

## EFFECT OF NASAL BREATHING EXERCISES AND INTRA NASAL STEROIDS IN COMPARISON WITH INTRA NASAL STEROIDS ALONE IN PATIENTS WITH SYMPTOMS OF ALLERGIC RHINITIS

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### Abstract

**Background:** Allergic Rhinitis (AR) is a chronic health problem affecting about 20-30% of the population. The ARIA guidelines classify the disease into mild, moderate and severe depending on the severity of symptoms and into intermittent and persistent varieties depending on the duration. Intranasal corticosteroids (INCS/INS) are the mainstay of treatment in most cases of persistent AR. Recent guidelines focus on symptom relief and maintenance of remission as the treatment end points rather than a definitive cure for AR. Hence, we have patients on long term therapy with INCS. This significantly increases the cost of treatment and consequently the economic burden AR imposes on the community. The aim is to study the effect of combining nasal breathing exercises along with intranasal corticosteroids in the treatment outcome of allergic rhinitis. **Materials and Methods:** A cross sectional study was conducted on 250 patients with features of allergic rhinitis. These patients were randomly grouped into 2 groups (125 each), the first that received INCS with NBE and the other with INCS alone. They were followed up for a period of 6 months during which the dose of steroids was gradually tapered and finally stopped. The symptom scores were recorded using a visual analogue scale during each month. **Result:** The total average symptom scores were similar in both groups while giving high dose of INS. However, on tapering the steroids the symptom scores were significantly reduced in the NBE group compared to the INS alone group. Finally, when the steroids were stopped the scores were comparable again. **Conclusion:** Nasal breathing exercises alone has no role in the treatment of AR. However, when combined with INS they can improve the efficacy of the same and therefore a lower dose of steroids is required to achieve the same level of symptom relief. This low-cost addition to treatment would decrease the dose of steroids required thereby reducing potential side effects as well as reducing the total cost of treatment.

## INTRODUCTION

Allergic rhinitis (AR) is an inflammatory disease of the nasal airway that causes a significant decrease in the quality of life of the patient if inadequately treated. The mainstay of treatment for moderate to severe, persistent allergic rhinitis is intra nasal corticosteroids (INS).<sup>[1]</sup> Although this is a safe and effective form of treatment some patients do not respond very well. Some patients have recurrence of symptoms immediately on stopping INS. Intranasal steroid sprays are expensive and most patients may require long term or even lifelong use of the same. The most common reason for discontinuing treatment is usually the cost of these medications.

Nasal breathing exercise (NBE) increases the rate of air flow through the nasal cavity and so helps in improving gas exchange. The flow of gases from the sinuses into the nasal cavity is dependent on several factors like the size of the ostia and anatomic variations in the structures of the nasal cavity. It has been proven that ventilation within the sinuses is enhanced by nasal breathing exercises and humming.<sup>[2,3]</sup> Humming sets about vibrations in the air column which causes increased air flow into the sinuses. In a study conducted by Sathish Nair, the effectiveness of NBE on allergic rhinitis symptoms were tested.<sup>[4]</sup> They have found that both treatments (INS & NBE) provided clinically meaningful responses, but the overall results favoured fluticasone propionate combined with NBE. Hence,

they concluded that NBE is a simple and cost-effective measure to reduce symptoms of AR and improve patient satisfaction. The delivery of INS to the sinus mucosa is essential in maintaining control of the allergic symptoms. If the ventilation of the sinuses increases during humming, then practicing NBE with humming after steroid use will increase the effectiveness of drug delivery and therefore require reduced doses of steroids for maintenance therapy.

NBE is relatively low-cost treatment modifications when compared with increasing doses of INS or other step-up therapies. However, these treatment options are not being prescribed regularly for patients with allergic rhinitis due to the lack of evidence regarding their efficacy. If proven to be effective in our setting, the dependence on nasal steroids and hence cost of treatment could be greatly reduced.

