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ALLERGIC RHINITIS: AN UPDATED REVIEW

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ABSTRACT

Allergic Rhinitis is a prevalent condition in adulthood that affects people of all ages. Nasal inflammation, nasal itch, rhinorrhoea and sneezing are the classic symptoms of the condition. Although Allergic Rhinitis (AR) is not a serious disease, it is clinically relevant because it involves many complications, is a major risk factor for poor asthma control and affects quality of life and productivity at work or at school. A diagnostic test of a pharmacotherapeutic agent may be started in people with clinically identified Allergic Rhinitis; however, specific immunoglobulin E (IgE) reactivity needs to be recorded to confirm the diagnosis. In order to establish the diagnosis of Allergic Rhinitis, a detailed history, physical examination and allergy skin testing are required. Awareness of patients is a vital component of care. The main therapy is oral antihistamines of the second generation and intranasal corticosteroids. Allergen immunotherapy is an effective immune modulating therapy that should be recommended if Allergic Rhinitis is not or is not tolerated in pharmacology. Treatment of Allergic Rhinitis requires a step-by-step approach depending on the severity and duration of symptoms. Only immunotherapy with specifically controlled allergens may change the natural history of Allergic Rhinitis. This article provides an overview of this disorder, pathophysiology, treatment and proper management.

KEYWORDS: Allergic Rhinitis, Immunoglobulin E, Allergen immunotherapy.

INTRODUCTION

Allergic rhinitis is defined as an inflammation of the nose lining and is characterized by anterior or posterior rhinorrhoea, sneezing, nasal blockage and/or nose itching.[8] Allergic rhinitis is a high prevalence disorder (persistent and severe rhinitis) that affects about 10-40% of the adult population in many advanced nations.[12] For many years, in European countries,

the incidence of AR has been rising regularly.[13] AR, one of the most prevalent chronic diseases in childhood and adolescence, was much greater in elderly kids than in younger kids.[8] It has been shown that AR in children and adults leads to significant deficiency of Quality of Life (QOL), but the disease burden has not been well understood until the last few years.[8] Poor control of asthma is associated with moderate to severe rhinitis that should be recognised and handled.[1] Allergic Rhinitis, especially in patients with serious disease, adversely impacts social life, school performance and work productivity.[1] Allergic and non-allergic asthma patients suffer from allergic rhinitis.[1] AR is extremely comorbid with asthma.[12] Allergic Rhinitis was previously grouped into seasonal, perennial, and occupational illnesses based on the moment of exposure.[12] Allergic rhinitis is now grouped into intermittent AR (symptoms 4 days/week or > 4 weeks) instead of prior seasonal and perennial AR units and is further categorized as mild/moderate/severe according to severity.[8] Previously, Allergic Rhinitis was classified into seasonal, perennial and occupational illnesses based on the duration of exposure. Patients were categorized by 4 ARIA groups (moderate intermittent, moderate persistent, moderate/serious intermittent and moderate /serious persistent).[12] The working group on Allergic Rhinitis and its impact on asthma (ARIA) suggested a fresh classification for AR based on symptoms and severity.[14] It is now acknowledged that Allergic Rhinitis is more than the conventional symptoms of sneezing, rhinorrhoea and nasal obstruction. Many patients also have conjunctivitis with seasonal Allergic Rhinitis.[16] Decongestants, antihistamines, intranasal cromolyn, and topical nasal corticosteroids are pharmacotherapies for AR.[13] Examples of drugs used to supress the inflammatory process are topically applied (intranasal) corticosteroids and nasal cromolyn.[13] Examples of antihistamines and decongestants are agents used to reduce exposure, pharmacotherapy is often used to stop the inflammatory process.[18] Oral antihistamines are the treatment of seasonal Allergic Rhinitis and the two main pharmacological medications are intranasal corticosteroids.[16] The rules for Allergic Rhinitis and its impact on asthma (ARIA) indicate the topical intranasal corticosteroids are the preferred therapy for anything besides mild, intermittent rhinitis.[17] Immunotherapy is currently accessible via sublingual and subcutaneous routes, primarily for people with pharmacotherapy uncontrolled Allergic Rhinitis and allergy prevention.[18] However, medications that alleviate AR and asthma nasal symptoms also decrease allergic asthma respiratory symptoms.[18]

