

Original Research Article

Prevalence of migraine in patients of allergic rhinitis

Sunil Pai¹, David D. M. Rosario^{2*}

Department of Otorhinolaryngology and Head and Neck Surgery, Srinivas Institute of Medical Sciences and Research Centre, Mukka, Mangalore, Karnataka, India

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*Correspondence:

Dr. David D. M. Rosario,

E-mail: davidrosario84@gmail.com

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ABSTRACT

Background: Migraine and allergic rhinitis are common disorders. Studies have shown increased frequency of migraine headaches in patients with allergic rhinitis. The aim of this study is to identify how age, sex and degree of allergic sensitization influences the occurrence, severity and treatment outcome of migraine headaches in patients with allergic rhinitis.

Methods: The study was conducted between 2014 and 2018 in a tertiary care hospital. 150 patients diagnosed with allergic rhinitis clinically were selected and total serum IgE levels were estimated. These patients were subjected to a detailed history taking to determine the characteristics of headache. All classifiable headache diagnoses had met criteria of the International Classification of Headache Disorders-II-2004. Severity of headache was assessed based on MIDAS score. The data was accessed based on age, sex, serum IgE levels, frequency and severity of migraine attacks and the treatment outcome using statistical methods.

Results: The prevalence of migraine in this study was 68% among those who had allergic rhinitis. In this study out 150 patients 111 were females and 39 were males. Comparatively females' patients 84 (75.7%) were found to be more prone for migraine. Majority patients were in the age group of 20 to 40 years (cumulative percentage of 67.3%). There was a negative correlation between age and IgE levels with $r = -0.092$. In comparison patients with higher levels of IgE (mean 3633) had more severe headaches. Patients with higher levels of IgE required a longer duration of treatment.

Conclusions: This study shows that allergic rhinitis is a risk factor for development of migraine. Apart from high prevalence of migraine in patients with allergic rhinitis it is evident from the study that female sex, younger age group and high degree of allergic sensitization also play an important role as the severity of migraine and treatment course depend on these parameters. Hence the treatment for migraine in patients should aim at reducing the allergic sensitization in addition to concurrent treatment for migraine.

Keywords: Allergic rhinitis, Allergic sensitisation, Migraine, Serum IgE

INTRODUCTION

Migraine headache and allergic rhinitis are both common disorders. In Asian countries prevalence of migraine is estimated to be between 8.4% and 12.7%, whereas the prevalence of allergic rhinitis is around 15%-25%.^{1,2} There is a significant overlap of symptoms between headaches due to allergic rhinitis and migraine. Both

these may be associated with headache, nasal block and watering from eye and may worsen with changes in weather and exposure to allergens.³ Studies done by several authors have shown significant correlation between allergic rhinitis and migraine taking into consideration certain parameters. Histamine has been associated with pathogenesis of migraine headaches.⁴ Since allergic rhinitis is a histamine driven syndrome,

and binding of antigens to IgE leads to degranulation of mast cells leading to histamine release, levels of IgE in blood may correlate with amount of histamine and may contribute to increased frequency of migraine headaches in sensitized individuals.⁵ Authors hypothesize that by bringing down the levels of histamine in blood may in turn reduce the severity and frequencies of episodes of migraine headaches as well as allergic rhinitis.

Aim of this study is to estimate the prevalence of migraine in patients with allergic rhinitis and to identify if other parameters like age, sex and degree of allergic sensitization contribute to severity and frequency of migraine headaches and how these parameters may affect the treatment of migraine.

METHODS

The study was conducted in a tertiary care multispecialty hospital between the period of June 2014 and August 2018. The study population comprised of 150 patients who were diagnosed with allergic rhinitis based on clinical symptoms like repeated bouts of sneezing per day, watery nasal discharge, nasal stuffiness, itching in the nose and aggravation of symptoms with exposure to allergens. Patient was subjected to detail clinical and endoscopic nasal examination to ascertain the signs suggestive of allergic rhinitis. Their total serum IgE levels were estimated.

Inclusion criteria comprised of patients above the age of 20 years with two or more symptoms out of watery rhinorrhea, sneezing, nasal obstruction and nasal pruritus persisting for more than or equal to 1 hour on most days. These patients were then asked if they suffered headache. If they gave an affirmative answer then the characteristics of headaches like the frequency, duration, severity of headache, presence or absence of aura, focal neurological deficits, aggravating and relieving factors in order to classify the headache. All classifiable headache diagnoses had met strict criteria of the International Classification of Headache Disorders-II-2004.⁶ Migraine headache was defined as ICHD-2 diagnoses of 1.1-1.5. Severity of headache was assessed based on MIDAS score.

Exclusion criteria comprised of patients with past history of secondary headache disorders such as a brain aneurysm, chronic sinusitis or brain tumors and other significant chronic medical illnesses associated with headaches based on International Classification of Headache Disorders-II-2004. Individuals below age of 20 years and above 80 years, pregnant and lactating females were excluded from the study.

