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The Effectiveness of Topical Corticosteroids Versus Antihistamines in Treating Allergic Conjunctivitis

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ABSTRACT

Allergic conjunctivitis significantly impacts patient's quality of life, necessitating effective management strategies. Topical corticosteroids and antihistamines are commonly employed treatments, yet their comparative efficacy and safety remain subjects of ongoing research. Aim of the study was to compare the effectiveness of topical corticosteroids and antihistamines in reducing symptoms of allergic conjunctivitis and to evaluate the safety profile and patient-reported outcome measures (PROMs) associated with each treatment modality. This randomized, controlled, double-blind clinical trial involved 100 subjects diagnosed with allergic conjunctivitis, equally divided into corticosteroid and antihistamine treatment groups. Primary outcome measures included symptom reduction (itching, redness, and tearing), while secondary outcomes focused on safety (changes in intraocular pressure and visual acuity) and PROMs (impact on daily activities, sleep quality, and overall well-being). Data were collected at baseline and after 4 weeks of treatment. The corticosteroid group exhibited marginally better symptom reduction compared to the antihistamine group, with mean differences in itching, redness and tearing being statistically significant. Corticosteroids were associated with a slight increase in intraocular pressure, whereas no significant changes in visual acuity were observed in either group. PROMs indicated that corticosteroid treatment slightly improved daily activities, sleep quality, and overall well-being more than antihistamines. Topical corticosteroids may offer superior symptomatic relief in the treatment of allergic conjunctivitis compared to antihistamines, with a modest impact on daily functioning and quality of life. However, the potential for corticosteroid-induced intraocular pressure increase necessitates careful patient selection and monitoring. Antihistamines remain a safe and effective option for patients, particularly where corticosteroid use is contraindicated or closely monitored. Future research should explore long-term outcomes and the cost-effectiveness of these treatments to guide clinical decision-making.

INTRODUCTION

Allergic conjunctivitis is an inflammatory eye condition triggered by allergen exposure, leading to symptoms such as ocular itching, redness, watering and eyelid swelling. This condition is part of the spectrum of allergic diseases, which also includes allergic rhinitis, asthma and atopic dermatitis^[1]. The prevalence of allergic conjunctivitis has been increasing globally, paralleling the rise in allergic diseases, attributed to factors like environmental pollution, urbanization and changes in lifestyle and hygiene practices. This rising trend underscores the importance of effective management strategies to alleviate the burden on affected individuals and healthcare systems. The pathophysiology of allergic conjunctivitis involves a complex interplay of immunological responses. Initial exposure to allergens prompts sensitization, where allergen-specific IgE antibodies are produced. Upon re-exposure, these antibodies trigger mast cell degranulation, releasing mediators such as histamine, which are responsible for the acute symptoms of itching, redness and tearing. Chronic exposure leads to infiltration of the conjunctiva by inflammatory cells, contributing to the persistence of symptoms^[2].

The impact of allergic conjunctivitis on patients extends beyond the discomfort of acute symptoms. Chronic or recurrent episodes can significantly impair vision-related quality of life, affecting daily activities, work productivity and social interactions. Moreover, the condition often coexists with other allergic diseases, complicating its management and further exacerbating the patient's overall burden of allergy^[3]. Treatment of allergic conjunctivitis aims to alleviate symptoms and prevent recurrence. Antihistamines, available in both oral and topical forms, are widely used for their ability to block histamine receptors, thereby reducing itching and redness. Topical antihistamines, in particular, offer the advantage of rapid symptom relief with minimal systemic side effects^[4]. On the other hand, topical corticosteroids are recognized for their potent anti-inflammatory effects, addressing both the immediate and late-phase responses in allergic conjunctivitis. However, their use is often limited by concerns over potential adverse effects with long-term use, such as cataract formation and increased intraocular pressure, leading to glaucoma^[5].

Despite the established roles of antihistamines and corticosteroids in managing allergic conjunctivitis, there is a paucity of head-to-head comparisons to guide clinicians in selecting the most effective and safe treatment. The variability in individual responses to treatment and the lack of clear guidelines on therapy selection underscore the need for comparative studies. This study aims to systematically compare the efficacy and safety of topical corticosteroids versus antihistamines in the treatment of allergic

conjunctivitis. By addressing this gap in the literature, the study seeks to provide evidence-based recommendations that can enhance clinical decision-making and patient care. In doing so, it aspires to contribute to the optimization of treatment outcomes, improving the quality of life for patients suffering from this prevalent and distressing condition.

MATERIALS AND METHODS

This randomized, controlled, double-blind clinical trial conducted at the Department of Ophthalmology, Kamineni Institute of Medical Sciences, Narketpally. A total of 100 subjects with clinically diagnosed allergic conjunctivitis were recruited. Inclusion criteria were: age between 18 and 65 years, a clinical diagnosis of allergic conjunctivitis based on symptoms and ophthalmological examination and consent to participate in the study. Exclusion criteria included: previous ocular surgery or laser treatment within the last six months, use of any ocular medication within the previous month, presence of glaucoma or cataract and pregnancy or lactation.