ETIOLOGY

Allergic Rhinitis is a global health issue that cause significant diseases and disabilities throughout the world.[8] Atopic disease involves allergic rhino conjunctivitis, asthma, atopic dermatitis and allergies to food, and tend to occur in families.[1] Several trials have observed that early environmental exposure to multiple infectious agents such as hepatitis A, Mycobacterium spp (other than M. tuberculosis, M. bovis, M. avium, M. leprae) toxoplasma gondii, these agents (e.g., endotoxins and lipopolysaccharides), or a mixture of them- protects against atopic growth.[1] Allergic Rhinitis is a global health issue that causes significant diseases and disabilities throughout the world.[8] Common symptoms include sneezing, itching, watery rhinorrhea and nasal blockage that can lead to sleep problems, activity constraints, and both practical and emotional issues.[14] Allergens in indoor and outdoor cause Allergic Rhinitis. Major allergens in the outdoor and indoor include pollens, molds, mites, dander's of animals, insects.[8] Allergens in the indoor and outdoor cause Allergic Rhinitis.[14] Allergenic food can sometimes be the cause of isolated nasal symptoms. Rhinitis by allergic and non-allergic mechanisms may also be caused by occupational agents. The function of air pollutants indoors and outdoors is likely to be important, but more information is required to evaluate their impact.

CLASSIFICATION

Rhinitis is categorized according to etiological classification as: IgE mediated (allergic), autonomous, infectious and idiopathic (unknown).[8] The ARIA strategies for classifying and treating Allergic Rhinitis resulted in the definition of allergic nasal disease as recurrent or persistent and mild or moderate to severe (figure 1).[1] Allergic Rhinitis has traditionally been classified as seasonal (occurring during a particular season) or perennial (occurring throughout the year).[20] Symptoms are categorized as mild when patients can normally sleep and do regular activities (including job or school); mild symptoms are usually intermittent. Symptoms are classified as moderate / severe if they have significant effect on sleep and day-to-day activities and are regarded to be bothersome.[14] It is essential to identify the seriousness and length of disease as this guides the treatment strategy for individual patients.[8]

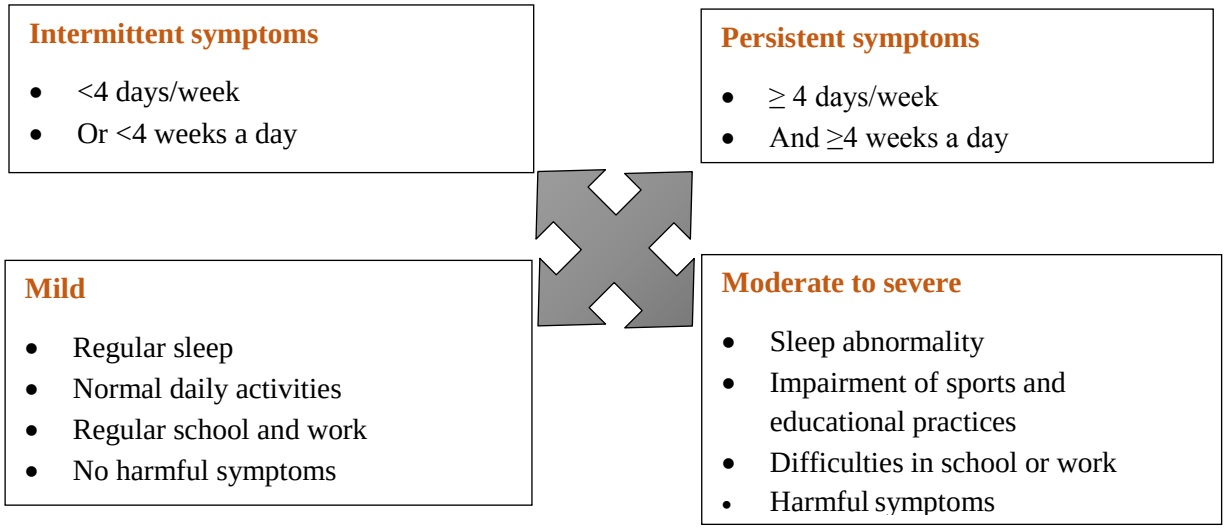

Figure No 1: Classification Of Allergic Rhinitis.

