

Diagnosis and management of allergic rhinitis

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Abstract

Allergic rhinitis is a nose disorder caused by chronic IgE-mediated inflammation following exposure to allergens in the lining of the nasal membranes. Allergic rhinitis starts from the time of life in the womb (utero), in children, adolescents until adults. The diagnosis of allergic rhinitis is obtained through anamnesis, physical examination and supporting examinations. Management for allergic rhinitis cases has the goal of reducing symptoms and improving the patient's quality of life. Regular and more frequent assessment of symptoms can help adjust treatment more quickly and accordingly to the patients.

Keywords: rhinitis, allergy, inflammation, allergen, atopy

Introduction

Allergic rhinitis is a nose disorder caused by chronic IgE-mediated inflammation following exposure to allergens in the lining of the nasal membranes. Symptoms of allergic rhinitis include rhinorrhea, nasal congestion, itchy nose and sneezing which may return spontaneously or with treatment [1].

Multimorbidity from allergic rhinitis occurs extra nasally in conjunctivitis, asthma, atopic dermatitis, rhinosinusitis accompanied by polyps, otitis media with effusion, adenoid hyperplasia, gastroesophageal reflux, sleep disturbances and chronic upper airway cough syndrome. The presence of one or more comorbidities will increase the duration and severity of the disease, decrease quality of life, and be refractory to treatment. Allergic rhinitis must be treated with a multidisciplinary approach [2].

Pathophysiology and Classification of Allergic Rhinitis

Allergic rhinitis starts from the time of life in the womb (utero); in children, adolescents until adults. In childhood, there is a defence hypothesis of the skin (skin barrier hypothesis). If there is a defect in the skin barrier, the allergen will enter easily and initial sensitization of the allergen will occur. Allergens trigger Th2-mediated memory expenditure, then migrate to the bronchi and lymphoid tissue, resulting in sensitization and inflammation of the airways. In addition, there are influences from genetic factors and the immune system. The immune system will occur polarization of TH2/Th17, activation of modulator and inflammatory immune cells, and release of chemical mediators, cytokines and chemokines. The nasal mucosa also has an important role in the allergic process, namely mucosal defence, innate and adaptive immune responses. Environmental factors such as parental, infection, climate/geography, and inhalants can also affect the allergic process. Allergic rhinitis is not fully known because it is a disease with complex interactions between genes, environment and age when exposure occurs [3].

Allergic rhinitis has a relatively complex pathophysiological pathway, consisting of early-phase and late-phase responses. This reaction begins with exposure to certain allergens such as house dust mites, pollen, etc., which then recognized by

IgE receptors on mast cells and basophils in sensitive individuals. In the early phase, mast cell degranulation occurs and causes the release of histamine shortly after exposure to allergens, which is followed by other inflammatory mediators such as leukotrienes and eicosanoids. This phase is responsible for acute nasal symptoms such as sneezing and runny nose, and ocular symptoms such as itchy, red and watery eyes. The presence of inflammatory mediators will increase vascular permeability and trigger oedema. Within a few hours after the initial exposure, a late phase takes place that is marked by the involvement of basophils, neutrophils, T lymphocytes, monocytes, and eosinophils, as well as the release of various types of mediators such as cytokines, prostaglandins, and leukotrienes. In this phase, tissue remodelling occurs, and further development of oedema will cause nasal congestion which is often one of the most disturbing symptoms for patients. Both the early phase and the late phase can be targets for intervention to treat allergic rhinitis.⁶

The Allergic Rhinitis and Its Impact on Asthma (ARIA) classifies allergic rhinitis based on the duration of symptoms and the severity of symptoms. The classification of allergic rhinitis can be seen in the table below.

Table 1: Allergic rhinitis classification according to ARIA guidelines [5]

Intermittent Allergy Rhinitis	Persistent Allergy Rhinitis
Symptoms	Symptoms
• Appears <4 days per week OR	• Appears >4 days per week AND
• Lasting <4 consecutive weeks	• Lasting >4 consecutive weeks

Mild allergic rhinitis	Moderate/Severe allergic rhinitis
No following symptoms were found:	One or more of the following symptoms are present:
Sleep disorders	Sleep disturbance
Interference with carrying out daily activities, including leisure and or exercise	Disruption to carrying out daily activities, including leisure and or exercise
Learning or work disorders	Learning or work disorders
There are symptoms, but they are not bothersome	There are symptoms that are considered disturbing

3. Diagnosis of Allergic Rhinitis

The diagnosis of allergic rhinitis is obtained through anamnesis, physical examination and supporting examinations [9]. A careful history and physical examination accompanied by appropriate diagnostic tests are needed to make a correct diagnosis. The most frequently used diagnostic test options are the prickly skin test, serum total IgE, serum specific Ig E, swabs from nasal secretions, nasal epithelial scrapings, and the nasal provocation test which is more frequently used for research purposes [11].

a. Anamnesis

Anamnesis begins with a general history of the disease and continues with more specific questions covering nasal symptoms including information about the patient's place of residence/work and occupation. The symptoms of allergic rhinitis that need to be asked are:

