

ROLE OF INTRANASAL STEROIDAL SPRAY IN SEASONAL ALLERGIC RHINITIS WITH OCULAR SYMPTOMS

Vineel Muppidi¹, Lingaiah Jad², Kalicheti Prabhakar Reddy³, Sudeep Madiseti⁴, Anvesh Krishna Med⁵, Madasani Anunya Reddy⁶

¹Professor, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

²Associate Professor, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

³Professor and HOD, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

⁴Associate Professor, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

⁵Postgraduate Resident, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

⁶Postgraduate Resident, Department of ENT, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal, Karimnagar, Telangana.

ABSTRACT

BACKGROUND

The eye is especially susceptible to the symptoms of allergic rhinitis, itching (pruritus), tearing (epiphora) and redness (erythema) because it lacks a mechanical barrier that could prevent the deposition of allergens, such as pollen on the conjunctival surface. These ocular symptoms have been described as examples of the type 1 immediate hypersensitivity reaction. A number of recently published clinical studies apparently support the positive effect of intranasal steroidal sprays on ocular allergy symptoms.

The aim of the study is to evaluate the role of intranasal steroids in relieving ocular symptoms in allergic rhinitis.

MATERIALS AND METHODS

60 subjects who had seasonal allergic rhinitis with ocular symptoms came to Outpatient Department of Chalmeda Anand Rao Hospital in the year 2015-2016. Randomly, each intranasal steroid is given to 12 patients to a total of 60 patients for 4 weeks 2 puffs in each nostril twice daily and the clinical response is observed.

RESULTS

A subjective improvement in ocular symptoms was observed in 11 of the 12 patients treated with fluticasone furoate, 8 of 12 patients with fluticasone propionate, 7 of the 12 patients with mometasone furoate, 6 of the 12 patients with beclomethasone and 6 of the 12 patients with budesonide.

CONCLUSION

Intranasal corticosteroids, which are used for seasonal allergic rhinitis with ocular symptoms are effective in controlling of ocular symptoms. Among these, intranasal corticosteroids, which are used for allergic rhinitis, fluticasone furoate is more effective in relieving ocular symptoms in our study.

KEYWORDS

Nasal-Ocular Reflex, Allergic Rhinoconjunctivitis, Nasal Challenge, Intranasal Steroids.

HOW TO CITE THIS ARTICLE: Muppidi V, Jad L, Reddy KP, et al. Role of intranasal steroidal spray in seasonal allergic rhinitis with ocular symptoms. J. Evid. Based Med. Healthc. 2017; 4(46), 2831-2834. DOI: 10.18410/jebmh/2017/561

BACKGROUND

Allergic rhinitis is a common disease affecting about 20% of the American population¹ and is ranked as the fifth most costly chronic disease in the United States.² Allergic rhinitis

Financial or Other, Competing Interest: None.

Submission 17-05-2017, Peer Review 24-05-2017,

Acceptance 06-06-2017, Published 08-06-2017.

Corresponding Author:

Dr. Lingaiah Jad,

Associate Professor, Department of ENT,

Chalmeda Anand Rao Institute of Medical Sciences,

Bommakal, Karimnagar, Telangana-505001, India.

E-mail: drjadi_ms@yahoo.com

DOI: 10.18410/jebmh/2017/561

greatly affects patients' quality of life, cognitive and learning functions, decision-making and self-perception.³ Quality of life impairments related to allergic rhinitis also lead to decreased work productivity and classroom activity. Therefore, cost-effective treatment for the disease is important for both patient and society. Clinical symptoms of allergic rhinitis include sneezing, rhinorrhea, nasal itching and nasal congestion. According to an analysis of National Health and Nutrition Examination Survey III data, more than 40% of the US population with allergic rhinitis experienced ocular symptoms primarily manifesting as itchy and watery eyes regardless of age or geographic location.



In a study performed by Wuthrich et al, the authors evaluated 509 symptomatic patients with hay fever who were not currently receiving medical treatment and found that conjunctivitis symptoms were at least as severe as rhinitis symptoms in approximately 70% of the patients. Several reports also support substantial increases in the prevalence of Allergic Rhinoconjunctivitis (AR) in developed countries in recent decades making it an important health problem. A survey of 2500 United States symptomatic and/or treated AR patients found that 40% of responders complained of frequent watery eyes during allergy season.⁴

Ocular symptoms can occur without evidence of direct conjunctival exposure to allergen. Lebel et al⁵ found that ocular symptoms were reported by approximately 20% of SAR patients in whom allergen provocation was isolated to the nasal mucosa. In a more recent study by Baroody et al,⁶ unilateral nasal provocation with ragweed or grass pollen resulted in ocular symptoms (itching and watery eyes) and increased ocular secretions bilaterally in SAR patients. Histamine and albumin in ocular secretions were not elevated, which indicates an absence of mast cell degranulation in the eye. In nasal secretions, biologic markers associated with an allergic response (histamine and albumin) were noted only on the side that was challenged, whereas the weight of nasal secretions increased bilaterally, because no nerves are known to communicate from one side of the nose to the other.⁷

In a pooled, retrospective analysis of data from 7 randomised, double-blind trials (N=1645) that compared the efficacy of fluticasone propionate and placebo in SAR patients, fluticasone propionate was found to be significantly more effective than placebo in reducing baseline Total Ocular Symptom Score (TOSS) after 1 and 2 weeks of treatment.