PATHOGENESIS

Allergic Rhinitis is triggered by an allergic immune response to inhaled allergens.[8] Numerous inflammatory cells in Allergic Rhinitis, including mast cells, CD4+ T cells, B cells, macrophages and eosinophil's invade the nasal lining when exposed to inciting allergens (most frequently airborne dust mite faecal particles, cockroach residues, animal dander, moulds and pollens).[19] CD4+ T cells play a key role in initiating and orchestrating the allergic immune response through cytokine secretion, such as interleukin 4, 5, 10 and 13. Interleukin 4 is a cardinal cytokine that induces allergen sensitization by inducing an IgE class switch in B lymphocytes.[8] IgE molecules on the surface of tissue mast cells and basophils are released into the bloodstream and bind to high-affinity receptors. Once allergens are accumulated on sensitized individuals nasal mucosa, they attach allergen-specific IgE to the surface of mast cells, resulting in rapid release of performed mediators such as histamine, causing symptoms associated with early nasal reaction - i.e., sneezing, rhinorrhoea, and nasal itching.[8] Atopic peoples are genetically predisposed to become sensitized to harmless allergens through activation of dentric cells and T lymphocytes.[19] The T cells that infiltrate the nasal mucosa are mainly T helper (Th) 2 in nature and release cytokines (e.g., interleukins [IL-3, IL-4, IL-5 and IL-13] that encourage plasma cell development of immunoglobulin E (IgE).[19] In IgE antibody formation, causes the release of mediators that are accountable for arteriolar enlargement, enhanced vascular permeability, itching, rhinorrhoea, mucous secretion and soft muscle contraction.[19,20,21]

