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Research Article

Descriptive Epidemiology in Allergic Rhinoconjunctivitis in the Last 5 Years in Northern Mexico

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Abstract

Purpose: To determine the frequency of allergic conjunctivitis in the period from 2015 to 2020 at the Regional Center of Allergy and Clinical Immunology of the University Hospital "Dr. José Eleuterio González" in Monterrey, Nuevo Leon, Mexico.

Methods: Observational, retrospective and descriptive study. The database of all patients with diagnosis of allergic rhinoconjunctivitis seen in the outpatient clinics from January 2015 to May 2020 was reviewed.

Results: The incidence from 2015 to 2020 of allergic rhinoconjunctivitis in the Regional Center of Allergy and Clinical Immunology was 1.5% in 2015, 2.7% in 2016, 2.8% in 2017, 3.2% in 2018, 4.2% in 2019 and 2.3% in 2020. The age group with the highest frequency for allergic rhinoconjunctivitis was found in those over 18 years of age; no significant difference was found between men and women. The year 2019 had the highest number of cases. The most common positive allergens in the skin tests of these patients were *Dermatophagoides, Cynodon dactylon* and *Fraxinus americana*, for the last two their pollination season were parallel to the peaks where the highest number of consultations were registered in March, April and August.

Conclusions: Allergic rhinoconjunctivitis is a disease that has been increasing in recent years and despite the economic and labor burden it represents, there are currently few studies that address the epidemiological characteristics of these patients.

Keywords: Ocular allergy; Allergic conjunctivitis; Allergic rhinoconjunctivitis

Abbreviations

AC: Allergic Conjunctivitis; SAC: Seasonal Allergic Conjunctivitis; PAC: Perennial Allergic Conjunctivitis; VKC: Vernal Keratoconjunctivitis; AKC: Atopic Keratoconjunctivitis; IgE: Immunoglobulin E; ISAAC: International Study of Asthma and Allergies in Childhood; NHANES: National Health And Nutrition Examination Survey.

Introduction

Allergy is the most common disorder of the immune system. It is estimated that it affects 15-20% of the western population, and its prevalence is increasing each year throughout the world [1]. Allergic Conjunctivitis (AC) is an inflammatory disease that directly affects the conjunctiva, a thin mucous membrane that lines the inner surface of the eyelid and covers the eye, serving as a protective barrier [2]. Although the eye was reported to be the first organ involved in the allergic reaction of the first described case of hay fever almost 200 years ago, ocular allergy has never received the same attention that has been given to respiratory and skin allergy [3].

Allergic disorders of the eye range from the mild conditions of Seasonal and Perennial Allergic Conjunctivitis (SAC, PAC), due to Immunoglobulin E (IgE)-mediated mast cell and histamine related inflammation, to the clinically more severe and sight-threatening diseases Vernal and Atopic Keratoconjunctivitis (VKC, AKC) associated with T cell-mediated chronic inflammation [4,5]. These clinical subtypes are diagnosed and managed by ophthalmologists and allergists usually considering clinical history as well as signs and symptoms, aided by in vivo and in vitro tests when identification of the specific allergic sensitization is required [5].

Whether ocular allergies are observed with or without rhinitis, this group of disorders significantly impacts quality of life [6]. Severe ocular allergy signs and symptoms have been associated with difficulties in physical, social and mental functioning, limiting the patient's capacity to perform daily tasks such as watching TV, reading, driving, and carrying out their work, as well as inducing anxiety and depression [7].

The prevalence of allergic conjunctivitis has been difficult to establish and is probably underestimated in most epidemiologic studies, as conjunctival symptoms are often not spontaneously reported in medical interviews or in questionnaire-based epidemiologic studies targeting rhinitis and/or asthma. The prevalence in the general population is estimated to be up to 40% in the United States and up to 35% in Europe and the Middle East [6]. In Mexico, there are few studies that report the incidence or prevalence of eye allergy, despite the impact they have on patient´s daily activities.

Material and Methods

It is a retrospective, observational and descriptive study. The

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database of all patients diagnosed with AC at the Regional Center of Allergy and Clinical Immunology of the University Hospital "Dr. José Eleuterio González" in Monterrey, Nuevo Leon Mexico was reviewed, from January 2015 to May 2020. The variables studied included the annual frequency in the number of consultations of AC, the frequency by age group and gender, the origin of residence where the most patients attended, trend in the number of consultations, identifying diseases associated with AC and the results of skin tests, as well as allergenic sensitization in these patients. This study complied with the principles of the Declaration of Helsinki and was approved by the Ethics and Research Committee of the University Hospital of the Autonomous University of Nuevo León with code AL20-0009, who consented to the omission of the informed consent.

