this test.

Laboratory testing for specific IgE

IgE circulates in the blood, and both total IgE and allergen-specific IgE may be detected by immunoassay. Most pathology providers offer allergen-specific IgE assays for a wide range of inhalant allergens.

Differential diagnosis of perennial rhinitis

There are numerous conditions that may be confused with perennial allergic rhinitis.

Common cold

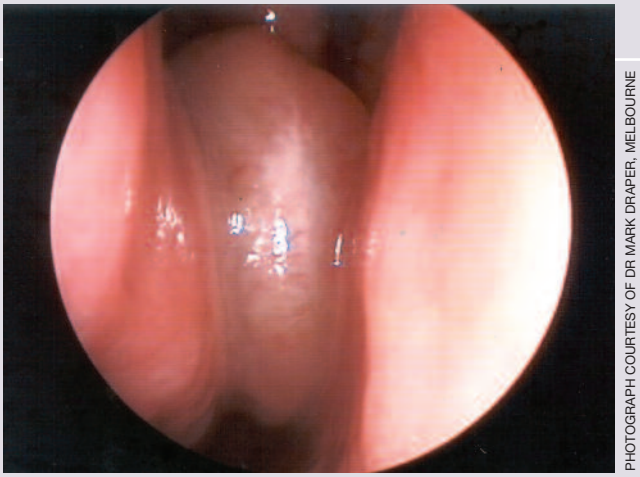
A cold may be associated with systemic aches and pains, fever, sore throat and coloured nasal discharge. It tends to last about a week in the absence of other complications. Treatment is symptomatic.

Bacterial sinusitis

Bacterial sinusitis involves pain over the affected sinus region with thick coloured nasal discharge and some degree of malaise and fever. A plain x-ray of the skull will usually confirm acute sinusitis, but CT scanning may be needed to demonstrate any underlying anatomical abnormalities. Antibiotics may deal with the infection, but surgical drainage is also required at times.

Nasal polyposis

Nasal polyps are inflammatory masses of unknown cause, often arising within the ethmoid sinus. They are large and oedematous (Figure A) and packed with eosinophils. They obstruct the nasal passages, resulting in mouth breathing, loss of olfaction (anosmia) and taste (ageusia), sinus pain and infection. Nasal polyposis may be diagnosed by the quality of the patient's speech, the profuse nature of the discharge, the severity of the blockage, anosmia and the typical appearance of the polyp (greeny-grey pearly mucosa). In adults, nasal polyps are frequently associated with adult-onset asthma and aspirin intolerance (Francis' triad or Samter's triad). They may be removed surgically or by treatment with oral corticosteroids. Relapse is frequent, but it may be delayed by use of nasal corticosteroid sprays in relatively high dosage. If any concurrent allergic rhinitis is present, treat it with allergen-specific measures.



PHOTOGRAPH COURTESY OF DR MARK DRAPER, MELBOURNE

Figure A. Nasal polyp.

Vasomotor rhinitis

The term vasomotor rhinitis is used when the symptoms suggest allergic rhinitis but the skin tests (or laboratory tests for specific IgE) do not support the diagnosis. The patient usually complains of nonspecific triggers, such as a change in temperature or strong smells. Most often, patients will respond to nasal corticosteroid sprays; however, in cases of profuse watery discharge that is resistant to such treatment, ipratropium bromide nasal sprays (Atrovent Nasal) often serve to reduce the severity of the discharge.

Rhinitis medicamentosa

This term refers to the nasal blockage caused by overuse of nasal decongestant sprays. Although they rapidly relieve nasal blockage, continuing their use for more than a few days worsens the severity of the blockage, reduces the effectiveness of the spray and makes the nasal mucosa hyper-reactive to nonspecific stimuli. The patient feels addicted to the spray and that he or she must continue using it to deal with the very adverse effects it has caused.

Nasal cytology

A nasal mucosal smear stained with Hansel stain will allow differentiation of eosinophils from neutrophils. A neutrophilic infiltrate implies infection, which may respond to antibiotic treatment. When eosinophils predominate, the condition is likely to respond to corticosteroid nasal sprays.

I have not found this test to be very helpful as a guide to the treatment of rhinitis.

Making the diagnosis

An established history of hay fever that is restricted to spring or summer (or markedly worse when compared with the rest of the year) over several years is sufficient to diagnose spring hay fever (seasonal rhinitis). If allergen immunotherapy is planned, skin prick testing (or an *in vitro* assay for specific IgE) to grass pollens is necessary.

When the symptoms are perennial, the diagnosis is less clear cut because there are numerous other possible diagnoses that may account for the complaint (see the box above). However, observation of a consistent trigger factor (e.g. sneezing and itch on exposure to dust or cats) strongly suggests an allergic cause.

After history, examination and determination of specific IgE, one should be able to state whether the patient is atopic, the diagnosis of the condition and the relationship of that diagnosis to any allergic cause.

Treatment

Drugs

When the rhinitis is trivial, treatment may be unnecessary. When the symptoms are mild or infrequent, they may respond to occasional use of antihistamine sprays or nonsedating oral antihistamines (histamine H_1 antagonists). Persistent symptoms generally respond better to topical corticosteroid sprays,[4] which may control conjunctivitis as well as rhinitis. Medications for allergic rhinitis are listed in the Table.

It is important to warn the patient that the onset of action of intranasal corticosteroid sprays can be slow and that persistence with the spray is likely to be rewarded. Six weeks is a reasonable amount of time for a trial of corticosteroid sprays.

