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Allergic and Nonallergic Rhinitis According to Symptoms: A Retrospective Chart Review

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ABSTRACT

Objective: Symptoms of the patients can guide whether the rhinitis is allergic or non-allergic. Our aim is to identify the prominent symptoms of allergic and non-allergic rhinitis and to evaluate the relationship between the symptoms and disease severity, symptom frequency, and comorbidities.

Materials and Methods: Patients with rhinitis symptoms were retrospectively evaluated in terms of predominant symptoms, symptom severity and persistency and sensitization patterns.

Results: A total of 249 patients with a mean age of 30.7 ± 9.77 (17-64) years were involved in the study. More than half of the patients had allergic rhinitis. Severity of rhinitis was not different between allergic and non-allergic groups but 52.8% of the allergic patients had intermittent and 66.3% of non-allergic patients had persistent symptoms. While postnasal drip was common in non-allergic patients (63.6%), itching, sneezing and eye symptoms were mostly present in allergic rhinitis patients (80.5%, 72.1%, 83.9%, respectively). Patients with postnasal drip and nasal obstruction often had persistent symptoms while patients with itching, sneezing and eye symptoms mostly had intermittent symptoms. Moreover, rhinitis patients with nasal polyposis or chronic rhinosinusitis also had more persistent symptoms. While most of the rhinitis patients with mite allergy (66%) had nasal obstruction, 51.9% of the patients with runny nose, 60.9% of the patients with itchy nose, 65.6% of the subjects with eye symptoms and 54.7% of the patients with sneezing were allergic to pollen.

Conclusion: Sneezing, eye symptoms and itching were the most common symptoms in allergic rhinitis patients while nasal obstruction and postnasal drip were more common in non-allergic rhinitis. In addition, the presence of nasal obstruction and postnasal drip may indicate that the disease is more persistent, more severe, and often accompanied by chronic rhinosinusitis, nasal polyposis, and asthma.

Keywords: Allergic rhinitis, runny nose, sneeze, blocked nose, eye symptoms, nonallergic rhinitis

INTRODUCTION

Rhinitis describes a pattern of symptoms that is manifested by inflammation of the nasal mucosa. The prevalence of rhinitis has increased steadily over the past decade. Today, it has become a very common disease in the daily allergy practice. Approximately one-third of the daily outpatient visits in our clinic consist of patients presenting with rhinitis symptoms. Roughly, rhinitis can be classified as allergic, non-allergic, and infectious. However, there may be combined phenotypes and different endotypes of rhinitis may overlap (1,2). Although allergic rhinitis has been extensively studied, non-allergic rhinitis is poorly defined and poorly understood (3). In patients who present with the complaints of runny nose, sneezing, nasal obstruction, postnasal drip, and itching of the nose and eyes, the underlying inflammation may be allergic or non-allergic (4). Disease severity (mild, moderate/severe), symptom pattern (seasonal/continuous or intermittent/persistent), predominant symptom (sneezing-runny nose/nasal obstruction), and possible triggering factors (allergens, infectious agents, etc.) can be used to classify rhinitis (2,5). However, due to the diversity of pathophysiological mechanisms and symptoms, it is difficult to clearly classify rhinitis and determine the

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appropriate treatment. Treatment for rhinitis depends on the frequency and severity of symptoms. It is thought that the symptoms of the patients can guide whether the rhinitis is allergic or non-allergic, and some symptoms are more prominent in severe rhinitis.

Our primary aim in this study is to identify the prominent symptoms of allergic and non-allergic rhinitis. In addition, it was aimed to evaluate the relationship between the rhinitis symptoms and disease severity, symptom frequency, and comorbidities seen in the patients.

MATERIAL and METHODS

Study Design

This study was designed as a retrospective chart review conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Ankara City Hospital (Approval no: E2-21-901). All patients signed the written informed consent form and allowed their files to be evaluated retrospectively.

