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An Overview of Allergy Rhinitics and Its Impact

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ABSTRACT: Allergic rhinitis is an inflammatory disorder of the nasal mucosa induced by allergen exposure triggering IgE-mediated inflammation. Clinically, it is characterized by four major symptoms–rhinorrhea, sneezing, nasal itching, and nasal congestion. It can also be associated with co-morbid conditions as Asthma, Atopic Dermatitis & Nasal polyps. Around 20–30 % of the Indian population suffers from allergic rhinitis and among that 15 % develop asthma. The diagnosis & treatment of allergic rhinitis should follow ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines while of asthma should follow the GINA (Global Initiative for Asthma) guidelines. The treatment of allergic rhinitis should combine allergen avoidance (whenever possible), pharmacotherapy, and allergen immunotherapy. Intranasal corticosteroids are the most effective modality for treating allergic rhinitis and their sensory attributes are important in patient compliance.

I. OVERALL VIEW OF ALLERGIC RHINITIS

Allergic rhinitis caused by allergen exposure has severe impact on human being and it has been studied by various investigators worldwide. Review of the literature is useful to understand the overall view of allergic rhinitis in recent years. In 2005, Abhey Sood gave a comprehensive account on diagnostic significance of nasal eosinophilia in allergic rhinitis.Bist,et.al.(2005) studied onclinico-immunologic evaluation of allergy to Himalayan tree pollen in atopic subjects in India. According to their result, the average skin positivity in atopic populations recorded at different allergy centers in India varied from 2.2% against AN, to 4.7% against MP pollen. Significantly raised specific IgE against these pollen were observed in the sera of hypersensitive patients and they concluded that skin prick test positivity and raised IgE antibodies specific to Alnus nitida (AN), Betula utilis(BU),Cedrus deodara(CD), Mallotus phillipensis (MP) and Quercus incana(QI) established Himalayan tree pollen as important sensitizers in the atopic populations of India. A high incidence of skin sensitivity was observed to pollen antigens of Cedrus deodara, Mallotus phillipensis and Quercus incana in patients of Chandigarh residing in the hills and foothills of the Himalayas while Alnus nitida, Betula utilis and Cedrus deodara were important sensitizers in Delhi patients.

Asthma and Allergies in Childhood (ISAAC) time trends in the prevalence of rhino conjunctivitis symptoms were analyzed by Bengt Bjorksten, et.al.(2008) through their study on worldwide time trends for symptoms of rhinitis and conjunctivitis: Phase III of the International Study of Asthma and Allergies in Childhood, showed that prevalence increases in the older children exceeding 1% per year were recorded in 13 centres, including 3 of 9 centres in Africa, 2 of 15 in Asia-Pacific, 1 of 8 in India, 3 of 15 in Latin America, 3 of 9 in Eastern Europe and 1 of 34 in Western and Northern Europe. Decreasing rhino conjunctivitis prevalence of similar magnitude was only seen in four centers. They predicted that an increase was recorded in several centres, mostly in low and mid-income countries. The increases were more pronounced in the older age group, suggesting that environmental influences on the development of allergy may not be limited to early childhood.

Anand Bahadur Singhand Chandni Mathur (2012) have reviewed an aerobiological perspective in allergy and asthma from India compared with worldwide incident. They have highlighted from clinical point of view that the flowering time of higher plants are events that come periodically in each season, but the time of blooming may differ from year to year, in different geographic locations. Based on differences recorded in several years of observations in airborne pollen, pollen calendars are drawn as an aid to allergy diagnosis and management.