Randomization and Blinding: Participants were randomly assigned to either the topical corticosteroid group or the antihistamine group in a 1:1 ratio using computer-generated random numbers. Both participants and investigators were blinded to the treatment assignments.

Intervention: The corticosteroid group received topical corticosteroid drops (specific medication and dosage) and the antihistamine group received topical antihistamine drops (specific medication and dosage). Both medications were administered twice daily for four weeks.

Outcome Measures: Primary outcome measures included the reduction in symptoms of itching, redness and tearing, measured on a visual analogue scale (VAS) at baseline, 1 week, 2 weeks and 4 weeks post-treatment. Secondary outcome measures involved the assessment of any adverse effects, including intraocular pressure changes and visual acuity, recorded at baseline and after 4 weeks of treatment.

Statistical Analysis: Data were analyzed using SPSS software (version XX). The normality of data distribution was tested with the Shapiro-Wilk test. Comparisons between groups for continuous variables were made using the Student's t-test or Mann-Whitney U test, depending on data normality. Categorical variables were compared using the Chi-square test or Fisher's exact test as appropriate. A $p < 0.05$ was considered statistically significant.

RESULTS AND DISCUSSIONS

The results presented in the (Table 1) reflect the effectiveness of topical corticosteroids versus antihistamines in reducing symptoms of allergic conjunctivitis, specifically itching, redness and tearing. These outcomes are based on the mean values and standard deviations (SD) derived from the treatment groups, as observed over the study period. Here's an explanation of the findings, incorporating the specific values:

- **Itching:** Patients in the corticosteroid group reported a higher average reduction in itching (mean = 4.66) compared to the antihistamine group (mean = 4.10). The standard deviations were 1.39 and 1.06, respectively. This suggests that corticosteroids were slightly more effective in relieving itching, though the variability in response was also slightly higher among patients treated with corticosteroids
- **Redness:** Similar to itching, a greater reduction in redness was observed in the corticosteroid group (mean = 5.03) as opposed to the antihistamine group (mean = 4.18), with both groups showing a standard deviation of 1.30. This indicates that corticosteroids were more effective in reducing redness, with a similar range of response variability in both treatment groups
- **Tearing:** The corticosteroid group again showed a higher mean reduction in tearing (mean = 4.94) compared to the antihistamine group (mean = 3.97), with standard deviations of 1.51 and 1.28, respectively. This points to corticosteroids being more efficacious in reducing tearing, albeit with a slightly wider variability in effectiveness among patients.

Overall, the results suggest that topical corticosteroids may offer a marginally better reduction in the symptoms of allergic conjunctivitis-itching, redness and tearing-compared to antihistamines. However, the observed variability in responses, as indicated by the standard deviations, highlights that while corticosteroids generally perform better on average, the extent of symptom relief varies among individuals. This underscores the necessity for clinicians to consider individual patient responses and potential side effects when choosing between these treatments for allergic conjunctivitis. The mean increase in intraocular pressure was higher in the corticosteroid group (1.02 mmHg) compared to the antihistamine group (0.49 mmHg). This suggests that patients treated with corticosteroids might experience a greater change in intraocular pressure, which is a known potential adverse effect of corticosteroid treatment. The standard deviations indicate the variability of this

effect within each group. Changes in visual acuity were minimal for both groups, with a mean change of 0.02 in the corticosteroid group and a slight decrease (-0.003) in the antihistamine group. The standard deviations suggest low variability in visual acuity changes, indicating that neither treatment significantly impacts visual acuity over the short term. These results highlight the importance of monitoring intraocular pressure in patients treated with corticosteroids for allergic conjunctivitis due to the potential for increased pressure. Conversely, visual acuity appears to remain stable with both treatments, suggesting minimal impact on vision from these therapies over the duration of the study.

The (Table 3) presents the results from patient-reported outcome measures (PROMs) assessing the impact of treatment with either corticosteroids or antihistamines on daily activities, sleep quality and overall well-being in patients with allergic conjunctivitis. These measures provide insights into how each treatment affects patients' quality of life from their perspective. Here's a breakdown and interpretation of the findings: Patients treated with corticosteroids reported a higher mean score (7.61) compared to those treated with antihistamines (7.02), indicating a better ability to perform daily activities. This suggests that corticosteroid treatment might be more effective in managing symptoms that interfere with day-to-day tasks. The standard deviations (1.34 for corticosteroids and 1.52 for antihistamines) indicate variability in responses among patients but show that corticosteroids consistently provide better outcomes for daily activities. The mean score for sleep quality was also higher in the corticosteroid group (7.03) than in the antihistamine group (6.31), suggesting that patients receiving corticosteroids experienced fewer symptoms that disturb sleep, such as itching or discomfort. The relatively close standard deviations (1.10 for corticosteroids and 1.14 for antihistamines) suggest a similar range of effect across patients within each treatment group.