Only completed survey forms were included for analysis. The data obtained from each patient were collected in Excel spreadsheets (Windows® version, 2019, Microsoft Corporation) and analyzed with SPSS version 23.0 (IBM® SPSS®). Descriptive statistics were performed for demographic variables (mean, standard deviation and range). Graphical analysis was also performed (bars, distribution graphs and frequency histograms).

Results

There were 1107 consultations with a diagnosis of allergic rhinoconjunctivitis in the study period, of which 346 patients (31.3%) were first time consults and 761 (68.7%) were subsequent. Similar prevalence was observed in both genders, since 50.3% were women (174) and 49.7% were men (172). Regarding age, the presence of allergic rhinoconjunctivitis was reported in 200 patients (57.8%) older than 18 years old, followed by the group of 6 to 12 years old with 81 patients (23.4%), the group of 13 to 17 years old with 36 patients (10.4%) and in those under 6 years of age, only 29 cases (8.4%) were reported (Figure 1).

The incidence of allergic rhinoconjunctivitis was 1.5% in 2015, 2.7% in 2016, 2.8% in 2017, 3.2% in 2018, 4.2% in 2019 and 2.3% in 2020 (Figure 2). The months with the highest number of consultations were: March with 134 cases (12.1%), followed by April with 120 (10.8%), and August with 119 (10.7%) cases.

The patients were from 32 different cities, most of them from the Monterrey Metropolitan Area (made up of the city of Monterrey and seventeen more cities in the state of Nuevo León), 16 patients were from the neighboring states, and 2 patients were from the United States (both from Texas).

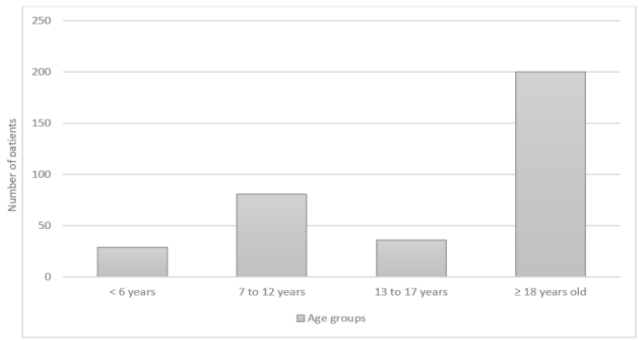

Figure 1: Age distribution of patients with allergic rhinoconjunctivitis.

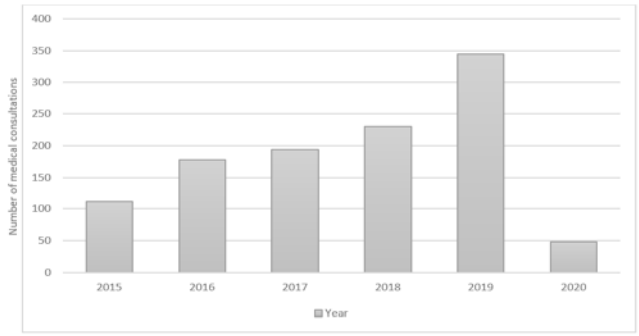

Figure 2: Number of consultations by year with features of allergic conjunctivitis.

Table 1: Association of allergic rhinoconjunctivitis with other allergic diseases.

Allergic diseases	Number of patients n= 346 (%)
Rhinoconjunctivitis only	255 (73.7%)
Rhinoconjunctivitis + asthma	51 (14.7%)
Rhinoconjunctivitis+ atopic dermatitis	21 (6%)
Rhinoconjunctivitis+ asthma +atopic dermatitis	5 (1.4%)
Rhinoconjunctivitis+ urticaria	14 (4%)

Regarding to comorbidities, we found 255 (73.7%) patients only with rhinoconjuctivitis; 51 (14.7%) patients with rhinoconjunctivitis and allergic asthma; 21 (6.1%) patients with rhinoconjunctivitis and eczema; 5 (1.4%) patients with rhinoconjunctivitis, allergic asthma and eczema, and 14 (4%) patients with allergic rhinoconjunctivitis and spontaneous urticaria (Table 1).

In 94.9% of the patients (318) skin tests were performed, of which 94% (299) were positive. A higher sensitization to *Dermatophagoides* (87%) was demonstrated, followed by *Cynodon dactylon* (28.7%) and in third place tree pollen were the most frequent with *Fraxinus americana* (13.2%) (Table 2).