## MATERIALS AND METHODS

A randomized clinical trial was conducted on 250 patients in the Department of ENT, Government Medical College, and Kozhikode from 2020 to 2023. After obtaining approval from the Institutional Research Committee and the Institutional Ethics Committee, all patients aged 18-40 years coming to the ENT department with features of persistent allergic rhinitis were included in the study. The patients with the following were excluded from the study:

- Pregnancy and lactation
- Recent nasal and paranasal surgery
- Treatment with systemic steroids during the previous 30 days
- Use of topical steroids, antihistamines, decongestants, or cromolyn in the preceding two weeks
- Immunotherapy in the last 2 years.

Patients satisfying the above criteria were consecutively placed into two groups - Group A (would receive only INS) and Group B (would receive both INS and NBE). Each arm had 125 patients each. All patients were followed up for a period of 6 months. Patients were scored each month for their symptoms based on symptom scoring method. The symptom score when being enrolled for the study was documented. The patients were asked to give a score for each of the cardinal symptoms of allergic rhinitis viz sneezing, running nose, nasal block and nasal itching. The four-point verbal descriptor scale used by the patient is as follows:

Score	Type	Description
0	Never	No problem
1	Rarely	Problem present but not disturbing
2	Quite often	Disturbing problem but not hampering any activity or sleep
3	Very often	Problem hampering some activities or sleep

Patients in group A were given intra nasal steroid therapy (INS) – 2 puffs of intranasal fluticasone propionate in each nostril twice daily for one month, after which the dose was reduced to 2 puffs once daily for the second month and then further reduced to 1 puff once daily for the third month. The fourth month was treatment free where the patients did not receive any drugs. Patients were then followed up for the recurrence/persistence of symptoms without steroids for further 2 months – total follow up of 6 months. Symptom scores were assessed on a monthly basis. During the last 3 months the patients were restarted on INS if symptoms worsen. In this case the symptom scores were assessed prior to restarting INS as well. The total cost for INS incurred by each patient over the entire period of follow up was noted.

Patients in group B were given INS just as the patients in group A but along with that they were asked to do the NBE. NBE was explained to the patient prior to enrolment and to ensure uniformity each patient was asked to repeat the same once to the examiner. Following the use of INS, the patient takes a deep breath through one nostril keeping the other closed with a finger. After complete inspiration through one nostril, the patient exhales via the opposite nostril keeping the former closed. During the period of expiration, the patient generates a humming sound through the nose. This cycle of inspiration and expiration (with humming) is repeated 5 times. After one month the steroid dose was reduced as in Group A, but NBE continued.

Data was tabulated in excel worksheet and statistical analysis performed by using the software SPSS18. Descriptive analysis was performed and analytical statistics performed by independent sample t test. P<0.05 was considered statistically significant.

## RESULTS

Initially a total of 151 patients were included in Group A and 155 in Group B. However, 8 patients from Group A and 11 from Group B were lost to follow up and so excluded from the study. A total of 125 patients were randomly selected from each group for the study. The most common complaints were nasal obstruction and sneezing. The average symptom score prior to treatment in Group A was 6.2 and the average score in Group B was 6.1. The mean difference in the scores was 0.1 which was not found to be statistically significant. There were 68 female patients (54.4%) and 57 (45.6%) male patients in Group A. Group B had 62 (49.6) female and 63 (50.4) male patients.

After 1 month of steroids the mean scores for both groups were 4.2 and 4.3 in Groups A and B respectively – the difference being 0.1 which was not statistically significant. On the second visit (after 2 months of steroids but with reduced dosage after the first month) the mean scores were 4.5 and 4.2 for Groups A and B respectively. Here the

difference was 0.3 which is more than the previous months however still not statistically significant. The third month scores (after further reduction of steroids) were 5.2 and 4.5 for Groups A and B respectively – the difference of 0.7 was found to be statistically significant. After stopping steroids during the fourth month the scores were 5.7 and 5.2 and difference 0.5 was statistically significant [see Table 1].

