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Status of Allergy Rhinitics and Its Impact: An Overview

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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.

I. OVERALL VIEW OF ALLERGIC RHINITIS

Review of the literature provides up to date information related to allergic rhinitis causing among the people. Lot of studies have been carried out in this aspect in recent past.Murray(1971) studied on infant feeding and respiratory allergy and explained about the potential dangers of feeding cow's milk to the newborn causing asthma, eczema and hay fever,etc along with family history of allergy. For those children who received supplemental foods in the 1st month, 22 (32%) showed evidence of nasal secretion eosinophilia; 46 (68%) did not. Only 2 (11%) of those on breastmilk alone displayed this sign and 16 (89%) did not. In the remaining 233 children who did not have an immediate family history of allergy the association was not significantly positive. There is evidence that, once an individual has become allergic to 1 substance, allergy to other antigens develops more readily, and 1 may therefore expect an infant with a milk allergy to be more liable than usual to develop allergy to house dust, animal danders, and pollens to which he is exposed in childhood. They also suggested that family history to allergic symptoms has to be assessed along with mother's feeding and cow's feeding to the newborn.

Sudhakara Rao (2009) reported through the study onrupatadine: pharmacological profile and its use in the treatment of allergic rhinitis. The use of rupatadine is indicated in adult and adolescent patients (>12 years of age) suffering from intermittent and persistent allergic rhinitis. In the treatment of these conditions, rupatadine is at least as effective as ebastine, cetirizine, loratadine and desloratadine. Avery good safety profile of rupatadine has been evidenced in various studies, including a long-term (1-year) safety study. Rupatadine does not present drug-drug interactions with azithromycin, fluoxetine and lorazepam, but should not be administered concomitantly with known CYP3A4 inhibitors.

Ranabir Pal,et.al.(2009) studied on theprevalence of bronchial asthma in Indian children**.** Wide differences in samples, primary outcome variables, lack of consistency in age category, rural–urban variations, criteria for positive diagnoses, and study instruments confounded the outcome variables. The mean prevalence was 7.24 ± SD 5.42. The median prevalence was 4.75% [with IQR = 2.65 − 12.35%]. Overall weighted mean prevalence was found to be 2.74. Childhood asthma among children 13 – 14 years of age was lower than the younger children (6 – 7 years of age). Urban and male predominance with wide inter-regional variation in prevalence was observed. Their finding indicated that the burden of bronchial asthma in indian children is higher than previously understood.

Chembolli Lakshmi and Srinivas, (2012)updated parthenium the terminator and concluded that parthenium dermatitis is a distressing dermatitis caused by the air borne allergen of the composite weed Parthenium hysterophorus. Jovilia M. Abong,et.al.(2012) studied on theprevalence of allergic rhinitis in Filipino adults based on the National Nutrition and Health Survey 2008 and reported about the possibilities allergic rhinitis between age groups with urban and rural areas distributions.According to their results**,**the response rate obtained from the interview was 94.1%. The overall prevalence of nose symptoms in the past 12 months was 20% while prevalence of nose symptoms at any time in the past was 23.8%. The proportion among both sexes was similar. The prevalence was highest among the respondents 40-49 years old. The overall prevalence of nose and eye symptoms for the past twelve months was 14.0%. The prevalence of respondents who reported presence of nose problems for the past twelve months was similar

across the 12 months of the year with highest rates noted in the months of June and May. Results predicted respondents from the rural area (22.1%) reported a higher prevalence of nose symptoms for the past twelve months compared to respondents from urban area (18%). There was no significant difference in prevalence of nose symptoms among residents living in coastal and/or inland areas.

A retrospective literature review of articles on the prevalence of asthma in the urban versus rural environment was initiated by Hamood Ur-Rehman Malik, et.al.(2012) in order to understand the effect of the environment on asthma. The urban-living effect is a global problem in the face of growing population, industrialization and pollution. The socioeconomic dichotomy in the urban versus rural environment also affects access and quality of health care. Articles reviewed had differences in the urban versus rural prevalence of asthma. However, further analysis of specific risk factors and socioeconomic trends that increased susceptibility to asthma was the same in these studies. Some rural areas may have similar environmental and socioeconomic issues that place them at the same risk for the development of asthma as their urban counterparts.Urban locations generally tend to have the prototype environment that can lead to the predisposition of asthma. Ultimately, the incidence of asthma can be decreased if these environmental and socioeconomic issues are addressed.

