

Original Article

Comparison Of Nasal Glucocorticoid, Antileukotriene Versus Combination Of Antileukotriene And Antihistamine In Treatment Of Seasonal Allergic Rhinitis

Adia Bushra Piracha¹, Sadia Chaudhry², Ashar Alamgir³, Amna Kousar⁴, Nimra Imtiaz⁵, Saba Sahar⁶

Abstract

Objective: This study aimed to compare the efficacy of nasal glucocorticoid combined with antileukotriene therapy versus a combination of antileukotriene and antihistamine therapy in managing symptoms of seasonal allergic rhinitis.

Methods: A randomised clinical trial was conducted from January 2024 to July 2024, involving 200 patients diagnosed with seasonal allergic rhinitis. Participants were randomly assigned to two groups of 100 each. Group A received a combination of nasal glucocorticoid and antileukotriene, while Group B received a combination of antileukotriene and antihistamine. Patients with significant respiratory comorbidities, ongoing systemic corticosteroid use, or hypersensitivity to the study medications were excluded. Symptom severity was assessed at four-week intervals using a pre-designed proforma, and statistical analysis was conducted to evaluate differences in symptom control between the two groups.

Results: Group A demonstrated superior symptom control compared to Group B across all variables. Nasal obstruction was significantly less frequent in Group A (12.0%) compared to Group B (40.0%, $p=0.0001$). Similarly, rhinorrhea was observed in 46.0% of Group A compared to 69.0% of Group B ($p=0.001$). Itching and sneezing were also significantly better managed in Group A, with rates of 40.0% and 68.0% compared to 76.0% and 91.0% in Group B, respectively ($p=0.0001$). These findings highlight the enhanced efficacy of glucocorticoid-antileukotriene therapy in managing seasonal allergic rhinitis.

Conclusion: Nasal glucocorticoid combined with antileukotriene therapy provides significantly better symptom relief for seasonal allergic rhinitis compared to the combination of antileukotriene and antihistamine. This regimen effectively addresses inflammatory pathways, ensuring comprehensive symptom control and improved patient outcomes.

Keywords: Seasonal allergic rhinitis, glucocorticoids, leukotrienes, antihistamine.

Introduction

Allergic rhinitis is a prevalent condition affecting individuals globally, and it poses a significant concern due to its rising prevalence in recent years. Allergic rhinitis is associated with elevated levels of Th2 cytokines, and recent research indicates that the underlying cause of AR may be linked to a compromise in the integrity of the nasal epithelium barrier. It is estimated that around 25% of children and 40% of adults are affected globally.^{1,2}

The estimated prevalence rate of allergic rhinitis in children during the initial five years of life is 17.2%, with the highest age of diagnosis occurring between 24-29 months, at a rate of 2.5%.³ Smoking did not demonstrate a significant relationship with the severity of nasal symptoms in allergic rhinitis, but it typically affected patients with chronic rhinitis.^{4,5} On the other hand, maternal smoking presented the highest risk in paediatric allergic rhinitis.⁶

Nasal glucocorticoids are recognised as the primary treatment for managing seasonal allergic rhinitis, as they effectively diminish inflammation in the nasal passages. These medications serve as effective anti-inflammatory agents by blocking the release of inflammatory mediators, including prostaglandins and leukotrienes, thus managing the underlying inflammation linked to allergic rhinitis.⁷ Conversely, antileukotrienes function by blocking leukotriene receptors or inhibiting leukotriene synthesis, addressing a distinct component of the allergic response. Leukotrienes serve as inflammatory mediators that are essential in the context of allergic reactions, leading to bronchoconstriction, increased mucus production, and inflammation.^{8,9} Antihistamines are commonly prescribed for seasonal allergic rhinitis and primarily act on the histamine receptors that mediate the allergic response. This action effectively alleviates symptoms including itching, sneezing, and a runny nose. Antihistamines effectively manage immediate allergic symptoms; however, they do not target the underlying inflammation linked to seasonal allergic rhinitis. This is where nasal glucocorticoids and antileukotrienes become relevant.¹⁰⁻¹²

The rationale for comparing nasal glucocorticoids, antileukotrienes, and the combination of antileukotrienes with antihistamines in the management of seasonal allergic rhinitis arises from the requirement to enhance therapeutic approaches for addressing this common ailment. A direct

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comparison between these treatment strategies is essential to ascertain the most effective, safe, and well-tolerated regimen for patients, thereby assisting clinicians in making informed decisions tailored to individual patient needs and enhancing overall outcomes for individuals afflicted with seasonal allergic rhinitis.