For overall well-being, patients in the corticosteroid group reported the highest mean score (8.04), compared to the antihistamine group (7.18). This indicates that patients feel generally healthier and more comfortable when treated with corticosteroids. The standard deviation values (1.44 for corticosteroids and 1.26 for antihistamines) reflect the variability in how different patients perceive their overall health and comfort during treatment, with corticosteroids showing a slightly wider range of patient experiences. These results imply that, from the patients' perspectives, corticosteroids not only provide better symptomatic relief but also contribute to a higher quality of life regarding daily activities, sleep quality and overall well-being compared to antihistamines.

Table 1: Comparative Efficacy of Topical Corticosteroids and Antihistamines in Treating Allergic Conjunctivitis Symptoms

Symptom	Antihistamine Mean \pm SD	Corticosteroid Mean \pm SD
Itching	4.10 \pm 1.06	4.66 \pm 1.39
Redness	4.18 \pm 1.30	5.03 \pm 1.30
Tearing	3.97 \pm 1.28	4.94 \pm 1.51

Table 2: Safety Profile Assessment: Changes in Intraocular Pressure and Visual Acuity Post-Treatment with Corticosteroids and Antihistamines

Outcome Measure	Group	Mean	SD
Intraocular Pressure Change	Corticosteroid	1.02	0.38
Visual Acuity Change	Corticosteroid	0.02	0.10
Intraocular Pressure Change	Antihistamine	0.49	0.32
Visual Acuity Change	Antihistamine	-0.003	0.05

Table 3: Patient-Reported Outcome Measures (PROMs) for Allergic Conjunctivitis Treatment: Corticosteroid vs. Antihistamine Groups

PROMs	Group	Mean	SD
Daily Activities	Corticosteroid	7.61	1.34
Sleep Quality	Corticosteroid	7.03	1.10
Overall Well-Being	Corticosteroid	8.04	1.44
Daily Activities	Antihistamine	7.02	1.52
Sleep Quality	Antihistamine	6.31	1.14
Overall Well-Being	Antihistamine	7.18	1.26

However, the decision to use corticosteroids over antihistamines should consider these benefits against the potential risks and side effects, including those observed in the safety profile assessment. This balanced approach ensures that treatment decisions align with both clinical efficacy and patient-centric outcomes. The present study aimed to evaluate the comparative efficacy and safety of topical corticosteroids and antihistamines in managing allergic conjunctivitis, focusing on symptom relief (itching, redness, tearing), secondary outcomes (intraocular pressure and visual acuity changes) and patient-reported outcome measures (PROMs) including daily activities, sleep quality and overall well-being. Our findings revealed that corticosteroids led to a marginally better reduction in itching, redness and tearing symptoms compared to antihistamines. These results are consistent with the work of Santiago et al. (2020), who reported that corticosteroids exhibit superior anti-inflammatory effects, providing more significant symptomatic relief for allergic conjunctivitis patients^[6]. However, the differences observed were relatively modest, echoing the conclusions of Holland and colleagues (2019) that both treatment modalities offer viable symptomatic relief, albeit with varying degrees of efficacy^[7].

The study also assessed the safety profile of both treatments, focusing on intraocular pressure changes and visual acuity. Corticosteroids were associated with a slight increase in intraocular pressure, which aligns with the well-documented risk of corticosteroid-induced glaucoma^[8]. In contrast, antihistamines showed minimal impact on intraocular pressure, supporting their safety profile in terms of ocular hypertension risk^[9]. Neither treatment significantly affected visual acuity, suggesting that short-term use does not compromise visual function,

consistent with findings from Azari and Arabi^[10]. Regarding PROMs, our results indicated that corticosteroids slightly improved daily activities, sleep quality and overall well-being compared to antihistamines. These findings highlight the importance of considering patient-centric outcomes in clinical decision-making, as also advocated by Gaballa *et al.*, who emphasized that treatment success should not only be measured by clinical outcomes but also by patient satisfaction and quality of life^[11].

CONCLUSION

In comparison with earlier studies, our research contributes to the growing body of evidence supporting the nuanced selection of treatment modalities based on efficacy, safety and patient preference. While corticosteroids offer superior efficacy in symptom relief, their potential adverse effects on intraocular pressure warrant cautious use and monitoring. Antihistamines, offering a safer profile with slightly less efficacy, remain a valuable option for patients with contraindications to corticosteroid use. The study concludes that topical corticosteroids are more effective than antihistamines in alleviating symptoms of allergic conjunctivitis and improving patient's quality of life, as reflected in patient-reported outcome measures. However, the potential for increased intraocular pressure with corticosteroids necessitates cautious use. The choice between corticosteroids and antihistamines should be personalized, balancing efficacy, patient quality of life and safety considerations.

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