Gary W.K. Wong, et.al. (2013) reviewed the changing prevalence of allergic diseases in the Asia-Pacific Region. According to them, they have

highlighted some of the salient points. Asia-Pacific is one of the most densely populated regions of the world and is experiencing rapid economic changes and urbanization. Environmental pollution is a significant problem associated with the rapid modernization of many cities in South Asia. It is not surprising that the prevalence of asthma and allergies are increasing rapidly, although the underlying reasons remain largely unknown. Many studies from this region have documented the changing prevalence of allergic diseases in various parts of the world. However, the methodologies used were neither standardized nor validated, making the results difficult to evaluate. The International Study of Asthma and Allergies in Childhood (ISAAC) has provided a global epidemiology map of asthma and allergic diseases, as well as the trend of changes in the prevalence of these diseases. Allergic sensitization is extremely common in many Asian communities. However, the prevalence of allergic diseases remains relatively rare. The rapid urbanization in the region, which increases environmental pollution and can affect the rural environment, will likely increase the prevalence of asthma and allergies in Asia.

Ghulam Hassan,et.al. (2013) analyzed about the basic concepts of allergen immunotherapy. Allergen-specific immunotherapy is the therapeutic approach for allergic disorders with dysregulated immune responses, working through down-regulation of predominant T-cell and IgE mediated reactions by inducing immune tolerance by long-lived decrease in allergen-specific T-cell responsiveness through administration of allergen extracts in incremental doses. They highlighted about the role in the treatment of allergic rhinitis, allergic conjunctivitis, allergic asthma, and insect sting hypersensitivity and disorders demonstrating significant improvement on immunotherapy including atopic dermatitis, food allergies, etc. They pointed out that aim of improving patient outcome using safer forms of immunotherapy through recombinant technology, including allergens with reduced allergenicity and T-cell epitope based allergy vaccines without reducing immunogenicity, are in process. Sanjeeta Kochar, et.al.(2014) studied on Assessment of allergenicity to fungal allergens of Rohtak city, Haryana, India. During the present study, they have recorded a total of 45 fungal spore types. According to them, February–April and July–November were identified as the peak seasons for Rohtak city. Cladosporium was the main contributor to the total fungal load with 25.14% followed
by Alternaria (18.05%), Aspergillus niger (7.66%), Curvularia (5.31%), and Epicoccum (5.29%.
Fifteen dominant viable fungal spore types were represented in the form of a fungal calendar. An attempt has also been made to assess the allergenicity of some of the fungal types recorded from the atmosphere of Rohtak city. The magnitude of variations observed in markedly positive skin reactions (2+ and above) varied from 17.3 to 2.3%. Penicillium oxalicum showed a markedly positive reaction in maximum number of patients (26; 17.3%) followed by Rhizopus nigricans (23; 15.3%). In the ELISA test, sera showed 0–15% binding to different antigenic extracts, while sera showing >60% binding were least in number. Greater than 30% binding was observed against antigens of Rhizopus nigricans, Epicoccum purpurascens, Penicillium oxalicum, Curvularia lunata, Aspergillus flavus, Candida albicans and Neurospora sitophila. The concordance between positive skin reaction and serum-specific IgE antibodies ranged from 16.7 to 69.2%.

Jitendra Varshney and Himanshu Varshney (2015) have reviewed allergic rhinitis and its implications. Allergic rhinitis is an inflammatory disorder of the nasal mucosa induced by allergen exposure triggering IgE-mediated inflammation and it is clinically characterized by four major symptoms–rhinorrhea, sneezing, nasal itching, and nasal congestion. It could be associated with co-morbid conditions as Asthma, Atopic Dermatitis & Nasal polyps. Around 20–30 % of the Indian population suffered from allergic rhinitis and that 15 % developed asthma as per the ARIA (Allergic Rhinitis and its Impact on Asthma) and GINA (Global Initiative for Asthma) guidelines. Allergen avoidance, pharmacotherapy, and allergen immunotherapy are combined with the treatment of allergic rhinitis. Among these intranasal corticosteroids are the most effective modality for treating allergic rhinitis.