Ruby Pawankar, et.al. (2012) reviewed onallergic Rhinitis and its Impact on Asthma in Asia Pacific and the ARIA Update 2008.The prevalence of allergic diseases such as allergic rhinitis (AR) and asthma are markedly increasing to epidemic proportions worldwide as societies adopt Western lifestyles. An estimated 300 million persons worldwide have asthma, about 50% of whom live in developing countries, and about 400 million people suffer from AR. AR has a marked impact on quality of life, socially, at school, and in the workplace and is a huge socioeconomic burden. Thus, there was clearly a need for a global evidence-based guideline not only for managing AR but also highlighting the interactions between the upper and lower airways including diagnosis, epidemiology, common risk factors, management, and prevention. The Allergic Rhinitis and its Impact on Asthma (ARIA) document was first published in 2001 as a state-of-the-art document for the specialist, the general practitioner, and other health care professionals. Subsequent research and increasing knowledge have resulted in the ARIA 2008 update. The present review summarizes the ARIA update with particular emphasis on the current status of AR and asthma in Asia Pacific.

Hansen(2014) has given an account on general practice of diagnosis and treatment of adult about acute maxillary rhinosinusitis (ARS). They also found that the most common bacteriae that can be isolated are S. pneumoniae and H. influenzae. For many years the first drug of choice has been penicillin V, and treatment with penicillin V has followed Scandinavian recommendations. However, the resistance patterns in respect of H. influenzae have changed over the years and if the dominant flora is H. influenzae, then oral penicillin is not sufficient anymore, and should be replaced by amoxicillin with or without clavulanate. They suggested that future research should focus on the use of CRP(C reactive protein) in general practice, analyzing cost-effectiveness of the use of CRP patient outcome in relation to antibiotic treatment, clarification of ARS as a female disease, and a detailed exploration of the relationship between URTI's and impaired lung function in lung-healthy patients.

Animesh Deb,et.al.(2014) studied on the profile of patients with allergic rhinitis (AR) in Kolkata. They reported that proportion of “blockers” was found to be much higher than that of “sneezers-runners” (64.1% vs. 35.9%). “Blockers” had significantly more sensitization to polyvalent house dust, house dust mites and fungi ($p < 0.05$), while, “sneezers-runners” had more sensitization to pollens ($p < 0.05$). Significantly more “blockers” had “moderate/severe persistent” and “mild persistent” types of the disease ($p < 0.05$), while “mild intermittent” and moderate/severe intermittent” type of disease were significantly more common among “sneezers-runners” ($p < 0.05$). Both bronchial asthma and sinusitis were significantly more common among the “blockers” ($p < 0.05$).They concluded from the study that the clinical profiles of the two main categories of AR namely “sneezers-runners” and “blockers” were distinct from each other.

Agrawal (2013) had a survey on prevalence and risk factors for self-reported asthma in an adult Indian population. From the study, they reported that the prevalence of self-reported asthma was 1.8% (95%CI 1.6–2.0) among men and 1.9% (95%CI 1.8–2.0) among women, with higher rates in rural than in urban areas and marked geographic differences. After adjustment for known asthma risk factors, women were 1.2 times more likely to have asthma than men. Daily/weekly consumption of milk/milk products, green leafy vegetables and fruits were associated with a lower asthma risk,

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whereas consumption of chicken/meat, a lower body mass index (BMI; <16 kg/m^2, OR 2.08, 95%CI 1.73–2.50) as well as a higher BMI (>30 kg/m^2, OR 1.67, 95%CI 1.36–2.06), current tobacco smoking (OR 1.30, 95%CI 1.12–1.50) and ever use of alcohol (OR 1.21, 95%CI 1.05–1.39) were associated with an increased asthma risk.

Edwin H Kim and Wesley Burks (2014) reviewed on oral and sublingual immunotherapy and reported that oral and sublingual immunotherapy, with its superior safety and ease of administration, offers an alternative for patients with allergic rhinitis and asthma and has also been promising as a potential treatment for food allergy. Luis Caraballo,et.al. (2016) studied aboutthe particularities of allergy in the tropics and found particularities in the tropics that merit further study because they strongly affect the natural history of common allergic diseases; most of them related to climate conditions that favor permanent exposure to mite allergens, helminth infections and stinging insects. In addition, they detected several unmet needs in important areas which should be investigated and solved by collaborative efforts led by the emergent research groups on allergy from tropical countries.