The data was accessed based on age, sex, serum IgE levels, frequency and severity of migraine attacks and the treatment duration for migraine. Percentage of males and females who suffered from allergic rhinitis, migraine and both allergic rhinitis and migraine was calculated. Age

distribution in various age groups where studied and depicted in tables for assessment. Arithmetic mean and standard deviation were calculated based on sex distribution. Pearson’s coefficient was used to find correlation between various parameters.

Written consent was taken from all the participants.

RESULTS

Total 150 patients were studied during the period of 4 years. Out of 150 patients who had allergic rhinitis 102 had migraine.

Table 1: Distribution of diagnosis.

Diagnosis	Frequency	%	Valid %	Cumulative %
AR+M	102	68	68.0	68.0
Valid ARs	48	32	32.0	100.0
Total	150	100	100	

As depicted in Table 1 out of 150 patients studied, 102 patients had allergic rhinitis with migraine. Rest 48 patients had only allergic rhinitis. The table shows that the prevalence of migraine in patients with allergic rhinitis is 68%. In this study out 150 patients 111 were females and 39 were males.

Table 2: Association between diagnosis and sex.

Diagnosis		Sex		Total
		Female	Male	
AR+M	Count	84	18	102
	% within sex	75.7%	46.1%	68.0%
AR	Count	27	21	48
	% within sex	24.3%	53.9%	32.0%
Total	Count	111	39	150
	% within sex	100%	100%	100%

As depicted in (Table 2) out of 150 patients 111 patients were female (68%) and 39 patients were male (32%). Out of 111 female patients 84(75.7%) had migraine in addition to allergic rhinitis and rest 27 (24.3%) had allergic rhinitis alone. Among 39 males, 18 (46.1%) had migraine with allergic rhinitis whereas 21 (53.9%) had allergic rhinitis alone. As represented in the table Prevalence of migraine in patients of allergic rhinitis was more common in females (75.7%) compared to males (46.1%). Also, as the Table 2 shows 102 patients out of 150 (68%) had migraine in addition to allergic rhinitis whereas rest 48 (32%) had only allergic rhinitis.

As depicted in Table 3 in the age group of 20 to 30 years there were 57 patients which accounted to 38% of patients studied. 44 patients were in the age group of 31-

40 years (29.3%). 30 patients were in the age group of 41-50 years. 18 patients were in the age group 51-60 years. 1 patient was in age about 60years.

As depicted in Table 3 majority of the patients i.e. 111 (67.3%) belong to age group of 20-40years. Least was in age group >60years.

Table 3: Age distribution.

Age group in years	Frequency	%	Cumulative %
20-30	57	38	38
31-40	44	29.3	67.3
41-50	30	20	87.3
51-60	18	12	99.3
>60	1	0.7	100
Total	150	100	

Pearson correlation was used to identify any correlation between age and serum IgE levels. When calculated for age and Serum IgE levels as variables as depicted in Table 4 the correlation coefficient was found to be -0.092, which implies there is a negative correlation between age and serum IgE levels which means to say at younger age serum IgE levels are higher.

Table 4: Correlation between age and IgE levels.

		IgE	Age
IgE	Pearson correlation	1	0.092
	Sig. (2-tailed)		0.362
	N	150	150
Age	Pearson correlation	0.092	1
	Sig. (2-tailed)	0.362	
	N	150	150

Negative correlation between IgE level and age, r= -0.092

Arithmetic mean was calculated to find out the average Serum IgE levels among males and females. As depicted in Table 5, In this study the mean IgE level among female patients was 1221.82 and among male patients was 1243.2, which shows that the mean IgE level was higher among males. However, the standard deviation in females was higher compared to males due to higher number of females in this study.

Table 5: Sex and IgE.

Sex	IgE (Mean, SD)
Female	1221.82 (1753.6)
Male	1243.2 (1475.6)

Using MIDAS score the patients with migraine headache were classified into mild, moderate and severe. Mean serum IgE levels in these patients were tabulated against the severity of headache. As depicted in Table 6 patients with higher levels of IgE (mean 3633) had more severe headaches compared to those with lower levels of Ig E.

which implies that the severity of migraine increased with severity of allergic rhinitis.

Table 6: Severity of headache and IgE level.

Severity	IgE (Mean, SD)
Mild	368.55 (143.79)
Moderate	793.64 (273.98)
Severe	3633 (2073.02)

As depicted in Table 7, 64 patients (42.67%) had relief of migraine after commencement of simultaneous treatment of allergic rhinitis and migraine within 3months of treatment.62 patients (41.33%) required 3-6months of treatment for complete relief of migraine. Only 24 patients (16%) required treatment of more than 7months, majority of patients had complete relief from migraine within 6 months of treatment (cumulative percent = 84%).

Table 7: Duration for complete relief.

		Freq uency	%	Valid %	Cumulative %
Valid	<3 months	64	42.67	42.67	42.67
	3-6 months	62	41.33	41.33	84.00
	>7 months	24	16.0	16.0	100.0
	Total	150	150	150	

The relationship between duration of treatment for complete relief of migraine headache and mean serum IgE levels was studied. As mentioned in Table 8, mean IgE levels in those who had relief from headache in less than 3 months was found to be 326.5 with standard deviation of 170.55. Those who required treatment for 3-6 months had mean IgE of 1322.6 with standard deviation of 1252.6 and those who required more than 7 months of treatment had mean serum IgE level of 4166.3 with standard deviation of 2209.6. As mentioned in Table 8 patients with higher levels of serum IgE required longer duration of treatment. This implies that severe forms of allergic rhinitis with migraine required a treatment of longer duration to be migraine free.