Materials And Methods

This randomised clinical trial was conducted from January 2024 to July 2024 on 200 patients diagnosed with seasonal rhinitis after taking ethical approval from the hospital. Participants were recruited from outpatient clinics through a lottery method and were eligible if they had a confirmed diagnosis of seasonal allergic rhinitis based on clinical history and symptomatology. Exclusion criteria included patients with other significant respiratory conditions, ongoing use of systemic corticosteroids, or those with known hypersensitivity to the study medications. After obtaining informed consent, patients were randomly allocated into two equal groups of 100 each. Group A received a combination of nasal glucocorticoid and antileukotriene therapy, while Group B was treated with a combination of antileukotriene and antihistamine.

All patients were instructed on the proper use of nasal sprays and adherence to their prescribed medications. Follow-up visits were scheduled at four-week intervals during the study period, during which symptom severity, including nasal obstruction, sneezing, rhinorrhea and itching, was assessed. The primary outcome was the improvement in symptom control.

Data were collected using a pre-designed proforma which included the demographics, comorbid such as asthma and outcome variables, symptoms. Chi-square test applied and the collected data were analysed to compare the efficacy of the two treatment regimens, with statistical significance set at a p-value of <0.05.

Results

We evaluated a sample of 200 patients with a mean age of 39.81 ± 12.28 years. Group A, treated with nasal glucocorticoid and antileukotriene, had a mean age of 40.57 ± 11.29 years, while Group B, treated with antileukotriene and antihistamine, had a mean age of 39.05 ± 13.20 years.

Table 1: Gender distribution

		Gender		Total
		Male	Female	
Groups	Group A (Nasal glucocorticoid + antileukotriene)	47	53	100
		47.0%	53.0%	100.0%
	Group B (Antileukotriene + antihistamine)	57	43	100
		57.0%	43.0%	100.0%
Total		104	96	200
		52.0%	48.0%	100.0%

The gender distribution included 104 male patients (52.0%) and 96 female patients (48.0%), with Group A comprising 47 male patients (47.0%) and 53 female patients (53.0%), while Group B included 57 male patients (57.0%) and 43 female patients (43.0%). Asthma distribution can be seen in Figure 1.

Table 2: Comparison of symptom control between both groups

Symptoms		Groups				P value
		Group A (Nasal glucocorticoid + antileukotriene)		Group B (Antileukotriene + antihistamine)		
		N	%	N	%	
Nasal obstruction	Yes	12	12.0%	40	40.0%	0.0001
	No	88	88.0%	60	60.0%	
Rhinorrhea	Yes	46	46.0%	69	69.0%	0.001
	No	54	54.0%	31	31.0%	
Itching	Yes	40	40.0%	76	76.0%	0.0001
	No	60	60.0%	24	24.0%	
Sneezing	Yes	68	68.0%	91	91.0%	0.0001
	No	32	32.0%	9	9.0%	

Nasal obstruction persisted in 12 patients (12.0%) in Group A, while 40 patients (40.0%) in Group B ($P = 0.0001$). Rhinorrhea 46 patients (46.0%) in Group A and 69 patients (69.0%) in Group B ($P = 0.001$). Itching 40 patients (40.0%) in Group A versus 76 patients (76.0%) in Group B ($P = 0.0001$).

Similarly, sneezing was reported by 68 patients (68.0%) in Group A and 91 patients (91.0%) in Group B ($P = 0.0001$).