Study Group and Data Recording

All patients who presented to our outpatient clinic with rhinitis symptoms in the last six-month period with complete file records were included in the study. Sociodemographic features (age, gender, smoking habit), presence of runny nose, nasal itching, nasal obstruction, sneezing and eye symptoms were recorded from the patient files. The prominent symptom was determined, and the persistence and the severity of the symptoms were evaluated by symptom scores and VAS according to the ARIA guidelines. Comorbid asthma, nasal polyposis, and chronic sinusitis were also recorded from the patient files. The diagnosis of asthma was made according to the GINA guidelines, and the diagnosis of nasal polyposis and/or sinusitis was made by paranasal computed tomography scanning and otolaryngological examination. The skin prick test results, and/or specific (sp) IgE measures were obtained from the file records.

Classification of the Subjects

Patients suffering from rhinitis symptoms with a positive skin prick test and/or spIgE test were considered as allergic rhinitis, while patients with a negative skin prick test and/or sp IgE test were classified as nonallergic rhinitis. Patients with symptoms less than 4 days per week or for less than 4 consecutive weeks were classified as intermittent, while symptoms more than 4 days per week and for more than 4 consecutive weeks were named as persistent. The severity of the symptoms was judged by the presence of abnormal sleep, disruption in daily activities, abnormal work and school days, troublesome symptoms and high symptom scores (6). According to ARIA guidelines the patients were classified into categories like "mild intermittent", "moderate/severe intermittent", "mild persistent" and "moderate/severe persistent" (7,8).

Measures

The skin prick tests were performed by experienced nurses on the forearm by using common aeroallergen extracts; *Dermatophagoides pteronyssinus, Dermatophagoides farinae*, mixtures of grass pollens, weed pollens, tree pollens, and cereal pollens; molds, and animal epithelia (cat and dog); (ALK, Abello, Spain) along with appropriate positive (histamine: 10 mg/mL) and negative controls (saline). A wheal size ≥3 mm was considered as positive skin prick test response in early readings at 15th minutes. CAP fluoroenzyme immunoassay was used for sp IgE measurements, in accordance with recommendation of the manufacturer (Phadia, Uppsala, Sweden). Sp IgE measurements >0.35 kU/L were considered positive.

Statistical Analyses

Statistical analyses were made by using SPSS version 21 software (SPSS Inc., Chicago, IL, USA). The conformity of the variables to the normal distribution was examined by visual (Histogram) and analytical methods (Kolmogorov-Smirnov/ Shapiro-Wilk test). Descriptive statistics were given using the mean and standard deviation for normally distributed variables, and using the median and interquartile range for non-normally distributed variables. Categorical data were evaluated using the Chi-Square test between two independent groups. The significance of the difference between the means in normally distributed groups was calculated by ANOVA analysis of variance, and in groups with non-normal distribution, the significance of the difference between the median values was calculated using the Mann-Whitney U or Kruskal-Wallis test. Values below 0.05 were considered significant for all p values.

RESULTS

There were 249 patients (159 female, 90 male) with a mean ± standard deviation (minimum-maximum) age of 30.7 ± 9.77 (17-64) years. In our study population, the median (minimum-maximum) duration of rhinitis symptoms was 36 (3-240) months. Disease duration was longer in allergic rhinitis patients than in non-allergic

rhinitis patients (p=0.02). Most of the patients were nonsmokers and 65.5% of them were allergic to at least one inhalant allergen. Nearly half of the patients had intermittent and 63.1% of them had mild symptoms (Table I). While 52.8% of the patients with allergic rhinitis had intermittent symptoms, 66.3% of non-allergic patients had persistent disease (p=0.005). According to ARIA classification 46.6% of our allergic rhinitis patients were mild intermittent, 15.33% were mild persistent, 6.13% were moderate/severe intermittent and 31.9% were moderate/severe persistent (Table II).

It was observed that the percentages of allergic or non-allergic rhinitis were not different between the subjects who presented with the complaints of runny nose and nasal obstruction (for runny nose: 68.3 % vs 31.7%; for nasal obstruction: 66.1% vs. 33.9%, respectively). While patients with postnasal drip were mostly non-allergic, itching, sneezing and eye symptoms were the dominant symptoms in allergic patients (63.6%; 80.5%, 72.1%, 83,9%, respectively) (p<0.0001) (Table I).