Table. Medications for allergic rhinitis

Intranasal antihistamine sprays
Azelastine (Azep)
Levocabastine (Livostin)

Oral antihistamines (nonsedating)
Cetirizine (Zyrtec)*
Fexofenadine (Telfast)
Loratadine (Claratyne, Lorastyne)

Combined oral antihistamine–decongestants
Fexofenadine–pseudoephedrine (Telfast Decongestant)
Loratadine–pseudoephedrine (Clarinase, Sinease Repetabs)

Intranasal corticosteroid sprays
Beclomethasone (Aldecin, Beconase Hayfever)
Budesonide (Budamax, Rhinocort)
Fluticasone (Beconase Allergy 24 Hour Fluticasone)
Mometasone furoate (Allermax, Nasonex)

* May sedate some people.

The main side effect of the intranasal corticosteroid sprays is a tendency to epistaxis. If the patient holds the bottle with the hand contralateral to the nostril receiving the spray (i.e. right hand for the left nostril and vice versa), there is less likelihood of epistaxis.

Nasal decongestant sprays are best avoided. They relieve nasal blockage rapidly, and they can be very useful for the nasal obstruction due to the common cold. Continuing their use for more than a few days worsens the severity of the blockage, reduces the effectiveness of the spray and makes the nasal mucosa hyper-reactive to nonspecific stimuli. This combination of effects is rhinitis medicamentosa, where the patient feels addicted to the spray and that he or she must continue using it to deal with the very adverse effects it has caused. Long term use of corticosteroid nasal sprays, on the other hand, is a valid treatment option in those with a responsive chronic rhinitis.

Allergen avoidance

Successful avoidance of allergens responsible for perennial rhinitis contributes to symptom reduction. Dust mite avoidance is optimised by removal of carpets, use of impermeable covers on mattresses, doonas and pillows, avoidance of feathers in bedding, and use of very hot water in laundering the bed linen.[5] If hot water is not available, bed linen may be soaked in the washing machine (top loader only) for one hour in lukewarm water with 100 mL eucalyptus oil and 25 mL of a commercial dishwashing liquid.[6] Even if they are not the principal allergens, animals should be kept outdoors because they raise mite levels by contributing food for mites.

Allergen immunotherapy

Allergen immunotherapy (desensitisation or allergy shots) is a very successful treatment for spring hay fever.[7] In a well conducted trial it has remained effective for at least three years, and it is common experience that it works for 10 years or more in some cases.[8] In perennial allergic rhinitis, the results are less clear cut,[9] but studies carried out since 1980 generally favour use of immunotherapy.[10]

Considerations

Allergen immunotherapy involves the repeated subcutaneous administration of the allergen to induce tolerance. The disease under treatment must be mediated by specific IgE and the symptoms must be severe enough (causing sufficient impairment of quality of life) to warrant the inconvenience, expense and risk of allergen immunotherapy. The relevant allergen must be identified and not easily avoidable. The treatment must be prescribed and supervised by a medical practitioner with appropriate training and experience. Patients must be selected with careful assessment and recognition of any contraindications (for example, concurrent use of beta blockers).[11] Injections must be given in a medical clinic and specific preparations made beforehand to deal with the well recognised possibility of a generalised reaction (see below). A specific effective extract should be used in adequate dosage according to a flexible schedule. The consultant should periodically review the patient, even when the injections are being administered by the patient's general practitioner.

Side effects

The side effects of allergen immunotherapy may be classified as localised or generalised reactions.

Localised reactions (a wheal and erythema at the site of injection) are common and may occur immediately or after several hours. Some practitioners will modify the next dose if the local swelling is beyond a certain size. Many will routinely ask their patients to premedicate with a nonsedating antihistamine one hour or more before the injection is given, to

Websites for patients

- http://www.allergy.org.au
- http://www.allergynet.com.au
- http://www.allergycapital.com.au

minimise the effect and the discomfort of local reactions.

Generalised reactions are rare and occur within minutes of the injection. They range in severity from generalised urticaria to anaphylaxis. Death has been reported when concurrent asthma has been inadequately evaluated and postinjection periods of observation have been omitted.[12] I require a non-negotiable 45-minute period of observation after every injection in the course.

Facilities for treatment of adverse effects must be organised beforehand and be operational when the treatment commences. The practitioner who administers the injections must have the skills to recognise adverse events (including anaphylaxis) and treat them.[13] There must be appropriate resuscitation equipment on the premises (adrenaline 1 in 1000 for intramuscular use, oxygen, a nebuliser to administer beta-2-agonists, equipment for intravenous cannulation and a supply of suitable fluid for infusion). These requirements are reasonable and necessary not only for allergen immunotherapy but also for many common medical procedures that may result in anaphylaxis, for example, vaccination or parenteral administration of antibiotics.

Conclusion

Allergic rhinitis may be either seasonal or perennial, depending on whether the causative allergen is seasonal (e.g. pollens from grasses, trees or weeds) or perennial (e.g. house dust mite, animal danders, mould spores). Further supporting evidence may be obtained by using skin prick testing or immunoassay to demonstrate the presence of IgE specific to the suspected inhalant allergen(s). Treatment options include antihistamine or corticosteroid nasal sprays, nonsedating oral antihistamines, allergen avoidance and allergen immunotherapy. Immunotherapy must be conducted by appropriately experienced medical practitioners, on carefully selected patients. MT

A list of references is available on request to the editorial office.

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