Table 8: IgE level and duration for complete relief.

Duration for complete relief	IgE (Mean, SD)
<3	326.5 (170.55)
3-6	1322.6 (1252.6)
>7	4166.3 (2209.6)

Based on Pearson correlation the statistical analysis was done to find any positive or negative correlation between Serum IgE levels and duration of treatment of migraine. As depicted in Table 9, In this study the correlation coefficient (r) was found to be 0.723. which implies that there is a good correlation between duration required for

complete relief and the IgE levels. Which means the patients with higher levels of IgE required longer duration of treatment.

Table 9: Correlation between IgE level and duration for complete relief.

		IgE	Duration
IgE	Pearson correlation	1	0.723**
	Sig. (2-tailed)		0.000
	N	150	150
Duration	Pearson correlation	0.723**	1
	Sig. (2-tailed)	0.000	
	N	150	150

**Correlation is significant at the 0.01 level (2-tailed); Good correlation between the above two variables, $r=0.723$.

DISCUSSION

This study was intended to identify the impact of different variables like age, sex and degree of allergic sensitization on the prevalence of migraine in patients with allergic rhinitis and how these variables correlate and their effect on the severity of migraine and the treatment course.

Various studies have shown that allergic rhinitis is a predisposing factor for development of migraine. Results of our study suggest that it is not just the coexistence of allergic rhinitis, but age, sex and degree of allergic sensitization also play a major role in severity of disease and the treatment outcome.

The prevalence of migraine in this study was 68% among those who had allergic rhinitis. Other similar studies such as Ku et al, and Scarupa et al, have reported prevalence of migraine among allergic rhinitis to be 26%.^{4,7} Another study by Saberi et al, reported the prevalence of migraine to be 37%.⁸ Hence in our study prevalence of migraine headaches in patients with allergic rhinitis was found to be higher than other studies.

In this study out 150 patients 111 were females and 39 were males. Out of 111 females 84 (75.7%) had migraine along with allergic rhinitis and the rest 27 (24.3%) patients were non migraineurs. However out of 39 males 18 (46.1%) of them had migraine with allergic rhinitis and the rest 21 (53.9%) were non migraineurs.

A study done by Saberi et al, showed a prevalence of 35.7% among males and 37.5% among females which is comparable between the two sex.⁸ However in this study sex difference was much higher as compared to other studies. In this study majority patients were in the age group of 20 to 40 years (cumulative percentage of 67.3%). In a study conducted by Mösges et al, age prevalence of allergic rhinitis with migraine was maximum in age group of 15 to 30 years which is comparable to this study.⁹

In this study there was a negative correlation between age and IgE levels with $r=-0.092$, which implies that at the younger age group IgE levels were higher. In a study conducted by Omenaas E et al. the mean Ig E levels were higher in younger age groups which is similar to this study.¹⁰

It was observed in this study that males had a higher IgE levels which is similar to the study conducted by Omenaas E et al.¹⁰

In a study conducted by Borish et al, the mean IgE levels among males were 2945 whereas among females it was 1792.¹¹ In this study mean IgE levels among males was 1243.2 and among females was 1221.82 which is comparable to present study which shows marginally higher serum IgE levels among males.

In this study patients with higher levels of IgE (mean 3633) had more severe headaches compared to those with lower levels of IgE (mean 368.55) and it was also observed that the patients with allergic rhinitis with migraine had higher IgE levels compared to another group. This finding is similar to a study conducted by David et al, which showed severity of migraine headaches was comparable to levels of serum IgE levels.¹¹

In this study majority of patients had complete relief from migraine within 6months of starting treatment. In a study conducted by Kalra et al, the duration of treatment for migraine depends on the type of drug used and the severity of migraine.¹³ However, his study has shown that an average duration of treatment for migraine is around 3-6 months which is comparable to this study.

In this study the patients with higher levels of Ig E required a longer duration of treatment compared to those with lower levels of IgE. As discussed earlier, this study has shown that patients with higher levels of serum IgE levels have more severe headaches. Study done by Kalra et al, has shown that duration of treatment depends on the severity of headaches which correlates with the findings in this study that the patients with higher levels of serum IgE require longer duration of treatment.¹³

CONCLUSION

This study clearly shows that allergic rhinitis is a risk factor for development of migraine as the prevalence of migraine headaches is very high among patients with allergic rhinitis. Apart from high prevalence of migraine in patients with allergic rhinitis it is evident from the study that female sex, younger age group and high degree of allergic sensitization also play an important role as the severity of migraine and treatment course depend on age, sex and degree of allergic sensitization. Hence the treatment for migraine in patients should aim at reducing the allergic sensitization in addition to concurrent treatment for migraine.

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