During the last two months of follow up without steroids, 98 patients (78.4%) had to restart nasal steroids in Group A and 79 patients (63.2%) from Group B. The difference in the number of patients that required steroids to remain symptom free (19 patients -15.2% more) was found to be significant. The symptom scores at the 5<sup>th</sup> month were 5.9 and 5.6 (difference of 0.3) and finally at the 6<sup>th</sup> month the scores were 6.1 and 6 (difference of 0.1).

**Table 1: ?**

Visit No.	Mean Symptom Score – Group A	Mean Symptom Score – Group B	Difference in Scores	
0	6.2	6.1	0.1	Not Significant
1	4.2	4.3	0.1	Not Significant
2	4.5	4.2	0.3	Not Significant
3	5.2	4.5	0.7	Significant
4	5.7	5.2	0.5	Significant
5	5.9	5.6	0.3	Not Significant
6	6.1	6	0.1	Not Significant

## DISCUSSION

Allergic rhinitis (AR) is one of the most common diagnosis made in any Otorhinolaryngology practice and it is a disease that usually persists throughout the life of an individual.<sup>[5]</sup> The prevalence of AR in India is reported to be increasing significantly over the past few years.<sup>[6,7]</sup> Intranasal corticosteroid sprays (INCS) is the first line therapy recommended for most cases of AR.<sup>[8]</sup> With the availability of newer INCS like mometasone and fluticasone furoate the use of steroids has increased many folds.<sup>[9]</sup> The recent guidelines for AR focus on control of symptoms with no clear treatment endpoints. This means that most patients with AR are bound to be on INCS, either continuously or intermittently for most of their lives. Although INCS are associated with very few side effects the compliance to therapy is generally low resulting in poor control of symptoms. One of the reasons for poor compliance is the cost of the sprays.

When air flows through the nose it ventilates the sinuses and facilitates gas exchange. Adequate ventilation of the sinuses is essential for preventing negative pressures within the sinuses, leading to stasis of secretions and development of chronic rhinosinusitis. The flow of gases from the sinus cavities into the nasal cavity has been studied by measurement of the concentration of nitric oxide. The most important factor that decides ventilation is the sinus ostium. The measurements show that the flow of gases to and from the sinuses is minimal during normal quiet respiration. However, when a humming sound is made during expiration the vibrations induced in the air column greatly increases the ventilation of the sinuses. A study by Weitzberg *et al* showed, humming caused a 15-fold increase (range, 8–21) in nasal NO compared with quiet exhalation.<sup>[2]</sup>

In our study we have seen that the difference between symptom scores was not significant when using higher doses of intranasal steroids. However,

on progressively tapering the steroid doses the patients in Group B (with NBE) had greater symptom relief as compared to the steroid alone group (Group A). Finally, on stoppage of INCS symptom scores came back to pre-treatment levels with no significant difference in either group. Hence it would be reasonable to just that NBE on its own probably does not have any beneficial effect in allergic rhinitis. However, when used in combination with steroids it has shown to increase the effectiveness of the same. This means that the same amount of symptom relief can be achieved with a much lower dose of inhaled steroids, thereby reducing the overall cost of treatment and reducing the side effects of long-term inhaled steroids.

Nasal breathing exercises used in this study are similar to that used in popular yoga practice. It is easy to perform and did not incur any additional costs to the patients. The addition of humming during the expiratory phase possibly increases the sinus ventilation. Since these NBEs are performed immediately after the application of topical sprays we propose that the penetration of the sprays into the sinuses significantly increases. This is probably why there is better control of symptoms and reduced recurrence in the NBE arm as compared to the steroids only arm. Since a lower dose of steroids were needed for maintenance in this group the total costs incurred were also significantly less. A study by Sathish Nair *et al* shows similar results. NBE with humming is a low-cost modification to the existing management that significantly reduces the dependence on steroids.

## CONCLUSION

Intranasal steroids are the mainstay in the treatment of persistent allergic rhinitis. The addition of nasal breathing exercises increases the efficacy of steroid therapy by allowing better penetration to sinus cavities and hence reducing the dose of steroids required to maintain remission of symptoms. NBE is

a cost effective and side effect free addition to the therapy of allergic rhinitis.

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