Aloke Gopal Ghoshal,et.al.(2016) have detailed about the burden of segregated respiratory diseases in India and the quality of care in patients and asia -pacific burden of respiratory diseases. According to them,a total of 1000 patients were enrolled. Asthma was the most frequent primary diagnosis followed by AR, COPD, and rhinosinusitis. A total of 335 (33.5%) patients were diagnosed with combinations of the four respiratory diseases; the most frequently diagnosed combinations were asthma/AR and rhinosinusitis/AR. Cough or coughing up sputum was the primary reason for the current visit by patients diagnosed with asthma and COPD while AR patients reported a watery, runny nose, and sneezing; patients with rhinosinusitis primarily reported a colored nasal discharge. The mean annual cost per patient was US$637 (SD 806). The most significant driver of direct costs was medications. The biggest cost component was productivity loss. As a conclusive remark, given the ongoing rapid urbanization of India, the frequency of respiratory diseases and their economic burden will continue to rise. Efforts are required to better understand the impact and devise strategies to appropriately allocate resources.

Bruce M Prenner (2016) reviewedthe clinical efficacy and safety of MP-AzeFlu, a novel intranasal formulation of azelastine hydrochloride and fluticasone propionate, in clinical studies conducted during different allergy seasons in the USand opinioned that **r**egardless of allergy season or prevalent pollen, MP-AzeFlu improved nasal symptoms of allergic rhinitis (AR) to a significantly greater degree than AZE or FP(fluticasone propionate), two treatments that currently are recommended as the first-line AR therapy. MP-AzeFlu improved all individual AR symptoms and was significantly better than FP and AZE for nasal congestion relief, which is generally accepted as the most bothersome symptom for AR patients. The onset of action was within 30 minutes. MP-AzeFlu also provided clinically important improvement in the overall Rhino conjunctivitis Quality of Life Questionnaire score and significantly improved ocular symptoms of rhinitis compared to placebo. Favorable characteristics of the MP-AzeFlu formulation as well as superior clinical efficacy make it an ideal intranasal therapy for AR.Bernard Yu-Hor Thong (2017) studied on allergic conjunctivitis in Asia and stated thatnatural allergens like house dust mites (HDM), temperate and subtropical grass and tree pollen are important triggers that drive allergic inflammation in AC in the Asia-Pacific region. Climate change, environmental tobacco smoke, pollutants derived from fuel combustion, Asian dust storms originating from central/north Asia and phthalates may also exacerbate AR/C. He reported that topical calcineurin inhibitors are effective in certain types of persistent AC, and sublingual immunotherapy is emerging as an effective treatment option in AR/C to grass pollen and HDM. Translational research predominantly from Japan and Korea involving animal models are important for the potential development of targeted pharmacotherapies for AC.

Dilek,et.al.(2017) studied on evaluation of nasal fluid β-defensin 2 levels in children with allergic rhinitis**.** Result of the study concluded that children with allergic rhinitis have reduced nasal fluid β-defensin 2 levels compared with controls, and β-defensin 2 levels were negatively correlated with disease severity. They suggested that a more definite understanding of the roles of defensins and other antimicrobial peptides in allergic inflammation can open up new horizons in the management and treatment of these common diseases.Guvenç,et.al.(2017) conducted a prospective study to evaluate nasal signs and symptoms and to perform allergen-specific immunoglobulin E (IgE) testing to investigate the relationship between migraine and allergic rhinitis. They found no significant difference between the migraine patients and the controls in the incidence of nasal signs and symptoms (i.e., discharge,

congestion, itching, and sneezing) or inferior turbinate signs (i.e., color and edema). According to the IgE assays, 14 migraine patients (35.0%) were sensitized to one or more allergens, compared with 11 of the controls (27.5%); the difference was not statistically significant. Sensitization was highest for the grass pollens panel in both groups. They concluded that a pathophysiologic association between the two conditions seems more likely than an etiologic association since there is no association between migraine and allergic rhinitis.