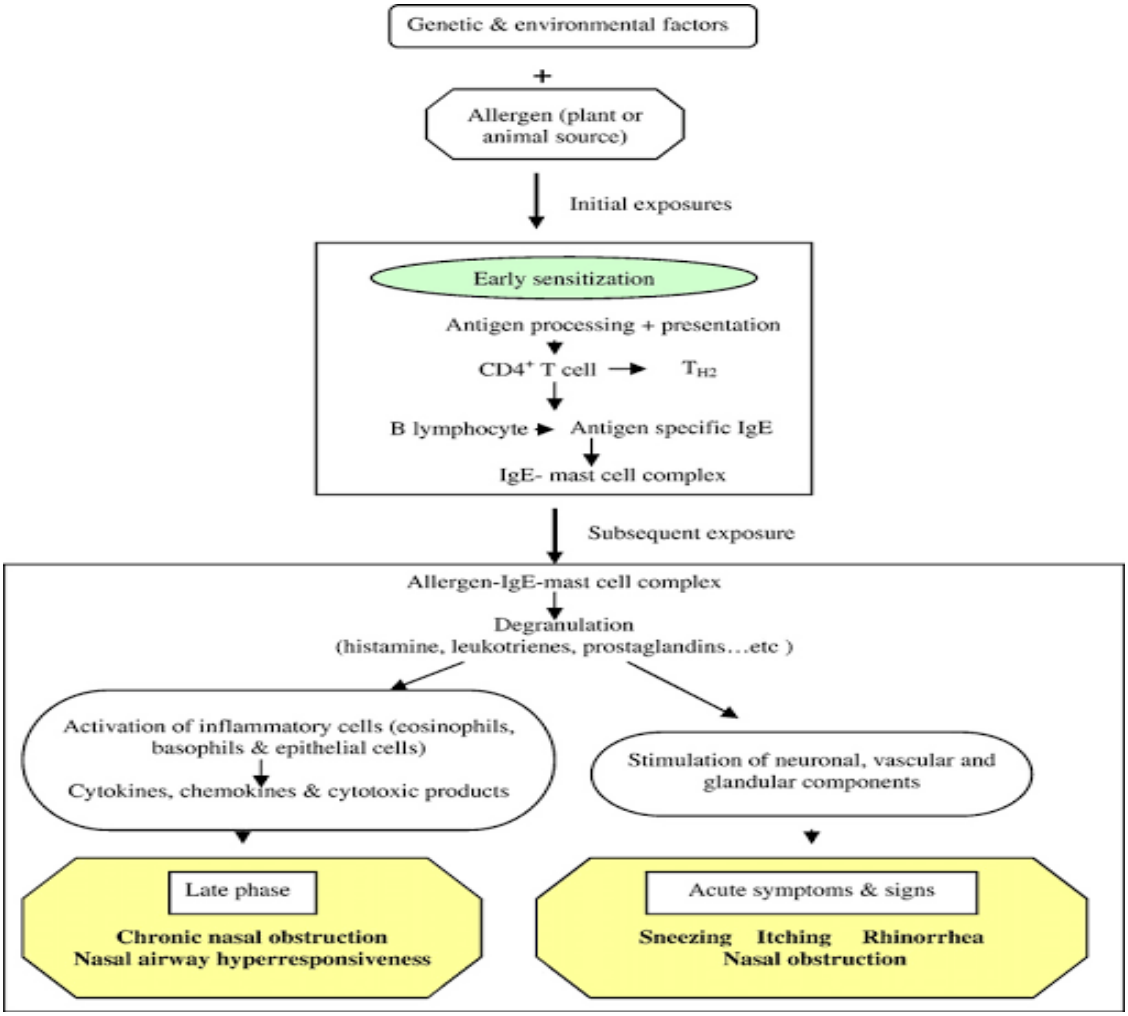

Figure no 2: pathogenesis of allergic rhinitis.

DIAGNOSIS

Although the clinical diagnosis of rhinitis requires a complete history and physical examination, further diagnostic testing is generally essential to verify that underlying allergies causes rhinitis.[19] AR diagnosis is based on a characteristic history of allergic symptoms and diagnostic tests.[15] The main technique for identifying particular allergic triggers of rhinitis is skin-prick testing. Skin-prick testing includes placing the skin of the wrists or back with a drop of a commercial extract of a particular allergen, then pricking the skin through the drop to bring the extract into the epidermis. A wheal and flare reaction (an uneven wheal blanched around a redness region) will happen within 15-20 minutes if the test is positive.[19]

SKIN TESTING

The most important for finding offending allergens is skin testing.[15] A functional alternative to skin prick testing is the use of allergens specific IgE tests (e.g., radioallergosorbent tests

[RASTs]). Which provide an in vitro estimate of the specific IgE concentrations of a patient against specific allergens.[31] However, skin-prick testing is usually regarded more sensitive and cost-effective than allergens specific IgE testing and has the additional benefit of offering instant outcomes to physicians and patients.[31,20,32]