Table I: Demographic specialties of the patients.

		Whole group (n=249)	Allergic patients (n=163, 65.5%)	Non-allergic patients (n=86, 34.5%)	p
Gender n (%)	Women	159 (63.8)	103 (64.8)	56 (35.2)	0.43
	Men	90 (36.2)	60 (66.7)	30 (33.3)	
Age year (mean±SD)		30.7± 9.77	30.06±9.51	31.92±10.18	0.15
Duration of rhinitis month median (min-max)		36 (3-240)	48 (4-240)	36 (3-240)	**0.02**
Severity of the symptoms n (%)	Mild -moderate	157 (63.1)	101 (64.3)	56 (35.7)	0.68
	Severe	92 (36.9)	62 (67.4)	30 (32.6)	
Frequency of the symptoms n (%)	Intermittent	115 (46.2)	86 (52.8)	29 (33.7)	**0.005**
	Persistent	134 (53.8)	77 (47.2)	57 (66.3)	
Smoking history n (%)	Nonsmoker	184 (73.9)	120 (65.2)	64 (34.8)	0.81
	Ex-smoker	20 (8)	12 (60)	8 (40)	
	Smoker	35 (14.1)	24 (68.6)	11 (31.4)	
Runny nose n (%)	Absent	60 (24.1)	34 (56.7)	26 (43.3)	0.11
	Present	189. (75.9)	129 (68.3)	60 (31.7)	
Sneezing n (%)	Absent	70 (28.1)	34 (48.6)	36 (51.4)	**0.001**
	Present	179 (71.9)	129 (72.1)	50 (27.9)	
Itchy nose n (%)	Absent	116 (46.6)	56 (48.3)	60 (51.7)	**< 0.000**
	Present	133 (53.4)	107 (80.5)	26 (19.5)	
Postnasal drip n (%)	Absent	172 (69.1)	135 (78.5)	37 (21.5)	**<0.000**
	Present	77 (30.9)	28 (36.4)	49 (63.6)	
Eye symptoms n (%)	Absent	138 (59.7)	78 (56.5)	60 (43.5)	**<0.000**
	Present	93 (40.3)	78 (83.9)	15 (16.1)	
Nasal obstruction n (%)	Absent	122 (49)	79 (64.8)	43 (35.2)	0.89
	Present	127 (51)	84 (66.1)	43 (33.9)	
Comorbid asthma n (%)	Absent	208 (83.5)	129 (62)	79 (38)	**0.001**
	Present	38 (15.3)	34 (89.5)	4 (10.5)	
Nasal polyposis n (%)	Absent	228 (92.7)	150 (65.8)	78 (34.2)	0.79
	Present	18 (7.3)	13 (72.2)	5 (27.8)	
Chronic rhinosinusitis n (%)	Absent	224 (91.1)	152 (67.9)	72 (32.1)	0.10
	Present	22 (8.9)	11 (50)	11 (50)	

Regarding comorbidities, asthma was observed in 20.9% of the allergic rhinitis patients (p=0.001). There was no difference in the frequency of nasal polyposis or chronic rhinosinusitis between the allergic rhinitis patients with or without asthma. Of the patients with rhinitis accompanied by sinusitis, 90.9% had nasal obstruction, especially in allergic ones (p=0.01), and 59.1% had postnasal drip (p=0.006). All non-allergic rhinitis patients with nasal polyposis had nasal obstruction (p=0.02) while 53.8% of the allergic rhinitis patients had postnasal drip (p=0.002).

According to the skin prick test results 120 patients were allergic to pollens, 50 to mite, 35 to cats, and 15 to mold. While most of the rhinitis patients with mite allergy (66%) had nasal obstruction (p=0.01), we found that 51.9% of the patients with runny nose, 60.9% of the patients with itchy nose, 65.6% of the subjects with eye symptoms and 54.7% of the patients with sneezing were allergic to pollen (p=0.04; p <0.001, p<0.001 p=0.001, respectively) (Figure 1).