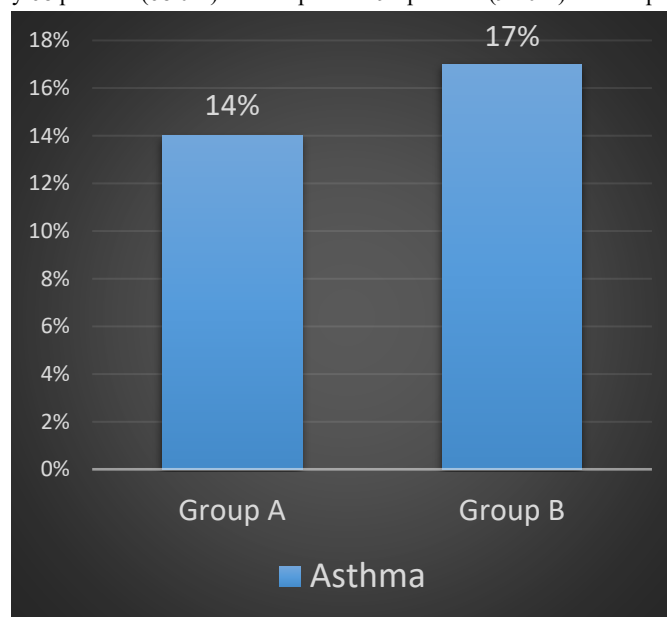


Figure 1: Distribution of asthma between both groups

Discussion

In our study, we observed the relative efficacy of nasal glucocorticoid combined with antileukotriene therapy compared to a combination of antileukotriene and antihistamine in managing symptoms of seasonal allergic rhinitis. This was assessed by comparing variables such as itching, rhinorrhea, nasal obstruction and sneezing across groups. These findings align with those shown by Pullerits et al., who evaluated fluticasone, montelukast, and a combination of montelukast and loratadine. Their results showed intranasal glucocorticoids, such as fluticasone, to be significantly more effective in alleviating daytime and nighttime symptoms and reducing eosinophilic inflammation than either montelukast alone or its combination with loratadine.¹³

Similarly, the systematic review by Rodrigo and Yañez et al. supported our observations, noting that while leukotriene receptor antagonists (LTRA) alone or in combination with antihistamines offered moderate improvements in nasal and ocular symptoms, they were consistently less effective than intranasal glucocorticoids for both nasal congestion and comprehensive symptom relief.¹⁴ In our findings, nasal obstruction and sneezing were better managed in the glucocorticoid-antileukotriene group, correlating with data from Nathan RA, which highlighted that corticosteroids provide superior control of nasal blockage compared to antihistamines or LTRA due to their broader anti-inflammatory effects.¹⁵

Our results also revealed a statistically significant difference in rhinorrhea control, favouring the glucocorticoid-antileukotriene group. This outcome is mirrored in the review by Baççioğlu et al., which emphasised the additive benefits of corticosteroids in suppressing both early- and late-phase allergic responses, particularly for symptoms like rhinorrhea and nasal congestion.¹⁶ Moreover, this study reinforced the dual benefit of controlling upper and lower airway inflammation in patients with comorbid asthma and allergic rhinitis.

While the efficacy of combining antileukotriene and antihistamine was evident for certain symptoms like sneezing and itching in our study, its effectiveness fell short compared to corticosteroid-based combinations. This observation aligns with the conclusion from Pullerits et al., which noted that montelukast-loratadine combinations did not surpass glucocorticoids in controlling nighttime symptoms or reducing mucosal eosinophilia, further supporting the dominant role of corticosteroids in allergic rhinitis management.¹³


In summary, our findings are consistent with existing literature, underscoring the superior efficacy of nasal glucocorticoids combined with antileukotrienes for comprehensive symptom control in seasonal allergic rhinitis. This therapeutic strategy not only addresses the inflammatory pathway comprehensively but also improves patient-reported outcomes better than combinations involving antihistamines and LTRA.

Conclusions

In conclusion, our findings demonstrate that combining nasal glucocorticoids with antileukotrienes is more effective than pairing antileukotrienes with antihistamines for treating seasonal allergic rhinitis. This combination provided notably better relief for symptoms like nasal obstruction and rhinorrhea, likely due to its ability to address the underlying inflammation more comprehensively. These results strongly support prioritising glucocorticoid-based therapies to ensure effective and lasting symptom management for patients with seasonal allergic rhinitis.

Author Information

1,4,5,6. Post Graduate Trainee, ENT, RMU 2. Professor, ENT, RMU 3. Assistant Professor, ENT, RMU.