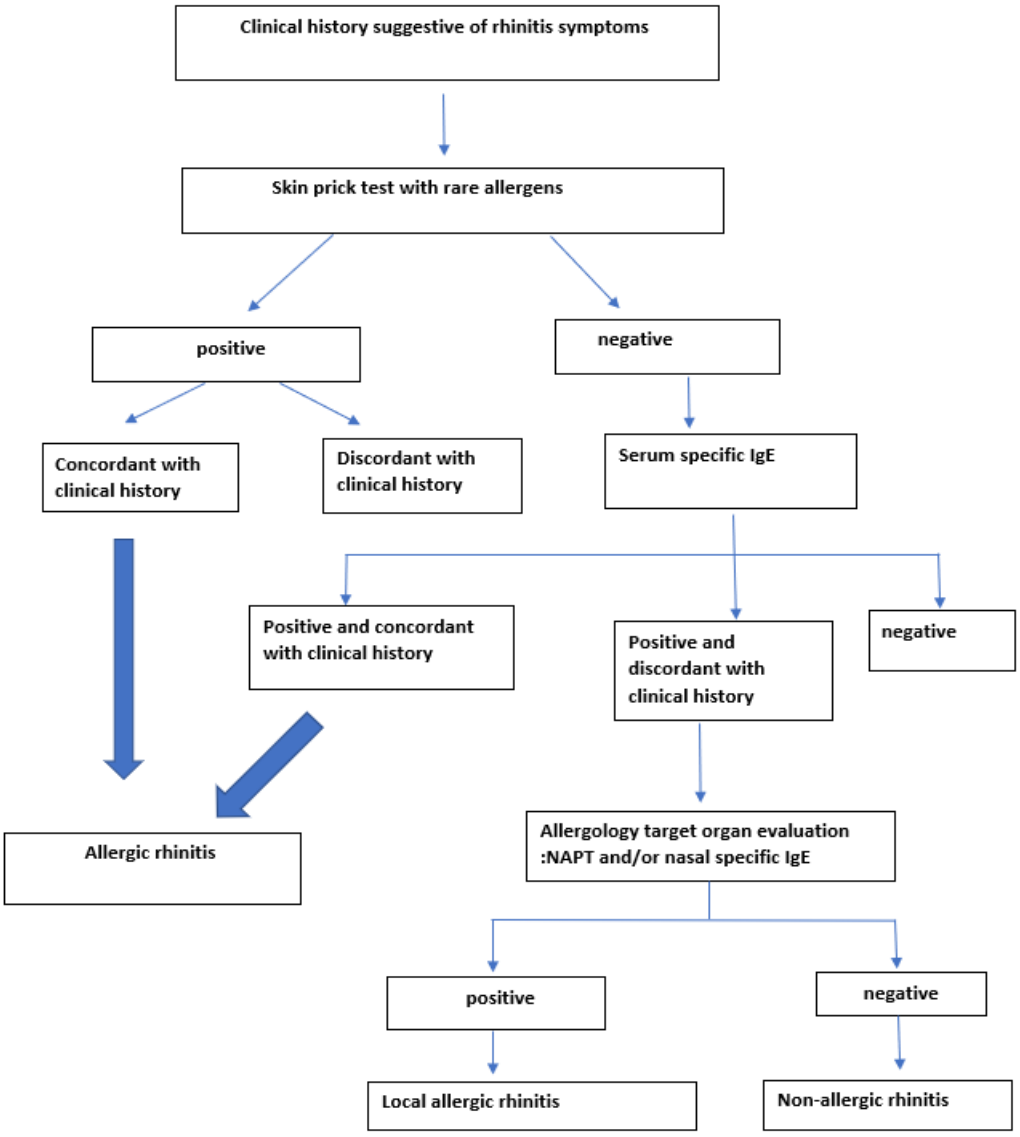

Figure no 3: Diagnostic algorithm of allergic rhinitis.

TREATMENT

A successful therapeutic approach to Allergic Rhinitis should include: allergic or irritant contact, pharmacotherapy, prevention and immunotherapy consideration.[8] (Figure 4) represents a treatment algorithm.[19] Therapeutic options available to achieve this goal includes prevention measures, oral antihistamines, intranasal corticosteroids, leukotriene

antagonist receptors and immunotherapy for allergens (see figure 2). Certain medications that may be effective for selected patients include decongestants and oral corticosteroids.[19]

	USUAL ADULT DOSE	USUAL PAEDIATRIC DOSE
ORAL ANTIHISTAMINE (SECOND GENERATION)		
Cetirizine (reactine)	1-2 tablets (5 mg) once daily 1 tablet (10 mg) once daily	5-10ml (1-2 teaspoon) once daily (children's formulation)
Desloratidine (aerius)	1 tablet (5 mg) once daily	2.5- 5ml (0.5-1.0 teaspoon) once daily (children's formulation)
Fexofenadine (allegra)	1 tablet (60 mg) every 12 hours (12 hour formulation) 1 tablet (120 mg), once daily (24-Hour formulation	not currently indicated for children under 12 years of age
Loratidine (claritin)	1 tablet (10 mg), once daily	5 -10 ml (1-2 teaspoons) once daily (children's formulation)
INTRANASAL CORTICOSTEROIDS		
Beclomethasone (beconase)	1-2 sprays (42 µg/spray) EN, Twice daily	1 spray (42 µg/spray) EN, twice daily
Budesonide (rhinocort)	2 sprays (50 µg/spray) EN, Once daily or 1 spray EN, Twice daily	2 sprays (64µg/spray) EN, once daily or 1 spray EN, twice daily (do not exceed 256µg)
Ciclesonide (omnaris)	2 sprays (50µg/spray) EN, Once daily	not indicated for children under 12 years of age