Retrospective analyses assessed ocular symptom data from subjects with SAR who were randomised to receive mometasone furoate or placebo as part of 4 phase III, double-blind trials.⁸ Subjects who entered the studies were not required to have ocular symptoms at baseline and despite the low baseline TOSS and thus low potential for improvement, significantly greater improvement in TOSS was found with mometasone furoate vs. placebo over the 2-week treatment period.

Pooled analyses of data from the 4 phase III trials also showed significantly greater reductions in the 3 TOSS component symptoms (itching, redness and tearing) as well as in TOSS across all degrees of symptom severities at baseline. Benefit was seen as early as day 2, reaching statistical significance at day 3 and was sustained throughout the dosing interval. Recently published data indicate that fluticasone furoate is also more effective than placebo in reducing ocular symptoms associated with SAR. In a 2-week, dose-ranging study of fluticasone furoate (55 mcg, 110 mcg, 220 mcg and 440 mcg, all once daily) in patients with SAR, mean change in reflective TOSS and Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) eye symptom domain score were significantly greater in all active treatment groups compared with placebo. Comparison of

once daily intranasal fluticasone furoate with placebo in subjects with SAR who had moderate-to-severe TOSS at baseline concluded that mean reductions from baseline were significantly greater with fluticasone furoate than with placebo for TOSS and each of the ocular symptoms.

A limited number of studies that compared the effectiveness of different INs in reducing ocular symptoms in AR patients have been published. In addition to the previously discussed trial comparing budesonide, fluticasone propionate and placebo once daily mometasone furoate (200 mcg) was compared to twice daily beclomethasone dipropionate (200 mcg) over a 1 month treatment period. Mometasone furoate and beclomethasone dipropionate were superior to placebo in reducing total nasal and non-nasal symptom scores, which included itching, tearing and redness of the eyes and itching of the ears or palate. No statistically significant differences between the 2 active treatment groups were noted. Triamcinolone acetonide and fluticasone propionate, both once daily were compared over a 3-week treatment period in SAR patients. In the ocular outcome variable that was assessed in this study (the eye symptom domain of RQLQ), triamcinolone acetonide and fluticasone propionate were both superior to placebo and were not significantly different from each other.

OBJECTIVES

To determine the effectiveness of intranasal corticosteroids in controlling ocular symptoms of seasonal allergic rhinitis. To compare the effectiveness among the used individual intranasal steroids in overall improvement of ocular symptoms of seasonal allergic rhinitis.

MATERIALS AND METHODS

Type of Study- Observational comparative study.

Source of Data- 60 subjects who had seasonal allergic rhinitis with ocular symptoms came to Outpatient Department of Chalmeda Anand Rao Hospital in the year June 2015 to May 2016, informed consent from patients and approval has been obtained from the ethical committee of our institute. Intranasal corticosteroids used were beclomethasone dipropionate, budesonide, fluticasone furoate, fluticasone propionate and mometasone furoate.

Inclusion Criteria

Patients included both males and females with mild-to-severe seasonal allergic rhinitis with ocular symptoms. Age group of 10 to 60 years were included (Table 1).

Exclusion Criteria

Allergic rhinitis without eye symptoms, hypertension and diabetes mellitus.

Age group of more than 60 years and less than 10 years were not included.

Study duration was one year. Randomly, each intranasal steroid is given to 12 patients to a total of 60 patients for 6 weeks 2 puffs twice daily in each nostril. After 6 weeks of treatment with used different intranasal steroidal sprays, we assessed the overall improvement in ocular symptoms by total ocular symptom score. Sum of the 3 individual ocular

symptoms (itching, watering and redness) was calculated on 0 to 3 grading (0=absent, 1=mild, 2=moderate, 3=severe). We hypothesised that repeated nasal allergen challenges would lead to priming and augmentation of nasonasal and nasal-ocular reflexes and that intranasal steroids would decrease inflammation and subsequently inhibit both nasonasal and nasal-ocular reflexes thus resulting in reduction of eye symptoms. Subjects recorded their nasal and ocular symptoms.

