

## ALLERGIC AND NONALLERGIC RHINITIS: THEIR CHARACTERIZATION IN A TROPICAL ENVIRONMENT.

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**Key words:** Allergy, rhinitis, tropic.

### SUMMARY

The differences between allergic and non-allergic rhinitis were evaluated in 127 individuals from tropical urban region of Venezuela. The study design had historic data obtained regarding exacerbation of initial symptoms on exposure to common precipitants, physical examination, nasal cytology, immunodiagnostic test, routine laboratory test (fresh stool test, white cell count and urine test) and sinus x-rays. Forty nine patients were diagnosed as having allergic rhinitis (AR), 10 as probably having AR, 13 had infectious rhinitis, 4 had mixed components, 1 as non-allergic non-eosinophilic rhinitis, and 50 had no evidence of immunological nasal respiratory allergy and were taken as controls.

The associated findings with allergic rhinitis were: conjunctivitis 62%, sinusitis 23%, and bronchial asthma 24%. Our results support a significative prevalence of allergic rhinitis in this particular group, with similar symptom patterns to that of industrialized countries.

### INTRODUCTION

The assessment of an adequate therapeutic regimen requires a differential diagnosis between allergic and non-allergic rhinitis. Increase knowledge of the pathophysiology of nasal allergy improves the rationale for specific therapy in developed countries [ 24 ]. The risk of developing allergic rhinitis depends on an inherited atopic disposition and on degree of exposure to allergens with a high sensitization capacity. Consequently, the prevalence of allergic rhinitis varies considerably from one place to the other [ 2,14 ].

In Venezuela, a handicap in accurate symptomatic characterization of allergic rhinitis had seriously affected the management of such disease. While a considerable part of the population have a minor nasal disorder, only 13.9 % of the population studied is currently afflicted with this disabling allergic effects [ 19 ]. The medical

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management of these patients has become more sophisticated and effective during past decades in other latitudes [ 4 ].

On the basis of the possible influences of the socioeconomic status upon the expression of allergic rhinitis symptoms, we have designed sequential studies with different population levels from a tropical region of Venezuela. The present study deals with the symptomatic form of rhinitis in a group of high socioeconomic status.

### MATERIAL AND METHODS

#### Subjects

A total of 127 individuals from Caracas, ranging in age from 11 months to 66 years and of high socioeconomic status [ 21 ] , were seen in consultation for possible allergic diseases. Seventy seven patients complained of three months or more of nasal congestion, sneezing and/or rhinorrhea. The total group had historic data obtained regarding exacerbation of initial symptoms on exposure to inhalants allergens, physical agents such as irritants and climate, foods, drugs and respiratory tract infections. In addition, a personal history for atopic diseases and the patient previous response to medication for the treatment of rhinitis, were recorded. Physical examination with special attention to the mucous membrane of the nose, i.e., degree of obstruction, color, type of nasal discharge, was also noted.

The different forms of rhinitis were defined according to the following criteria: IgE-mediated allergic rhinitis (AR) was a syndrome with immediate symptoms or sneezing, itching, nasal discharge and blockade in relation to the specific seasonal or perennial history for allergen exacerbation, positive skin tests correlates by history and IgE levels  $> 144$  U/ml [ 28 ] ; non-allergic, non-eosinophilic rhinitis was regarded as non-immunologic non-infectious, chronic form of rhinitis [ 31 ] with negative skin tests or less than two positive skin tests, with no correlation by history, and total serum IgE levels  $< 144$  U/ml; non-allergic eosinophilic syndrome (NARES) was that presenting profuse watery secretion, paroxysms of sneezing, puritis and nasal mucousal eosinophilia with no evidence of a role for specific antigen [ 10 ] ; infectious rhinitis had evidence relation with bacterial or viral diseases with nasal cytology presenting abundant neutrophil cells and bacteria, no relation to allergen exacerbation or less than two positive skin test without positive correlation by history [ 25 ] ; mixed forms expressed allergic relationship with different antigens and infections as a precipitant of symptomatic pattern [ 26 ] . These definitions were converted into numerical values, and each patient was assigned a numerical score on the basis of data collected in the study by modification from Mullarkey et al [ 23 ] .

### Nasal cytology

All patients had nasal smears from nasal mucousal scraping from mid-inferior portion of inferior turbinate (right and left). Specimens were smeared on a microscope slide and immediately fixed in 95 % ethanol and stained with Wright's stain. Scan whole slide at low power (100x) was used; one hundred cells were counted and the number of cells per 100 expressed as a percentage with an equivalent grade ranging between 0 to 4<sup>+</sup>. Two cut-off were analyzed at 20 and 25 % or more cells. Nasal eosinophilia was regarded as significant when > 20 % of the cells on nasal smear were eosinophils.