Fluticasone furoate (avamys)	2 sprays (27.5µg/spray) EN, once daily	1 spray (27.5µg/spray) EN, once daily
Fluticasone propionate (flonase)	2 sprays (50µg/spray) EN, once daily/every 12hours (for severe rhinitis)	1-2 sprays (50µg/spray) EN, once daily
Momantasone fuorate (nasonex)	2 sprays (50µg/spray) EN, once daily	1 spray (50µg/spray) EN, once daily
Triamcinolone acetonide (Nasacort)	2 sprays (55µg/spray) EN, once daily	1 spray (55µg/spray) EN, once daily
LEUKOTRIENE RECEPTOR ANTAGONIST		
Montelukast	1 tablet (10mg) ,once Daily	not currently approved for patients under 15years of age

EN: Each Nostril

Figure No 4: Pharmacotherapy Based On Adult And Paediatric Dosing.

ALLERGEN AVOIDANCE

It is sometimes difficult to avoid indoor allergens like house dust mites. First line Allergic Rhinitis treatment involves eliminating related allergens (e.g., house dust mites, moulds, pets, and pollens) and irritants (e.g., cigarette smoke). Patients allergic to house dust mites should be advised to use allergy impermeable bedding covers and retain the relative humidity in the home below 50% (to inhibit the growth of mites). Through maintaining windows closed, using an air conditioner, or reducing the amount of time spent outdoors in peak pollen seasons, pollen exposure can be minimized.[31]

PATIENT AVOIDANCE

For patients allergic to animal dander, removal of the animal from the home is recommended and usually results in a significant reduction in symptoms within 4-6 months.[19] These avoidance strategies can effectively improve the symptoms of Allergic Rhinitis, and patient should be advised to use a combination of measures for optimal results.[8]

ANTIHISTAMINES

In contrast, second-generation antihistamines penetrate the blood-brain barrier much less than first-generation antihistamines, and thus they have few side effects on the central nervous system.[15] Oral H1-antihistamines are effective against symptoms mediated by histamine (rhinorrhoea, sneezing, nasal itching and eye symptoms) but are less effective on nasal congestion. First-generation oral H1-antihistamines possess significant side effects due to their sedative and anticholinergic properties.[1] The newer, non-sedating, second-generation oral antihistamines (e.g., desloratadine [Aerius], terfenadine, fexofenadine [Allegra] and loratadine [Claritin]) are the first-line pharmacological treatments recommended for all patients with allergic rhinitis.[19] Terfenadine and astemizole were initially used second-generation antihistamines. These drugs have severe cardiac toxicity inducing QT prolongation and torsade de pointes.[15] When these antihistamines are administered along with macrolide antibiotics or azole antifungal agents, the risk of cardiac side effects is elevated because these drugs affect cytochrome p450 isoenzyme CYP3A4 activity. Although the older (first-generation) sedating antihistamines (e.g., diphenhydramine, chlorpheniramine) are also effective in relieving symptoms, they have been shown to negatively impact cognition and functioning and, therefore, they are not routinely recommended for the treatment of allergic rhinitis.[19,20,32] Topical antihistamines have been reported to reduce itching, sneezing and rhinorrhoea. However, they are less effective than intranasal corticosteroids and ineffective in eye symptoms.[19]

INTRANASAL CORTICOSTEROIDS

Intranasal corticosteroids are also first-line therapeutic options for patients with mild persistent or moderate/severe symptoms and they can be used alone or in combination with oral antihistamines.[19] Intranasal corticosteroids are the most effective therapeutic agents for allergic rhinitis,[1,2-4] and they are superior or equal to the combination of an antihistamine and an antileukotriene.[5]

