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Is NOSE Score Reliable to Absolute Eosinophil count? Effect of Nasal Corticosteroid Spray In Allergic Rhinitis.

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ABSTRACT

Nasal Obstruction Symptom Evaluation score is a simple method to assess the severity of the symptoms of Allergic Rhinitis. This study is done to know the effect of Nasal corticosteroid spray in Allergic Rhinitis in relation to N.O.S.E score & Absolute Eosinophil Count. This prospective observational study was conducted in patients of Allergic Rhinitis visiting ENT & HNS Department, KLES Dr. Prabhakar Kore Hospital & Medical Research Centre, Belgaum for 1 year. A total of 50 patients were included in study after obtaining the informed consent. All the patients were assessed by severity of symptoms with N.O.S.E score with AEC before & after treatment with intranasal corticosteroid spray & was followed up after 3 months. The mean age of patients is 32.48±12.77, with 40% female participants and 60% were male participants. The male to female ratio in 1.5:1, with male preponderance. The NOSE score was found to be significantly higher before treatment (47.1±1.56) compared to after treatment (16.40±0.85), with $p<0.05$. There is a weak strength of positive correlation between the NOSE score with the AEC ($r=0.201$, $p<0.05$). Nasal corticosteroid spray is effective in Allergic Rhinitis in relation to NOSE score. NOSE score is better indicator of control of Allergic Rhinitis compared to AEC. The examination of NOSE score is simple, inexpensive, and non-invasive. As a result, it can be utilized as a replacement for AEC value in clinical settings.

Keywords: N.O.S.E score, AEC, Allergic rhinitis.

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INTRODUCTION

Allergic rhinitis is a common health issue world-wide affecting the life quality. Early recognition and diagnosis is important. Absolute Eosinophil Count is the fastest tool to recognize at the earliest.[1]

The N.O.S.E score is simple, easier, and faster method used in various studies of nasal obstruction which can be followed up before and after treatment with intra-nasal corticosteroid spray. [1]

As eosinophils play main role in Allergic Rhinitis, correlating AEC & N.O.S.E score would be very useful to see severity before & after treatment. [1]

Need for study is to see how effective Intranasal corticosteroid spray Fluticasone Proprionate in this study will play in patients of Allergic Rhinitis.

As N.O.S.E scale is utilized to know the acerbity of symptoms after course of treatment, this can help determine up to what extent intranasal steroid spray would help patient on follow up basis after 3 months. [2]

Aim of the Study

To know the effect of Nasal corticosteroid spray in Allergic Rhinitis in relation to N.O.S.E score & Absolute eosinophil count before & after treatment.

MATERIALS AND METHOD

An observational study among the 50 patients of Allergic Rhinitis visiting ENT & HNS Department, KLES Dr. Prabhakar Kore Hospital & Medical Research Centre, Belgaum for 1 year.

Formula for sample size:

$$n = \frac{z_\alpha{}^2 P(1-P)}{d^2}$$

Where P stands for the prevalence percentage and d for the likelihood of the prevalence difference in percentage terms. Z and significance level are related. Z = 1.96 at a 5% level of significance.

"Profile of Patients with Allergic Rhinitis (AR): A Clinic Based Cross-Sectional Study from Kolkata, India". Study population - 568, Out of which 462 were diagnosed with Allergic Rhinitis. Study conducted by Deb A et al.[18] With P = 84.31% and d =15% of P =12.65%, the sample size is 32. To get confirmative result, the sample size will be taken as 50.

Inclusion criteria:

- All patients above 13years of age.
- All patients with anterior or posterior rhinorrhoea, sneezing, nasal blockage, and /or itching nares for consecutive days.

Exclusion criteria:

- Bronchiectasis
- Obstructive Airway Disease
- Recent Nasal surgeries
- Usage of oral or nasal decongestants before treatment.

Study method:

Informed consent was taken. Detailed evaluation of the patients including detailed history & complete Nasal examination were done. All patients were given N.O.S.E score questionnaire & sent for Absolute eosinophil count, then was correlated with NOSE score before & after treatment with Fluticasone Proprionate nasal spray & follow up was done after 3 months .

Statistical Analysis

Since the study is of observational study, the planned analysis is as follows. Mean and standard deviation was calculated for the continuous quantitative variables. The summarized data were represented using tables, figures, bar diagram and pie charts. For the purpose of comparison if the data is divided into two groups i.e before & after treatment with correlation to N.O.S.E score & Absolute eosinophil count.

RESULTS AND DISCUSSION

Mean age of patient is 32.48±12.77, with 40% female participants and 60% were male participants. Male to female ratio is 1.5:1, with male preponderance. The mean score of nasal smear eosinophil count per HPF before treatment was 5.023 & mean score after treatment was 0.444. The mean NOSE score before treatment was 47.1 & after treatment was 16.40. The NOSE score & NSE were correlating very well in patients with AR in our study & also to note is that it was directly proportional to each other.

In our study, the maximum N.O.S.E score was 14/16. Minimum was 1/16. Also, the maximum Nasal Smear for Eosinophilia was 90 per HPF, & minimum was zero per HPF. Mean N.O.S.E score before treatment was 47.1±1.56 & mean N.O.S.E score after treatment was 16.40±0.85.