### Routine laboratory tests

All individuals had differential white counts, feces sample (fresh and eggs of intestinal helminths [ 12 ] ) and urine test. Sinus X-rays, when indicated, were interpreted independently by a radiologist, and radiological evidence of 2 mm or more of mucous membrane thickening was interpreted as sinusitis.

### Immunodiagnostic tests

Total serum IgE levels were measured in all patients by the Phadebas IgE paper disk radioimmunoassay technique (PRIST) (Pharmacia Diagnostics, Uppsala, Sweden) [ 5 ] .Patients were routinely tested to histamine, saline, three grass and weed grain pollens from the region under study, mixed inhalants, mixed molds, and *Dermatophagoides pteronysinus* and *farinae* and any other agents suggested by history. The criteria of a prick skin test positive was that of immediate wheal (mean diameter) of > 2 mm.

## RESULTS

Forty nine patients (39 % ) scored 5 to 11 points and were diagnosed as having AR. Fourteen patients (11 % ) scored 1 to 4 points and had evidence of immunologic nasal respiratory allergy. Ten patients (8 % ) who did not meet the strict criteria for AR, were classified as having probable AR and 4 (3 % ) identified specific antigens and associated nasal infections as precipitants of mixed type. The remaining 50 (39 % ) patients were considered as controls since they did not fall into the rhinitis categories described. Table I shows the immunoclinical characteristics of the 77 patients who were referred for nasal symptoms. The mean point score for allergic rhinitis was > 5, for non-allergic rhinitis was < 4, whereas those patients with mixed components, scored > 9 points (infection and allergic precipitants). The most prevalent symptom was sneezing (79 % cases), followed by rhinorrhea (73 % ), nasal obstruction (71 % ) and itching of the nose (66 % ).

The laboratory evaluation of nasal smear for eosinophils over 20 % was signi-

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ificantly associated with allergic rhinitis and mixed form ( $\chi^2 = 12.02$ ,  $p < 0.005$ ). No helminths or eggs were found in any patients. The most prevalent specific IgE levels were obtained to *D. pteronissinus* and *D. farinae*.

As shown in Table II, 73 % of patients with allergic rhinitis had conjunctivitis and 34 % had or were asthmatics. Statistical analysis showed the significant association with the diagnosis of allergic rhinitis and bronchial asthma when compared with nonallergic rhinitis ( $\chi^2 = 23.78$ ,  $p < 0.005$ ). AR was most prevalent in males under 20 year-old; 67 % of the patients with AR had a positive atopic family history.

### DISCUSSION

The low prevalence of atopic diseases in rural communities of developing countries, particularly those located in the tropical belt, has been ascribed to a variety of factors [ 32,8 ], the most popular of which is the blocking or inhibiting effect of intestinal helminthiasis [ 6 ]. This could occur via a mechanism of competitive inhibition at the level of mast Fce receptor caused by polyclonal increase of IgE synthesis induced by such infections. Recent results suggest, however, that mast cell blockade is unlikely to occur in vivo [ 15, 11, 9 ]. Therefore, the possible influence of environmental, social, nutritional and other factors, are now taken into account [ 7, 16, 29 ].

Studies in Venezuela have revealed a high period prevalence of respiratory allergic diseases in both urban and rural subjects, regardless helminthic infestations (Ponce et al., in preparation). They further provide evidence against the theory above as a significant number of rural and urban individuals yielded positive skin test reactions to a range of allergens even in the presence of high serum total IgE levels. It is known that the factors related to the socioeconomic level of tropical populations can also influence the allergic reactivity [ 17 ] and malnutrition effect has been attributed to altered lymphocyte function [ 20 ]. The significant prevalence of AR found in the present study among this particular high socioeconomic status population from an urban region of Venezuela, is consistent with the allergic reactivity found in industrialized countries [ 22 ], including the immediate skin hypersensitivity to specific total allergens and elevated total serum IgE levels without evidence of parasitic infections. It is worth noting that the distinction between seasonal and perennial allergic rhinitis and other forms of rhinitis was based in relation to our bimodal dry/rainy seasons [ 1 ] and specific stimuli.