Corresponding author: Dr. Adia Bushra Piracha  adiapiracha@gmail.com

References

- Bernstein JA, Bernstein JS, Makol R, Ward S. Allergic rhinitis: a review. JAMA. 2024;331(10):866-77. <https://doi.org/10.1038/s41572-020-00227-0>
- Bousquet J, Anto JM, Bachert C, Baiardini I, Bosnic-Anticevich S, Walter Canonica G, et al. Allergic rhinitis. Nat Rev Dis. 2020;6(1):95-9. <https://doi.org/10.1038/s41572-020-00227-0>.
- Hill DA, Grundmeier RW, Ram G, Spergel JM. The epidemiologic characteristics of healthcare provider-diagnosed eczema, asthma, allergic rhinitis, and food allergy in children: a retrospective cohort study. Pediatrics. 2016;16(1):1-8. <https://doi.org/10.1186/s12887-016-0673-z>
- Gómez RM, Croce VH, Zernotti ME, Muñio JC. The active smoking effect in allergic rhinitis. World Allergy Organ J. 2021;14(2):100504. <https://doi.org/10.1016/j.waojou.2020.100504>
- Wolf JS, Papadimitriou JC, Morales RE, Califano III JA, Kline NL, Bhatnagar K, et al. The association of active and passive tobacco smoke exposure with chronic rhinosinusitis symptom severity: A cross-sectional study. Int Forum Allergy Rhinol. 2022;12(3):278-85. <https://doi.org/10.1002/alr.22887>
- Chung SJ, Kim BK, Oh JH, Shim JS, Chang YS, Cho SH, et al. Novel tobacco products including electronic cigarette and heated tobacco products increase risk of allergic rhinitis and asthma in adolescents: Analysis of Korean youth survey. Allergy. 2020;75(7):1640-8. <https://doi.org/10.1111/all.14212>
- Wang H, Zuo Y, Li J, Wang W. Effects of glucocorticoid therapy on nasal conditions and inflammatory factors in patients with allergic rhinitis. Int J Clin Exp Med. 2020;13(4):2154-62.
- Sokolowska M, Rovati GE, Diamant Z, Untersmayr E, Schwarze J, Lukasik Z, et al. Effects of non-steroidal anti-inflammatory drugs and other eicosanoid pathway modifiers on antiviral and allergic responses: EAACI task force on eicosanoids consensus report in times of COVID-19. Allergy. 2022 ;77(8):2337-54. <https://doi.org/10.1111/all.15258>
- De Corso E, Anzivino R, Galli J, Baroni S, Di Nardo W, De Vita C, et al. Antileukotrienes improve naso-ocular symptoms and biomarkers in patients with NARES and asthma. Laryngoscope. 2019;129(3):551-7. <https://doi.org/10.1002/lary.27576>
- Kawauchi H, Yanai K, Wang DY, Itahashi K, Okubo K. Antihistamines for allergic rhinitis treatment from the viewpoint of nonsedative properties. Int J Mol Sci. 2019;20(1):213-7. <https://doi.org/10.3390/ijms20010213>
- Deka B, Bhattacharjee B, Ahmed A, Newar A, Sonowal B, Dey N, Barman D, Iqbal AM, Rajkhowa A, Bharali A. Clinical management of allergic rhinitis: A comprehensive review. Res J Pharmacol Pharmacod. 2021;13(1):9-16. <https://doi.org/10.5958/2321-5836.2021.00003.3>
- Linton S, Hossenbaccus L, Ellis AK. Evidence-based use of antihistamines for treatment of allergic conditions. Ann Allergy Asthma Immunol. 2023;131(4):412-20. <https://doi.org/10.1016/j.anai.2023.07.019>
- Pullerits T, Praks L, Ristioja V, Lötval J. Comparison of a nasal glucocorticoid, antileukotriene, and a combination of antileukotriene and antihistamine in the treatment of seasonal allergic rhinitis. J Allergy Clin Immunol. 2002;109(6):949-955. <https://doi.org/10.1067/mai.2002.124467>
- Rodrigo GJ, Yañez A. The role of antileukotriene therapy in seasonal allergic rhinitis: A systematic review of randomized trials. Ann Allergy Asthma Immunol. 2006;96:779-786. [https://doi.org/10.1016/S1081-1206\(10\)61339-7](https://doi.org/10.1016/S1081-1206(10)61339-7)
- Nathan RA. Pharmacotherapy for allergic rhinitis: A critical review of leukotriene receptor antagonists compared with other treatments. Ann Allergy Asthma Immunol. 2003;90:182-191. [https://doi.org/10.1016/S1081-1206\(10\)62138-2](https://doi.org/10.1016/S1081-1206(10)62138-2)
- Bağcıoğlu A, Yorgancıoğlu A, Cingi C, Çuhadaroğlu Ç. Role of leukotriene antagonists and antihistamines in treatment of allergic rhinitis and asthma comorbidity. J Med Updates. 2013;3(1):34-39. <https://doi.org/10.2399/jmu.2013001008>.