

# Comparison of Fluticasone Furoate Nasal Spray versus Combined Oral Anti-Histamine and Anti-Leukotriene Therapy in Allergic Rhinitis

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## ABSTRACT

**Background:** Allergic rhinitis is IgE mediated inflammation associated by attacks of sneezing, running nose, nasal blockage, and irritation of nose, eyes and palate. It is also associated with postnasal discharge, cough, irritability, and malaise.

**Aim:** To compare intranasal fluticasone furoate spray as a first line therapy with oral anti-histamine and anti-leukotriene in allergic rhinitis in terms of change in mean nasal symptom score.

**Study Design:** Randomized controlled trial

**Duration and Place of Study:** Capital Hospital Islamabad from 10-12-2016 to 09-12-2017.

**Methods:** The study was conducted on 80 patients. Two groups of patients were made. Group A patients received Cetirizine 10 mg plus Montelukast 10 mg both onetime daily for 6 months. And Group B received spray of Fluticasone Furoate 110 mcg onetime daily (27.5 mcg per spray) i.e. 2 sprays in each nostril daily for 6 months. Baseline Nasal symptom score was calculated on first visit. Patients were called for follow up visits 4 times, 1<sup>st</sup> after 2 weeks then after every two months. On every follow-up visits total nasal symptoms scores were recorded. Sum of the nasal symptoms score were calculated on every visit. Final outcome was measured on 4<sup>th</sup> visit i.e. after 6 months of starting therapy.

**Results:** There were 45% male and 55% were female. There were forty patients in each study groups. In group A (cetirizine plus montelukast), the mean nasal score  $\pm$  standard deviation was observed as  $2.21 \pm 0.38$  whereas in group B (Fluticasone Furoate nasal spray), the score was observed as  $1.04 \pm 0.33$  which was statistically significant.

**Conclusion:** Present research showed that cetirizine plus montelukast and fluticasone furoate nasal spray has statistically significant difference. It is also revealed that fluticasone furoate nasal spray is more effective than combined oral anti-histamines and leukotriene receptor antagonists in allergic rhinitis.

**Keywords:** Fluticasone furoate, Cetirizine, Montelukast, Allergic rhinitis

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## INTRODUCTION

Allergic rhinitis is an chronic inflammatory condition associated with attacks of sneezing, nasal discharge, nasal blockage, and irritation of the nose, eyes and palate along with cough, irritability, and fatigue.<sup>1-4</sup> The disease not only effects the quality of life but also decreases work performance<sup>5,6</sup>.

Allergic rhinitis patients produce allergen specific IgE antibodies which attach to the receptors specific for IgE on mast cells of respiratory mucosa and to the basophils in the blood. On subsequent exposure to the same allergen results in activation the mast cells releasing granules of chemicals responsible for the symptoms of allergic rhinitis<sup>7</sup>.

Intra-nasal steroids are the most effective medications for allergic rhinitis, in terms of symptoms control with extra benefits of single therapy, better patient compliance, cost-effectiveness, and decreased adverse effects<sup>8</sup>. Topical steroids modify the nasal mucosal environment in terms of mucociliary clearance<sup>9</sup>.

Antihistamines improve itching, sneezing and running nose but have no effect on nasal blockage<sup>5</sup>. The second generations antihistamines have less side effects<sup>10</sup>.

Montelukast is effective in congestion and mucus production with good safety profile. The use of montelukast

along with antihistamines such as loratadine or cetirizine has greater efficacy than when these agents are used alone<sup>11,12</sup>.

In a study of Pullerits and his colleagues effects of fluticasone propionate nasal spray and a combination of anti leukotriene and antihistamine in the treatment of seasonal allergic rhinitis with mean symptoms score were  $1.1 \pm 0.5$  and  $1.5 \pm 0.4$  respectively concluding that intranasal steroids are better than combined anti leukotriene and antihistamine in controlling nasal symptoms in allergic rhinitis<sup>13</sup>.