Discussion

The prevalence of different allergic eye diseases has some variation between different geographical areas of the world not only due to genetic differences and environmental factors, but also due to the lack of standardization in the evaluation of ocular symptoms [6]. In our population, when reviewing the first and subsequent consultations, we observed that patients with allergic rhinoconjunctivitis require constant evaluation given the episodes of exacerbation of their symptoms, especially in the months of March, April and August. This is striking since it matches the pollination peaks of *Cynodon dactylon* and *Fraxinus americana* [8], the most frequent allergens found in patient´s skin tests. *Dermatophagoides* which is present throughout the year, with peaks during spring and autumn due to the ideal conditions of temperature and humidity of our region, also match with patient´s the clinical manifestations.

The results show that the numbers of consultations for allergic rhinoconjunctivitis has increased in recent years. An exception was 2020, a decrease in the number of reported cases was observed due to quarantine measures because of the Covid-19 pandemic, where only emergencies were attended and the other patients were referred to

Table 2: Positive allergens reported in skin prick tests in patients with allergic rhinoconjunctivitis.

Skin test	Number of positive tests n= 1107 (%)
Bromus	75 (6.8%)
Cynodon	318 (28.7%)
Holcus	43 (3.9%)
Lolium	55 (5%)
Phleum	90 (8.1%)
Sorghum	82 (7.4%)
Amaranthus	61 (5.5%)
Ambrosia	41 (3.7%)
Artemisa	47 (4.2%)
Atriplex	135 (12.2%)
Chenopodium	34 (3.1%)
Helianthus	35 (3.2%)
Salsola	41 (3.7%)
Fraxinus	146 (13.2%)
Junglans regia	77 (7%)
Junglans sabinoide	34 (3.1%)
Ligustrum	11 (1%)
Populus	23 (2.1%)
Prosopis	92 (8.3%)
Quercus	84 (7.6%)
Alternaria	14 (1.3%)
Aspergillus	6 (0.5%)
Penicillum	3 (0.3%)
Helminthosporium	6 (0.5%)
Rhizopus	3 (0.3%)
Dermatophagoides	964 (87%)
Cockroach	56 (5.1%)
Felis	72 (6.5%)
Canis	54 (4.9%)

teleconsultation. This study reflects the impact of patients with AC who repeatedly attend the ophthalmology and allergy centers, which also implies a significant economic burden on the Mexican health system.

Unlike results found in the United States, by the National Health and Nutrition Examination Survey III (NHANES III) where ocular symptoms, defined as "episodes of tearing and ocular itching", affected 40% of the adult population, with no significant differences according to age [9], in our study, a greater number of patients older than 18 years were found, followed by those in the group between 6 and 12 years old, and thirdly those between 13 and 17 years of age. These are worrisome data, since it is in these stages where the greatest academic load is concentrated in children, adolescents, and young adults as well the burden of the economic impact. Similar results were found in women and men.

Allergy related diseases including rhinitis, allergic conjunctivitis, and eczema are increasing in most parts of the world. These chronic recurrent conditions cause significant physical and psychological distress, sleep disturbance and reduced quality of life among patients of all ages [10]. Often, patients with ocular allergies have coexisting atopic manifestations such as rhinitis, asthma, urticaria, or eczema [11,12]. In multicenter studies such as the International Study of Asthma and Allergies in Childhood (ISAAC) [12,13] and the National Health And Nutrition Examination Survey (NHANES) [14], the association of allergic conjunctivitis was demonstrated above all with respiratory diseases such as rhinitis, followed by asthma and finally eczema [10,15]. Given the common relationship between rhinitis and allergic conjunctivitis reported in most studies [10,12,16], in our center the patients with ocular and nasal symptoms are classified in the same group, we do not have a registry of only patients with allergic conjunctivitis, for this study, patients with only clinical manifestations of allergic rhinitis, without ocular symptoms, were excluded. The most common comorbidities to AC were respiratory allergies, as rhinitis and asthma; however, interestingly, we found as cutaneous associated diseases not only eczema but spontaneous urticaria.

Conclusion

Allergic rhinoconjunctivitis is a disease that can appear at any age and with a wide range of clinical manifestations and severity. Symptoms may be mild and not interfere with daily activities or present as severe and sight-threatening causing frequent absence from work and school. More studies are necessary to identify the presence of allergic conjunctivitis symptoms and all patients should receive a complete ophthalmological examination in search for specific AC characteristics. This entity increases annually and given its impact on patient´s quality of life and overall health symptoms, a prompt diagnosis is essential.

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