Yang,et.al.(2017) did the work on the changing analysis of allergic rhinitis inhalant allergen spectrum in Xinjiang region. They carried out skin prick test in 480 cases with allergic rhinitis using 20 inhaled allergens and compared the major change in recent years with allergic rhinitis and allergen distribution. Among 480 cases, 406 showed positive reaction. The most common allergens found in patients were cheno podium (61.6%) and mug wort (44.1%), followed by willow(37.7%), maple(37.7%), poplar(30.3%), house dust mite(30.3%), plantain(29.8%), acacia(25.9%), dust mite maple(25.4%), and so on. The rate of positive reaction to only one allergen was 9.6%, of which 21 were mite allergens. The positive rate to allergens in male and female were 84.2% and 85.1%, the distribution of allergens in both sexes did not differ ($\chi(2)=0.001$, $P=0.978$). The positive rate to allergens in patients aged 21 to 35 years old was 88.6%, in patients aged 36 to 54 years old was 78.4%, the difference was statistically significant ($\chi(2)=0.258$, $P<0.01$). The positive rate to allergens in Kazakhs was slightly higher than that in other ethnic groups (91.7%). The positive rates to allergens in the Han, Uygur and other ethnic groups were 84.8%, 86.4% and 63.3% respectively, the difference was statistically significant($\chi(2)=9.779$, $P=0.044$). Seventy-five point four percent of all allergen-positive patients (306 cases) combined with asthma. They concluded that the major allergen with allergic rhinitis is chenopodium. Among them, Kazakh allergic positive rate is higher than other ethnic groups.

Principi and Esposito (2017) have furnished an imprecisely defined medical procedure. Nasal irrigation (NI) and its relevance in clinical practice is discussed to assist physicians in understanding the available evidence and the potential use of this medical intervention. Although in recent years several new studies have been performed, most of the studies that have evaluated NI have relevant methodologic problems. They suggest that multicenter studies enrolling a great number of subjects can solve the problem of the real relevance of NI, and these studies are urgently needed. Methods for performing NI have to be standardized to determine which solutions, devices and durations of treatment are adequate to obtain favorable results.

Posa,et.al.(2017) reviewed onnatural evolution of IgE responses to mite allergens and relationship to progression of allergic disease**.** Allergenic molecules of the house dust mite (HDM) are crucially important indoor allergens, contributing to allergic rhinitis and asthma around the globe. Several cross-sectional and longitudinal studies confirmed the role of Der p 1 and Der p 2 as major allergenic proteins of the HDM. A newly identified player is the major allergen Der p 23. They predicted that an Individual sensitization profiles towards HDM allergens provide important information to evaluate a patient's current stage and risk for clinical symptoms.

Ferrando,et.al.(2017) have given anew suggestions in sublingual immunotherapy for house dust mite-related allergic diseases The results of the published clinical trials were encouraging and led to the approval and commercialization of MK-8237 HDM-SLIT tablet.The favorable efficacy and safety profile of MK-8237 HDM-SLIT tablets provided a consolidated therapeutic option for patients with HDM-induced allergic rhinitis and asthma.Mahboubi Oskouei,et.al.(2017) have reported of common aeroallergens among allergic patients in Northeastern Iran. Patients with symptoms of asthma, allergic rhinitis, atopic dermatitis, and urticaria were enrolled. Ninety seven percent of patients had a positive skin test to at least one aeroallergen. In the spring, the most prevalent allergens were Russian thistle, ash, grass mix, tree mix, and pigweed mix. In the summer, Russian thistle, ash, grass mix, tree mix, and pigweed mix accounted for the most prevalent allergens. During the autumn, Russian thistle, ash, grass mix, pigweed mix and lamb's quarter were the most common aeroallergens, while in the winter, Russian thistle, ash, grass mix, pigweed mix, and tree mix were shown to be the most common aeroallergens. As a conclusive mark, determination of the most common aeroallergens in this area is unavoidable in the diagnosis and management of allergic disorders. Understanding the prevalence of the most common aeroallergens such as Russian thistle in 50.2% of people or other common aeroallergens can help patients and specialists to more easily identify suspected allergens, reduce costs, and support immunotherapy of allergic patients in this area. Moreover, it is helpful in avoiding pollens or cross-reactions.