The most important symptoms during nasal allergy was nasal blockade, since abundant watery rhinorrhea and sneezing were less frequently complained by our patients. These later symptoms, associated with itching, must be caused by the stimulation of irritant receptors in the mucosa [ 24 ], through the direct effect of chemical mediators on the glands [ 30 ]. It is known that H1-antagonists can eradicate this reflex component of nasal allergy, however, two third of the population under study complained that antihistamines only gave partial relief, probably due to nasal blockade which is not relieved by them. Furthermore, late reaction following nasal challenge by LTB4 and the lack of inhibition by systemic steroids have been demonstrated

TABLE I.  
IMMUNOCLINICAL CHARACTERISTICS OF 77 PATIENTS

Diagnosis	Patients		Eosin.		IgE(UI/ml)	Mean Positive
	n	o/o	Mean Age	o/o	G.M.	Skin Test
Infectious	13	10	13	8	46	2
Non-Infectious						
Allergic						
Seasonal	15	12	25	20	312	4
Perennial	34	27	18	24	125	4
Probably Allergic	10	8	13	10	214	3
Non-Allergic						
Eosinophilic	—	—	—	—	—	—
Non-Eosinophilic	1	1	36	0	61	1
Mixed (allergic and infectious)	4	3	9	25	561	4

G.M. = Geometric Mean

[ 3 ] ; the later may be caused by the secondary influx of cells attracted by chemotaxis released during the allergic reaction such as eosinophils that can be seen in the nasal mucosa. Nasal eosinophilia is of little use in the diagnosis of allergic rhinitis; however, it provides significant information regarding the therapy and prognosis of non-allergic rhinitis [ 27 ] . A single count of eosinophils from the mucosa cannot be taken as a suitable indicator of nasal allergy. We should remark here that we have taken two samples from right and left nostril, routinely. Thus, our results enable us to suggest the possible dual involvement of eosinophils in immediate allergic reaction and late phase reaction, mainly due to the nasal blockade referred by the majority of patients.

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TABLE II.  
DIAGNOSTIC ASSOCIATIONS IN 77 PATIENTS

Clinical Entity	ASSOCIATION		
	Sinusitis	Conjunctivitis	Bronchial Asthma
	o/o	o/o	o/o
Infectious	31	46	8
Non-Infectious			
Allergic			
Seasonal	27	73	20
Perennial	21	53	32
Probably Allergic	40	60	20
Non-Allergic			
Eosinophilic	—	—	—
Non-Esinophilic	—	—	—
Mixed (allergic and infectious)	0	100	25

Values represent the percentage of patients with infectious (n = 13), non-infectious (n = 60) or mixed rhinitis (n = 4), having the indicated diagnostic association.

The association between sinusitis, conjunctivitis and bronchial asthma with AR, is consistent with recent work, indicating that they are the most frequent incidence of nasal allergic diseases in non-tropical countries [ 18 ].

Finally, the net result of all these influences is that a tropical urban population of high socioeconomic status can suffer allergic conditions at an or higher rate than those in temperate climate countries.

Futher studies, are required to improve the rationale for specific therapy in the tropics.

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### RESUMEN

**Rinitis alérgica y no alérgica: caracterización en un medio tropical.** *Perdomo de Ponce, D. (Hospital de Clínicas Caracas, Av. Panteón con Alameda, Piso 2, Cons. 203. San Bernardino, Caracas 1011, Venezuela). Uribe, M., Wolff, I. Invest. Clín. 31(3): 129-138, 1990.*— Se evaluó la diferencia entre rinitis alérgica y no alérgica, en 127 individuos en una región tropical de un área urbana de Venezuela. El estudio incluía la recopilación de datos relacionados con síntomas nasales iniciales, asociados a la exposición del paciente a agentes precipitantes comunes, exámen físico, citología nasal, pruebas dérmicas a alérgenos seleccionados, rutina de laboratorio (exámen de heces en fresco, hematología completa y exámen de orina simple), y rayos X de senos paranasales. Cuarenta y nueve pacientes fueron diagnosticados como rinitis alérgica (RA), 10 como probable RA, 13 tenían rinitis infecciosa, 4 expresaron un componente mixto, 1 no alérgico no eosinofílico y en 50 individuos no se encontró evidencia alguna de procesos respiratorios de carácter alérgico, considerándose a estos últimos como el grupo control. La prevalencia de entidades clínicas asociadas con rinitis alérgica fueron: conjuntivitis 62 %, sinusitis 23 % y asma bronquial 24 %. Nuestros resultados soportan una prevalencia significativa de rinitis alérgica en este grupo en particular con un patrón de síntomas similares a los reportes en países industrializados.

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