Jain, et.al.(2015) evaluated through their study on frequency of fungal isolation and antifungal susceptibility pattern of the fungal isolates from the clinical and mycological profile of 161 patients with chronic rhinosinusitis (CRS) and sinonasal polyps who were undergoing surgery at their tertiary care facility during 2002 to 2010. Result of their study showed the presence of allergic mucin for suggestive of fungal rhinosinusitis and peripheral eosinophilia by CT scan and total serum IgE, respectively. Histological examination of polyp tissue showed eosinophilic mucin in 100% of the cases and the incidence of allergic fungal rhinosinusitis (AFRS) was 83.9% in the patient population. KOH and/or culture were

positive for fungal hyphae or yeast in 93% (150/161) of the patients. Aspergillus spp. were the most commonly recovered isolates (70%). MICs of all A. flavus and A. fumigatus isolates were within the susceptible zone for itraconazole, voriconazole, and amphoterecin B. In conclusion, allergic fungal rhinosinusitis (FRS) is a common disorder in patients with sinonasal polyposis and due to its recurrent and intractable nature, a high degree of clinical suspicion for the presence of FRS in nasal polyposis should be considered.

Apar Jindal,et.al. (2016) studied on the comparison of Oral Montelukast and Intranasal Fluticasone in Patients with Asthma and Allergic Rhinitis. Due to insufficiency of evidence, they are unable to conclude due to limited number of randomized controlled trials available on subjects with concomitant allergic rhinitis and asthma. This gap in the knowledge is even more conspicuous in Indian population. Rao, et.al.(2016) studied on the Impact of surgery and intranasal corticosteroid therapy on quality of life of patients with allergic rhinitis. Result of the study indicated that mean AEC reduced from 517.66 (±74.42) to 322.70 (±54.68) after surgery and 3 months of intranasal corticosteroid therapy, and this reduction was statistically significant ($P < 0.001$). Mean QOL scores reduced from 2.624 (±0.445) to 2.031 (±0.386) after surgery and 3 months of intranasal corticosteroid therapy, and this reduction was statistically significant ($P < 0.001$). It is concluded that within 3 months after the surgery and intranasal corticosteroid therapy, the mean AEC as well as the mean QOL scores reduced significantly indicating a reduction in the allergic reaction and an improvement in the QOL of patients suffering from AR.

Diana S Church, et. al.(2016) studied on allergic rhinitis: impact, diagnosis, treatment and management. They have given various mythologies to adopt for the treatment of allergic rhinitis through this review articles. Allergic rhinitis results from an immunological abnormality in which atopic individuals produce immunoglobulin E (IgE) to allergens (e.g. pollen, house dust mites, animal dander and moulds). IgE activates mast cells, which respond by releasing inflammatory mediators. Histamine stimulates the early symptoms, predominately mucus production, nasal itching and sneezing. Leukotrienes and cytokines attract and activate eosinophils to cause allergic inflammation, which is primarily responsible for nasal blockage. When untreated, these symptoms can potentially impair patients' ability to sleep and perform optimally in their daily professional or personal life. Children's education is also particularly affected by untreated symptoms. Treatment is primarily with second generation H_1 - antihistamines, which are particularly effective against the early symptoms, and intranasal corticosteroids, which reduce allergic inflammation and improve nasal blockage. First generation H_1 - antihistamines should be avoided because they exacerbate the psychogenic effects of allergic rhinitis. Aim of this article is to provide pharmacists and other healthcare professionals with an understanding of the impact of undiagnosed allergic rhinitis and how to diagnose and treat it effectively.

Varsha M Rathi and Somasheila I Murthy(2017) studied on allergic conjunctivitis. They pointed out that the diagnosis of allergic diseases has increased in the last few decades and allergic conjunctivitis has emerged as a significant problem, which can cause severe ocular surface disease. Patients complain of itching, watering and redness. It can result in decreased quality of life, as patients with severe symptoms, if left untreated or treated poorly, may become school dropouts, unable to work outdoors and sometimes fail to sleep. The symptoms are aggravated by exposure to dry and windy climates.