The severity of rhinitis was not found to be associated with runny nose, itching, sneezing, eye symptoms, and postnasal drip. However, nasal obstruction was observed frequently in patients with severe rhinitis and especially in allergic ones (62.9% vs. 44.6%) (p=0.02). In addition, severe rhinitis was more common in patients with nasal polyposis [66.7% (p=0.01)], particularly in non-allergic ones [80%, (p=0.04)]; in patients with chronic rhinosinusitis [72.7% (p=0.001)], both in allergic and non-allergic individuals [81.8%, (p=0.003), 63.6%, (p=0.03), respectively]; and in patients with asthma [55.3% (p=0.01)], especially in allergic ones [61.8%, (p=0.003)].

Severity of rhinitis did not different between allergic and non-allergic groups but, 52.8% of the allergic patients have intermittent and 66.3% of non-allergic patients have persistent symptoms (p=0.005).

Patients with postnasal drip and nasal obstruction frequently had persistent symptoms [84.4%, (p<0.000); 60.6%, (p=0.03), respectively] while patients with itching,

Table II: Phenotypes of the patients according to ARIA classification.

	Mild intermittent, n (%)	Mild persistent, n (%)	Moderate- severe intermittent, n (%)	Moderate-severe persistent, n (%)
Allergic rhinitis, n=163	76 (46.62)	25 (15.33)	10 (6.13)	52 (31.90)
Non-allergic rhinitis, n=86	26 (30.23)	30 (34.88)	3 (3.48)	27 (31.39)

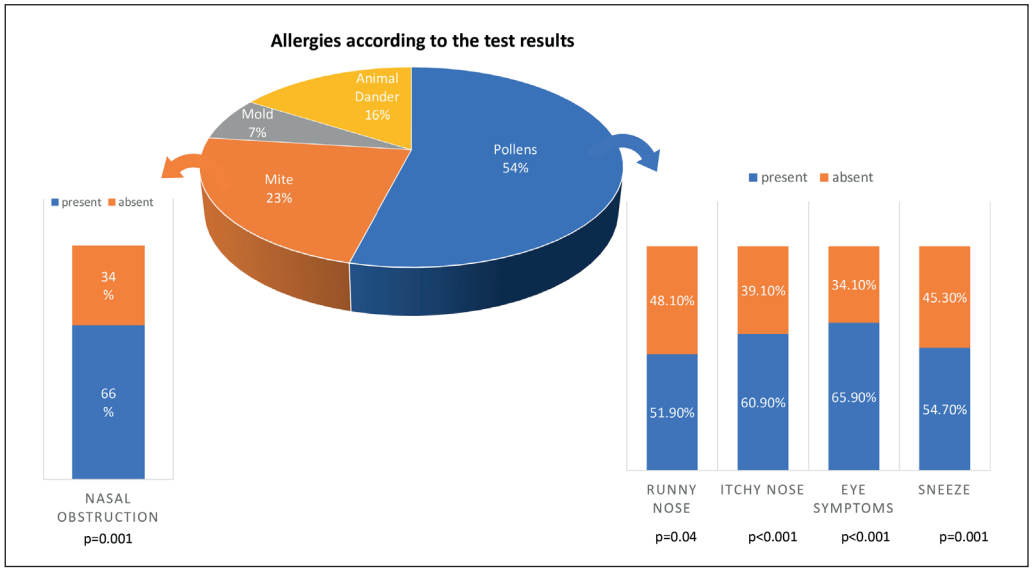

Figure 1. Relation between symptoms and allergies. Patients allergic to pollen more frequently have runny nose (p=0.04), itchy nose (p<0.001), sneeze (p=0.001) and eye symptoms (p<0.001) than patients with perennial allergies. Whereas, patients allergic to mites more frequently suffered from nasal obstruction than patients with seasonal allergies (p=0.01).

sneezing and eye symptoms mostly had intermittent symptoms [53.4%, (p=0.01); 51.4%, (p=0.01); 60.2%, (p=0.001), respectively)]. Moreover, rhinitis patients who had nasal polyposis or chronic rhinosinusitis also had more persistent symptoms [77.8%, (p=0.04); (86.4%, (p=0.001), respectively].