- Sneezing (more than five times per attack), rhinorrhea (watery clear mucus).
- Nasal congestion (persistent / alternating), itching in the nose, throat, palate or ears.
- Sometimes accompanied by: itchy, watery or red eyes, hyposmia/anosmia, posterior nasal drip or chronic cough.
- Attack frequency, disease severity, duration of illness, intermittent or persistent.
- Influence on quality of life such as interference with work, school, sleep and daily activities.
- Comorbid in other organs before or concomitant with allergic rhinitis
- Rhinosinusitis, bronchial asthma, eosinophilic otitis media, adenoid tonsillar hypertrophy, atopic dermatitis, urticaria, food allergies
- Family history of atopy. If there are any family members (father, mother, siblings) ever suffered from any of the allergic diseases mentioned above (family history of atopy)
- Trigger factors for allergic rhinitis symptoms. The environment, for example, pollutants, cigarette smoke, cold air, chemical odours such as perfume, deodorant and sports odours. In addition, there is also hypersensitivity and hyperresponsiveness.
- Treatment history and results
- The effectiveness of previously used drugs and the types of treatment that have been received and medication adherence

b. Physical Examination

- Anterior rhinoscopy using sufficient light and a nasal speculum. Note the presence of oedema from the inferior/middle concha covered with clear watery secretions, and pale mucosa. Another nasal anatomical conditions such as the nasal septum. Note also the possibility of nasal polyps.
- Nasoendoscopy (if facilities are available). This examination can assess the pathology of the nose and paranasal sinuses that are not visible on the anterior rhinoscopy examination. Can use rigid or flexible endoscopes. The inferior turbinate is livid/pale and hypertrophied turbinates may also be found.

There are typical signs of allergic rhinitis sufferers:

- Allergic shiner: black colour on the orbits and palpebral

- Nasal crease/linea nasalis: Thickening and scarring of the nose
- Allergic greeting: usually found in children, it is because the child is trying to reduce the itching sensation in the nose.

c. Supportive Examination

- Skin Prick test
- Intradermal skin test / Skin End Point Titration Test (if available)
- Specific IgE serum (expensive)
- Total IgE serum (less useful), adult range value 100 – 150 IU/ml
- Cytological examination of the nose, if needed to:
 - Determine between allergic / non-allergic and rhinitis due to infection
 - Follow-up response to therapy
 - Seeing eosinophil cells, basophils and mast cells
 - This examination is more often done for research purposes.
- Nasal provocation test/nasal challenge test (if available), performed when there are doubts and difficulties in diagnosing allergic rhinitis, where the history of allergic rhinitis is positive, but the results of allergy tests are always negative.
- Plain X-ray of paranasal sinuses: if there is any indication of paranasal sinus involvement
- CT Scan / MRI of the paranasal sinuses: upon indication, performed if:
 - To determine whether there are complications such as rhinosinusitis
 - No response to therapy
 - Planned operative action

Management of Allergic Rhinitis

Management of allergic rhinitis cases has the goal of reducing symptoms and improving the patient's quality of life. The management of allergic rhinitis treatment is as follows [12].

1. Avoidance of allergens
2. Medical therapy

Several pharmacological agents that often used in the management of allergic rhinitis include:

- a. Physiological NaCl for nasal irrigation
- b. Intranasal corticosteroids
- c. Antihistamine
- d. Decongestant
- e. Cromolyn
- f. Leukotriene receptor antagonist (LTRA)

The use of saline nasal sprays and nasal irrigation has been suggested as a treatment option for various sinonasal conditions, including acute upper respiratory tract infections, chronic sinusitis, and allergic rhinitis. Saline can be used in the nasal cavity in a variety of forms, including drops, sprays, nebulizers and irrigations [4].

Precision medicine is a new paradigm in the management of allergic rhinitis. The principles of precision medicine are personal management, prediction of success, prevention of disease progression and patient participation.⁷ Precision medicine is guided by endotypes, not phenotypes, which add to the prediction of success, disease prevention, and patient participation. The phenotype of rhinitis is the

severity and duration of symptoms, primary symptoms, pattern of sensitization, presence of comorbidities, and control after treatment. The rhinitis phenotype has been used as an evidence-based management algorithm for rhinitis and a trial and error approach^[7,8]. In the application of precision medicine, the results showed that allergic rhinitis was controlled and uncontrolled according to the visual analogue scale, the total nasal symptoms were 71.7% and 28.3%, and the compliance rate for control patients was 100%. The application of precision medicine in allergic rhinitis produces good effectiveness^[10].

The guideline changes from 2008, 2016 and 2020 are increasingly based on patient preference, symptom control and the impact of symptoms on the patient's quality of life. In ARIA 2020, the VAS was used as a tool to measure the impact of symptoms on a patient's quality of life. Regular and more frequent assessment of symptoms can help adjust treatment more quickly and accordingly to the symptoms felt by the patient.

Conclusion

Allergic rhinitis is a nose disorder caused by chronic IgE-mediated inflammation following exposure to allergens in the lining of the nasal membranes. Symptoms of allergic rhinitis include rhinorrhea, nasal congestion, itchy nose and sneezing, which may return spontaneously or with treatment. Management of allergic rhinitis cases has the goal of reducing symptoms and improving the patient's quality of life.

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