Allergic rhinitis is very common in some parts of the world while less common in other parts of the world<sup>14,15</sup>. The prevalence in the industrialized world is increasing, especially in urban areas with increase in prescriptions and thus increasing the economic burden<sup>16-19</sup>.

Allergic rhinitis is also very common in Pakistan. According to one study, the incidence of allergic rhinitis in Pakistan is 24.62%<sup>20</sup>. There are very few studies done on intra-nasal steroids in Pakistan. Research on anti-histamines and montelukast have been done in Pakistan but no comparative studies between intra-nasal steroids as a first line therapy and combined oral anti-histamines and montelukast are carried out in Pakistan. This study results

may recommend better management of patients in future and decrease morbidity accordingly.

## MATERIALS AND METHODS

This Randomized control trial was conducted at Capital Hospital Islamabad from 10-12-2016 to 09-12-2017 using non probability sampling technique. According to previous study: Mean nasal symptoms score with fluticasone propionate nasal spray of  $1.1 \pm 0.5$  and Mean symptoms score with combined montelukast and loratadine of  $1.5 \pm 0.4$  with Confidence Interval (2-sided) of 95%, Power of 90%, the Sample size calculated of Group 1=40 and Sample size of Group 2=40. All individuals of either gender between 25 to 60 years of age having Clinically symptoms at screening: Total Nasal Symptoms Score (TNSS)  $>6$  with any one combination of these symptoms; nasal blockage, runny nose, nasal itching, sneezing and difficulty in sleep were included in the study. While Patients with Non-Allergic Rhinitis, Nasal blockage due to DNS or any other structural abnormality, Nasal Polyps, Hyper-sensitivity to intra-nasal steroids, cetirizine, montelukast, Known Hypertensive, Immuno-compromized, Using oral steroids for any other condition and Known diabetic candidates were excluded from the study. Randomly two groups were made by lottery method; to the selection bias. To group A cetirizine 10 mg once daily plus montelukast 10 mg once daily were prescribed for 6 months. And to group B fluticasone furoate nasal spray 110 mcg once daily (27.5 mcg per spray) i.e., 2 sprays in each nostril daily was prescribed for 6 months. Baseline Nasal symptom score was calculated on first visit. Patients were called for follow up visits 4 times, 1<sup>st</sup> after 2 weeks then after every two months. On every follow-up visits Total nasal symptoms scores were entered on questionnaire and register. Sum of the nasal symptoms score were calculated on every visit. Final outcome was measured on 4<sup>th</sup> visit i.e. after 6 months of starting therapy. SPSS 17.0 was used for data analysis. Qualitative variable i.e. gender was measured as frequency and percentages. Quantitative variables i.e. age and nasal score were measured as mean  $\pm$  SD. Mean symptoms score change was measured and was compared between two groups by independent sample t-test with level of significance of  $\leq 0.05$ . Effect modifiers like age and gender were controlled by stratification. After stratification independent sample t-test was applied.

## RESULTS

There were 36(45%) male and 44(55%) female with male to female ratio 0.82:1 with minimum age of 25 years and maximum age of 56 years with mean was  $38.34 \pm 9.59$  years. There were forty patients in each study groups. The minimum total nasal symptom score was calculated as 2.00 and maximum total nasal symptom score recorded was 3.33 with mean as  $2.59 \pm 0.36$ . After six months follow up, the minimum total nasal symptom score was calculated as 0.50 and maximum total nasal symptom score was calculated as 2.88 with mean as  $1.62 \pm 0.69$ .

In group A (cetirizine plus montelukast), the mean was observed as  $2.21 \pm 0.38$  and in group B (fluticasone furoate nasal spray), the mean was observed as  $1.04 \pm 0.33$ . Statistically significant difference was found by using

independent sample t-test between study groups for the allergic rhinitis having p-value 0.001.

By using independent sample t-test, significant difference of mean change in symptoms was found in both groups with p-value= 0.000 in males. In females, significant difference of mean change in symptoms was found in both groups with p-value = 0.000.