Nasal smear eosinophil count per HPF before treatment was 5.023±2.01 & N.O.S.E score before treatment was 47.1±1.56, Nasal smear eosinophil count per HPF after treatment was 0.444±0.08 & N.O.S.E score after treatment 16.40±0.85. Both of the variables (N.O.S.E score & Nasal smear eosinophilia) among patients with allergic rhinitis correlate well with each other.

Table 1: Patient's mean age

	N	Minimum	Maximum	Mean	SD
Age	50	13.0	60.0	32.480	12.77

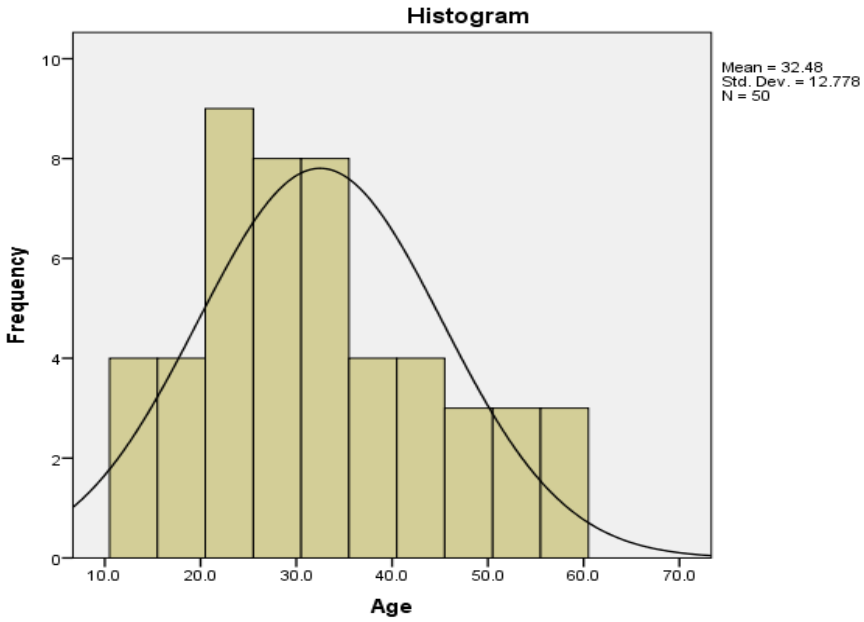

Figure 1: Histogram showing the age distribution

Table 2: Age wise distribution of participants

Age	Frequency	Percent
13-20yrs	8	16
21-30yrs	17	34
31-40yrs	12	24
41-60yrs	13	26
Total	50	100

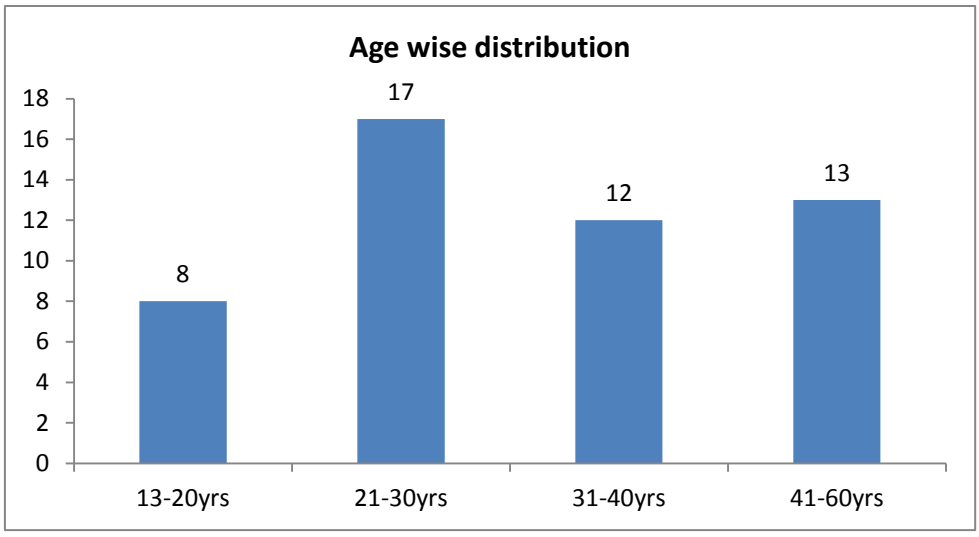

Figure 2: Age wise distribution of participants

Table 3: Gender distribution

		Frequency	Percent
Gender	Female	20	40.0
	Male	30	60.0
	Total	50	100.0

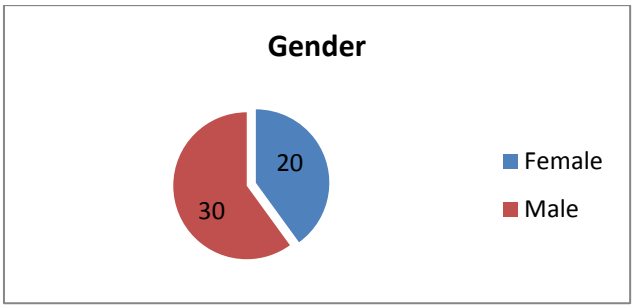

Figure 3: Gender distribution

Table 4: Pearson's correlation of NOSE score with absolute eosinophil count

Pearson's correlation		AEC
NOSE score	R	.201**
	Sig	.05

*. Correlation is significant at the 0.05 level (2-tailed).