DISCUSSION

In this retrospective chart review, we found that patients who presented to our outpatient clinic with rhinitis symptoms were mostly allergic. Itching, sneezing, and eye symptoms were more common in allergic patients while postnasal drip was more common in non-allergic ones. Runny nose and nasal obstruction were seen at similar rates in both allergic and non-allergic individuals.

Similar to our findings Backert et al. have reported that allergic rhinitis was three times more common than non-allergic rhinitis in their study involving 4959 adult rhinitis patients, and allergic rhinitis patients complained more frequently of runny nose, itching, sneezing and eye symptoms (9). Moreover, in a study conducted in 303 children with rhinitis symptoms, it was found that runny nose and nasal obstruction were similar in patients with allergic and non-allergic rhinitis while nasal itching, sneezing and eye symptoms were more frequent in allergic rhinitis patients (10).

In terms of comorbidities, we found that chronic rhinosinusitis is common in allergic rhinitis patients with nasal obstruction and postnasal drip. In addition, the most common symptom accompanying nasal polyposis in patients with non-allergic rhinitis was nasal obstruction and postnasal drip in patients with allergic rhinitis. In our study group, rhinitis symptoms were more severe and persistent in patients with nasal polyposis and chronic sinusitis. As in our results, it has been reported in the literature that asthma and chronic rhinosinusitis are more common in allergic rhinitis patients with nasal obstruction than in those with sneezing and runny nose (5,11-14). In a study conducted in Iran, the prevalence of asthma was reported as 12% in allergic rhinitis patients, and it was stated that all of these patients were in the persistent allergic rhinitis group (15). However, in our study, the frequency of asthma was found to be 20% in our patient group with allergic rhinitis, and most, but not all, had severe persistent rhinitis.

We found that patients with nasal obstruction have more severe and persistent symptoms especially in allergic subjects. In addition, in our group, patients with postnasal drip had more persistent symptoms whereas those with itching, sneezing and eye symptoms had more intermittent symptoms. Consistent with our results, Deb et al. reported that in 548 patients with allergic rhinitis, individuals with nasal obstruction had more persistent and severe symptoms than patients with sneezing and runny nose (11). Additionally, a study from South Korea with a large sample size also indicated that blockers have persistent symptoms while those who sneeze have mild intermittent symptoms (16).

In terms of allergic rhinitis, the sensitization pattern of the patients with sneeze and/or runny nose and patients with nasal obstruction are thought to be different. While patients presenting with runny nose and sneezing are more sensitive to seasonal allergens, patients with nasal obstruction are thought to be more sensitive to perennial allergens (11,12). The course of rhinitis in these patients also appears to be variable. As in the literature, our patients with nasal obstruction were more sensitive to mites, while patients with runny nose and sneeze were more sensitive to pollen.

Despite the retrospective design, the fact that many patients with detailed and complete file records could be reached from a single center in the last 6 months strengthened our hand. However, the limitation of the study is that nasal provocation tests could not be performed to distinguish non-allergic patients from local allergic rhinitis patients.

CONCLUSION

In our study, the most common symptoms in allergic rhinitis patients were sneezing, eye symptoms and itching, while the most common symptoms in non-allergic rhinitis patients were nasal obstruction and postnasal drip. In addition, the presence of nasal obstruction and postnasal drip may indicate that the disease is more persistent, more severe, and often accompanied by chronic rhinosinusitis, nasal polyposis, and asthma. However, prospective randomized controlled studies with longer follow-up periods are needed to be more precise.

Authorship Contributions

Concept: **Zeynep Çelebi Sözener, Şengül Beyaz,** Design: **Zeynep Çelebi Sözener, Şengül Beyaz,** Data collection or processing: **Zeynep Çelebi Sözener, Şengül Beyaz,** Analysis or Interpretation: **Zeynep Çelebi Sözener, Şengül Beyaz,** Literature search: **Zeynep Çelebi Sözener, Şengül Beyaz, Şadan Soyyiğit,** Writing: **Zeynep Çelebi Sözener, Şengül Beyaz, Şadan Soyyiğit,** Approval: **Zeynep Çelebi Sözener, Şengül Beyaz, Şadan Soyyiğit.**

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