When used regularly and correctly, intranasal corticosteroids effectively reduce inflammation of the nasal mucosa and improve mucosal pathology.[19] Studies and meta-analyses have shown that intranasal corticosteroids are superior to antihistamines and leukotriene receptor antagonists in controlling the symptoms of allergic rhinitis, including nasal congestion, and rhinorrhoea.[16-20] They have also been shown to improve ocular symptoms and reduce lower airway symptoms in patients with concurrent asthma and allergic rhinitis.[26-28] Since intranasal corticosteroids are not absorbed systemically, they induce few systemic side effects and subcutaneous and muscular necrosis.[1] The most common side effects of intranasal corticosteroids are nasal irritation and stinging.[19] However, these side effects can usually be prevented by aiming the spray slightly away from the nasal septum.[2] When intranasal corticosteroids are administered, eosinophil's and basophils decrease in 1 week.[31] Intranasal corticosteroids are effective in all AR symptoms, especially nasal obstruction and eye symptoms. The therapeutic effect of intranasal corticosteroids is encountered 7 hours after administration and reaches the maximal level after 2 weeks. The systemic absorption rates of flunisolide, triamcinolone acetonide and beclomethasone dipropionate are 20-50%, whereas those of mometasone furoate and fluticasone propionate are very low (≤ 0.1% and ≤ 2%, respectively).[31] In addition, most of the intranasal corticosteroids are eliminated by first-pass hepatic metabolism. Although intranasal steroids are considered effective drugs for managing allergic rhinitis, symptomatic response to intranasal steroids may not be evident for several days after therapy is initiated, and some patients may require a therapeutic trial of 2 to 3 weeks to determine whether the treatment is satisfactory.[11] For treatment with intranasal steroids to be effective, they must be used on a regular basis to maintain optimal therapeutic efficacy.[3]

LEUKOTRIENE RECEPTOR ANTAGONISTS

The leukotriene receptor antagonists (LTRAs) montelukast and zafirlukast are also effective in the treatment of allergic rhinitis; however, they do not appear to be as effective as intranasal corticosteroids.[29-31] Montelukast is effective in reducing nasal and eye symptoms in patients with seasonal AR and improves nasal obstruction comparable to loratadine.[15] Some previous studies have advocated that a combination of montelukast and loratadine has faster and a better efficacy than montelukast or loratadine alone.[15]

IMMUNOTHERAPY

Allergen immunotherapy involves the subcutaneous administration of gradually increasing quantities of the patient's relevant allergens until a dose is reached that is effective in inducing immunologic tolerance to the allergen.[19] Immunotherapy was initially introduced for seasonal AR due to pollens. Immunotherapy is effective in house dust mite and pollen AR of adult and children, prevents asthma in AR patients and reduces new atopic sensitization.[15] Sublingual immunotherapy has also shown the potential of prevention of seasonal allergic asthma in grass pollen allergic children suffering only from rhinitis.[35] Subcutaneous immunotherapy is effective in people with allergic rhinitis, with long-lasting reduction of symptoms and drug requirements, and it seems to prevent new sensitization and asthma.[1,6,7] SLIT is safer than subcutaneous immunotherapy. Common adverse events are local reactions (oral pruritus or swelling) and gastrointestinal problems (nausea, vomiting, diarrhoea or abdominal pain), which subside spontaneously or with conservative management. Fatal adverse events causing death.[15] we are cautiously optimistic about sublingual immunotherapy as an effective treatment and possible preventer of asthma.[1]

CONCLUSION

Allergic Rhinitis is a common disorder that can significantly impact patient quality of life. Prevalence of allergic rhinitis continues to increase and will undoubtedly have substantial effects on the lives of many sufferers and society.[19] The diagnosis is made through a comprehensive history and physical examination. Further diagnostic testing using skin-prick tests or allergen-specific IgE tests is usually required to confirm that underlying allergies cause the rhinitis. The therapeutic options available for the treatment of allergic rhinitis are effective in managing symptoms and are generally safe and well-tolerated. Second-generation oral antihistamines and intranasal corticosteroids are the main stay of treatment for the disorder. Allergen immunotherapy as well as other medications such as decongestants and oral corticosteroids may be useful in selected cases.[1]

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