There is a positive correlation between the NOSE score with the AEC ($r=0.201$, $p<0.05$).

DISCUSSION

Allergy rhinitis is the most common illness affecting the airways, and its progression is determined by the combination of genes, environment, and immunological variables. Symptoms such as nasal obstruction, pruritis, sneezing, and secretions are used in diagnosis of allergic rhinitis.[1,4]

When an allergen is breathed by patient with a sensitized immune system, the allergen causes IgE to be produced. According to research, eosinophils are involved in pathogenesis of allergic respiratory disorders. Thus, mast cells are stimulated to mediators, which serve as augmenting factors for eosinophilic infiltration in allergic illness.[3]

When exposed to an allergen, several inflammatory cells enter the nasal lining. T cells invading the nasal mucosa are mostly Th2 in type and produce cytokines that stimulate IgE plasma cell production. In turn, IgE synthesis causes the release of inflammatory mediators causing dilatation of arterioles, increased permeability of vascular system, pruritis, and contraction of smooth muscle.[7]

Our study aimed to assess the effect of Nasal corticosteroid spray in Allergic Rhinitis in relation to N.O.S.E score & Nasal smear eosinophilia in 50 patients. The mean age of patients in our study is 32.48 ± 12.77. The ratio between male and female is 1.5:1, with preponderance of male. Similarly in the study done by Kumar et al in the year 2012 was 1:1.6. Our study correlated well with above study.

Nasal cytogram is simple, non- invasive economical procedure which can be used as an alternative to peripheral smear eosinophilia as both are equally helpful in diagnosing allergic disorders.[2]

In our study the Nasal smear eosinophil before treatment was found to be significantly higher (5.023±2.01) compared to after treatment count (0.444±0.08), with $p<0.05$. Whereas study

done by Pal I et al in 2017 documented 5.23+-9.076 before treatment. But did not relate N.O.S.E score to one another after treatment. [2]

An eosinophil count of 40-440 cells per microliter of blood is considered normal. AEC determines the amount of eosinophils, which are white blood cells. Several investigations have found a link between eosinophils and allergic illness. In participants who had a dual reaction to allergen challenge, there was a link between the severity of allergic rhinitis and peripheral blood eosinophilia.[7]

In our study, there is an association between the nasal smear eosinophil count with AEC ($r=0.450$, $p<0.05$), which is statistically significant.

Our findings imply that the N.O.S.E score can be utilized to determine the severity of symptoms. It can also be used to assess symptoms alleviation after a therapy course, also improvise patient care by understanding potential therapeutic effects.[6]

In our study, a positive correlation between the N.O.S.E score with the AEC was noted ($r=0.201$, $p<0.05$).Whereas, in a study done by Patel AK et al in 2017, showed no association between AEC and N.O.S.E scores and no nasal smear eosinophilia.[3]

In our study correlation between N.O.S.E score and pre & post treatment, p value was 0.01. Whereas a study done by Harugop A. et al in 2020, the N.O.S.E score pretreatment had a p value of 0.02.[5] Both this & our study were statistically significant. Our study gave an added advantage of post treatment follow-up compared to the above study.

SUMMARY

Our present study aimed to assess the effect of Nasal corticosteroid spray in Allergic Rhinitis in relation to N.O.S.E score & Absolute eosinophil count in KLEs Dr. Prabhakar Kore Hospital & Medical Research Center Belgaum. A total of 50 patients fulfilling inclusion criteria are included in the study after obtaining the informed consent. The mean age of patients is 32.48±12.77, with 40% female participants and 60% were male participants. The male female ratio is 1.5:1, with male preponderance. The NOSE score was found to be significantly higher before treatment (47.1±1.56) compared to after treatment (16.40±0.85), with $p<0.05$. There is a weak strength of positive correlation between the NOSE score with the AEC ($r=0.201$, $p<0.05$). N.O.S,E can be utilized in any small set ups or rural areas with AEC as an adjuvant for regular follow-up.

CONCLUSION:

N.O.S.E score can be utilized to know the severity of allergic rhinitis before & after treatment with intra-nasal corticosteroid spray. In our study, the N.O.S.E score & Absolute eosinophil count were correlated with each other in Allergic Rhinitis both pre-treatment & post treatment. We found that in our study NOSE score can be used as a tool to know the severity

of symptoms in pre & post treatment of AR. The N.O.S.E score is very good tool for prognosis of Allergic Rhinitis patients whereas AEC was not a good indicator for assessing pre & post treatment of AR. Hence, as per our study & results, the NOSE score can be utilized as an indicator for assessing pre & post treatment of AR. NOSE score is easier, cheaper & faster compared to AEC value in clinical settings.

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