Table 1: Descriptive statistics (overall)

Variable	Mean $\pm$ SD
Age (25-56 years)	38.34 $\pm$ 9.59
Total nasal symptom score (2-3.33)	(2.59 $\pm$ 0.36)
Total nasal symptom score follow-up (0.50-2.88)	(1.62 $\pm$ 0.69)

Table 2: Group-wise descriptive statistics

Variable	Group	Mean $\pm$ SD
Age	A	38.33 $\pm$ 9.66
	B	38.35 $\pm$ 9.64
Total nasal symptom score	A	2.66 $\pm$ 0.38
	B	2.54 $\pm$ 0.33
Total nasal symptom score follow-up	A	2.21 $\pm$ 0.38
	B	1.04 $\pm$ 0.33

Table 3: Difference of mean symptom score between study groups

Group	Mean $\pm$ SD	P value
A	2.21 $\pm$ 0.38	0.001
B	1.04 $\pm$ 0.33	

## DISCUSSION

Allergic rhinitis is chronic inflammatory condition mediated by IgE. It causing postnasal discharge, cough, irritability, and malaise<sup>21</sup>. This study compared intranasal fluticasone furoate spray as a first line therapy against oral anti-histamine and anti-leukotriene in allergic rhinitis in terms of change in mean nasal symptom score.

From eighty patients with allergic rhinitis, the minimum age was calculated as 25 years and maximum age was calculated as 56 years with mean  $\pm$  standard deviation as  $38.34 \pm 9.59$  years. The minimum total nasal symptom score was computed as 2.00 and maximum total nasal symptom score was determined as 3.33 with mean  $\pm$  standard deviation as  $2.59 \pm 0.36$ . After six months follow up, the minimum total nasal symptom score was determined as 0.50 and maximum total nasal symptom score was calculated as 2.88 with mean  $\pm$  standard deviation as  $1.62 \pm 0.69$ . There were 45% male and 55% were female.

In a study by Ansari et al<sup>12</sup> the age range was found as 22-45 years (mean  $\pm$  standard deviation =  $31.6 \pm 1.9$ ) which is in accordance to our study while in another study the ages were 12 years to 55 years with 35 as median. Contrary to our study the male female patient ratio was 2:1; which is high<sup>20</sup>.

Varshney et al<sup>8</sup> showed that patients using fluticasone propionate nasal spray has got good effect with respect to scent, soothing effect and nasal irritation with no delayed adverse effects.

Similarly Berger et al<sup>22</sup> showed the effectiveness of fluticasone propionate in relieving the symptoms of seasonal allergic rhinosinusitis with improvement quality of life. In a study of Baroody et al<sup>23</sup> they determined no significant difference of quality of life and peak flow with fluticasone furoate compare to xylometazoline.

A meta-analysis proved better results of combine antihistamine along with montelukast compare to antihistamine alone<sup>24</sup>.

Present research showed that in group A (cetirizine plus montelukast), the mean symptom score was observed as 2.21±0.38 and in group B (Fluticasone Furoate nasal spray), the mean symptom score was observed as 1.04±0.33 standard deviation. Statistically significant difference was found by using independent sample t-test between study groups for the allergic rhinitis having p-value 0.001.

Result from another study showed means symptoms score with fluticasone propionate nasal spray and combined antileukotriene and antihistamine 1.1±0.5 and 1.5±0.4 respectively which are comparable to our study. So it was concluded that intranasal steroids are better than combined antileukotriene and antihistamine in controlling nasal symptoms in allergic rhinosinusitis<sup>13</sup>.

In a study by Gill et al. the eosinophil, basophil, and neutrophil count and mucociliary clearance were significantly improved with steroid nasal spray compare to placebo-treated patients<sup>9</sup>.

## CONCLUSION

The current research shows that intranasal fluticasone furoate spray as a first line therapy against oral anti-histamine and anti-leukotriene have statistically significant difference. It is also revealed that fluticasone furoate nasal spray is more effective than combined oral anti-histamines and leukotriene receptor antagonists in allergic rhinitis.

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