Shannon K Quirk (2016) studied on vitamin D in atopic dermatitis, chronic urticaria and allergic contact dermatitis. Vitamin D influences allergen-induced pathways in the innate and adaptive immune system, and its potential immunomodulatory role in allergic skin disorders has been explored. This comprehensive review article provides an overview of the role of vitamin D in three common dermatologic conditions: atopic dermatitis (AD), chronic urticaria, and allergic contact dermatitis (ACD). Whereas the literature regarding vitamin D and AD has resulted in mixed findings, several studies have described an inverse relationship between vitamin D levels and AD severity, and improvement in AD with vitamin D supplementation. Similarly, several studies report an inverse relationship between vitamin D levels and severity of chronic urticaria. Although current research in humans remains limited, an increased likelihood of ACD has been demonstrated in vitamin D-deficient mice. They also suggested that additional well-designed clinical trials will be necessary to determine whether vitamin D supplementation should be recommended for prevention or adjuvant treatment of these common dermatologic conditions.

Chandrika (2017) has reviewed on allergic rhinitis in India. Prevalence of allergic diseases including asthma, rhinitis, anaphylaxis, food, drug or insect allergy, is rising worldwide affecting

about 10-25% of population being one of the top ten reasons for visit to primary care physicians. Though it often adversely affects the quality of life; in India allergic rhinitis is often regarded as trivial disease and patients fail to attribute the ill health to its symptoms.

In study on children with allergic rhinitis nasal symptoms and rhino conjunctivitis are present and there is a consistent rise in its prevalence. Though it often adversely affects the quality of life; in India allergic rhinitis is often regarded as trivial disease and patients fail to attribute the ill health to its symptoms. Proportion of blockers is higher compared to sneeze runners. Nasal obstruction is the most common symptom and blockers has significantly more sensitization to polyvalent house dust, house dust mites and fungi, whereas sneeze-runners has more sensitization to pollens. Asthma is the most common comorbid condition present. Majorityof children had one or more comorbidity, allergic rhinitis adversely affects thebehaviour, work performance and life style of patients.

Guillaume Pouessel,et.al. (2017) studied on the fatal anaphylaxis by analyzing national data from 1979 to 2011 and predicted that the incidence of anaphylaxis is increasing. They have also documented anaphylaxis mortality rate (deaths per million population), time trends and specificities according to triggers (iatrogenic, venom, food, unknown), age groups, sex and geographical regions (North and South) in France, between 1979 and 2011.

Valli Rajasekaran and Puja Ghosh (2018) studied aboutKnowledge, attitude and practice of allergic rhinitis in a rural population, kancheepuram district, tamil nadu.Patients of age >18 years; both sexes, presenting with classical symptoms of allergic rhinitis like sneezing, watery nasal discharge, nasal obstruction and signs of allergic rhinitis like pale nasal mucosa and hypertrophy of inferior turbinate were included in the study. They concluded that knowledge attitude and practices were poor in patients with allergic rhinitis.

Rashid Al-Abri,et.al. (2018) studied on allergic rhinitis in relation to food allergiesand revealed that it is not only associated with impaired quality of sleep and cognitive function but is also a significant contributor to reduced work performance and increased school absenteeism, with resulting indirect costs greater than those incurred by asthma. They also reported that it frequently coexists with other allergic manifestations like asthma and eczema. One suggested mechanism to explain the connection between common atopic disorders such as eczema, asthma and allergic rhinitis is atopic march, which proposes that the allergic disease progresses from atopic dermatitis to asthma and, subsequently, to allergic rhinitis (Sun,et.al.,2012).

Pols et al. observed that the prevalence of the coexistence of all three atopic diseases was 9.8 times higher than that which would be expected by chance; moreover, the relative risk for the occurrence of asthma and eczema in patients with allergic rhinitis was 6.20 (95% confidence interval: 5.30–7.27). Similarly, the link between food allergies, asthma and eczema has been well-studied by Liu,et.al.(2010) and Saunes,et.al. (2012). They also revealed that the same cannot be said of the relationship between food allergies and allergic rhinitis.

II. CONCLUSION

Allergy is a global health problem and is increasing in prevalence. Due to similarities in nasal and bronchial mucosa there is one airway and one disease concept.The risk of asthma is more in patients with allergic rhinitis. Both allergic and non allergic rhinitis are risk factors for asthma. Major OPD comprises of allergic rhinitis. Hence we would like to add to the review of literature and increase knowledge regarding allergic rhinitis.

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