Lombardi and Passalacqua(2017) did the survey study on Vitamin D levels and allergic diseases from Italy. Three hundred and nine patients were enrolled (132 male, mean age 37.5 ± 17 years). Of them, 40% reported a positive family history for allergies (asthma / rhinitis). Rhinitis plus asthma was present in 47% of patients, atopic dermatitis in 15%, and a consistent clinical history of food allergy associated with positive skin tests was present in 25% of subjects. There was no significant association between Vit D level and age, sex, family history, rhinitis, or food . They concluded that larger samples would be required to better define the association between Vit D and allergies.

Hu,et.al.(2017) studied onCorrelation between the visiting rate of patients with allergic rhinitis and airborne pollen concentrations in Beijing in recent 3 years**.** They noticed that the highest pollen concentration of spring (April to May) was in early and middle April. Tree pollen was the major portion in spring, which were popular pollen are pine tree pollen, ash tree pollen, cypress tree pollen and birch trees pollen. The highest pollen concentration of autumn (August to September) was in late August and early September. Weed pollen was the major portion in summer and autumn, which were artemisia pollen, chenopodiaceae pollen and humulus japonicas pollen. The visiting rate of patients with AR showed significant correlation with airborne pollen concentrations (r value was 0.537, 0.484 and 0.566, respectively; all $P<0.01$). The results concluded the visiting rate of patients with AR showed positive correlation with airborne pollen concentrations.

Bozek (2017) studied onpharmacological management of allergic rhinitis in the elderly. They predicted that the main management trend for allergic rhinitis in elderly patients is the same as the trend in young patients. Second-generation antihistamines and nasal gluco corticosteroids are also the first-line therapies in seniors. In a few trials, allergen-specific immunotherapy for grass pollen or house dust mites has been shown to be effective and safe in patients aged 60 years or older with allergic rhinitis. In conclusion, undertreatment of allergic rhinitis in the elderly is a reality. Pharmacological treatment is quite similar in both older and younger patients with allergic rhinitis.

Suh-Young Lee,et.al.(2013) analyzed about the allergic diseases and air pollution.The prevalence of allergic diseases has been increasing rapidly, especially in developing countries. Various adverse health outcomes such as allergic disease can be attributed to rapidly increasing air pollution levels. Rapid urbanization and increased energy consumption worldwide have exposed the human body to not only increased quantities of ambient air pollution, but also a greater variety of pollutants. Many studies clearly demonstrate that air pollutants potently trigger asthma exacerbation. Evidence that transportation-related pollutants contribute to the development of allergies is also emerging. Moreover, exposure to particulate matter, ozone, and nitrogen dioxide contributes to the increased susceptibility to respiratory infections. This article focuses on the current understanding of the detrimental effects of air pollutants on allergic disease including exacerbation to the development of asthma, allergic rhinitis, and eczema as well as epigenetic regulation.

Nasreen,et.al.(2016) assessed therelationship of hemoglobin concentration in adult asthmatic patients. Asthma and anemia associated with acute infections occur both in children and adults. For comparison age matched 50 male and 50 female apparently healthy persons were also studied as control. The study findings showed a high prevalence of anemia among asthmatic patients than non asthmatic healthy persons.

Daniel Zamanfar,et.al.(2016) studied on the the Prevalence of Allergic Rhinitis, Eczema and Asthma in Students of Guidance Schools in Mazandaran Province, Iran. The prevalence of wheezing, allergic rhinitis symptoms (sneezing and pruritus) and atopic dermatitis symptoms (pruritus skin lesion) were 30.5%, 30% and 15% respectively. History of pets contact and smoking was positive 6.6% and 36 % respectively. About 52% was born with caesarian section. There was wheezing in 32.5% during sport. The diagnosis of asthma, allergic rhinitis and eczema were 12.2%, 28.5% and 15% respectively. Eczema, asthma and allergic rhinitis were significantly more common in boys students ($p < 0.05$).The results of this study showed that asthma, allergic rhinitis and eczema have a high prevalence and they are more common in boys.

II. CONCLUSION

Allergic rhinitis is hypersensitivity of nasal mucosa to allergens associated with hypersensitivity of lower airways, atopic dermatitis and allergic conjunctivitis. Allergic rhinitis is an under reported and under treated condition. Hence we would like to add upto the review of literature of allergic rhinitis and its impact.

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