RESULTS

An overall clinical improvement in ocular symptoms was seen in 38 patients out of 60 of which pretreatment with beclomethasone dipropionate showed improvement in 6 patients (50%), budesonide in 6 patients (50%), fluticasone propionate in 8 patients (66.6%), mometasone furoate in 7 patients (58.3%) nasal spray reduced sneezing, the nasonasal and nasal-ocular reflexes (Figure 1). All the used intranasal steroids showed the positive results in improving the ocular symptoms, but it is more effective with fluticasone furoate, which showed a subjective improvement in 11 patients out of 12 (91.6%) (Table 2). The results of this study helped to confirm the existence of a nasal-ocular reflex after allergen challenge of the nose and demonstrated the exaggeration or priming of this reflex by repeated exposure to allergen and thus supported the role of the nasal-ocular reflex in the genesis of at least part of the eye symptoms in patients with AR. This study also helped to demonstrate the efficacy of fluticasone furoate over other intranasal steroids in reducing allergic inflammation, priming and subsequently the nasal-ocular reflex and ocular symptoms. Our results therefore support a mechanism that helps explain how control of eye symptoms can be achieved by the administration of fluticasone furoate in patients with seasonal allergic rhinitis.⁹

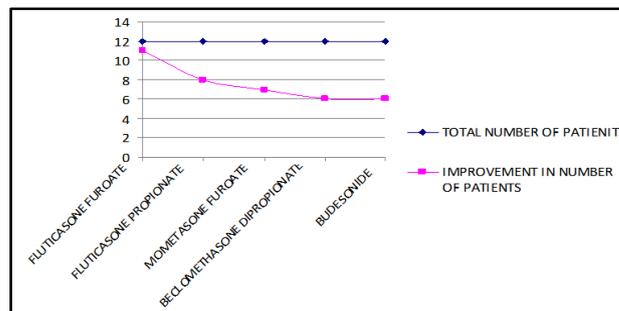


Figure 1. Line Diagram Showing the Results

DISCUSSION

Intranasal Corticosteroids vs. Oral Antihistamines

Although, INs are considered first-line therapy for moderate-to-severe AR, because they are especially effective for nasal congestion, non-sedating antihistamines have been recommended over INs for relief of ocular symptoms. Contrary to expert opinion, a meta-analysis by Weiner et al of 16 randomised, controlled trials conducted between 1966 and 1997 found that oral antihistamines are not superior to INs for the relief of ocular symptoms. Subsequent to the meta-analysis, loratadine was compared to both fluticasone propionate and triamcinolone in 28-day, randomised, controlled trials for SAR. Treatment with fluticasone propionate was associated with significantly greater reductions in TOSS and individual ocular symptoms compared with loratadine. The percentage of patients who reported relief from ocular symptoms was also higher with triamcinolone than with loratadine, although these differences only became significant in weeks 3 and 4.

Intranasal Corticosteroids vs. Topical Antihistamines

Topical ocular antihistamines are noted for their rapid onset of action and are associated with lower rates of sedation and dry eye than first generation oral antihistamines. There is a perception among physicians that non-sedating oral antihistamines maybe preferable to treat coexisting nasal symptoms present in the majority of SAC and PAC patients. A study by Abelson et al (N=500) demonstrated significant relief of sneezing, itchy nose and runny nose with olopatadine 0.2% vs. placebo (P=0.05). However, a meta-analysis of findings from 4 published clinical trials that compared the effects of INs to topical (ocular) antihistamines on ocular symptoms in AR demonstrated no overall significant difference between the two treatment modalities. Fluticasone furoate was associated with significant improvement in TOSS and each of the individual symptoms.¹⁰ Mometasone furoate nasal spray and fluticasone furoate seem to have a relatively early onset of effect within 24 to 72 hours of initiation with a statistically significant mean change from baseline during the 15 days of the studies. The pooled analysis of the studies with mometasone furoate nasal spray found that improvements for individual symptoms occurred as early as day 2 of treatment.

In a study¹¹ of budesonide in a paediatric population with perennial AR, eye symptom scores related to allergic conjunctivitis significantly decreased after 1 year of

Age Group	Males	Females
10-20 years	3	2
21-30 years	8	6
31-40 years	12	9
41-50 years	7	6
51-60 years	3	4

Table 1. Showing Age and Sex Distribution

Drug	Number of Patients	Improvement in Ocular Symptoms	Percentage of Improved
Fluticasone furoate	12	11	91.6%
Fluticasone propionate	12	8	66.6%
Mometasone furoate	12	7	58.3%
Beclomethasone dipropionate	12	6	50%
Budesonide	12	6	50%

Table 2. Showing Drugs Used and Percentage of Patients Improvement in Ocular Symptoms

treatment. Older studies with triamcinolone acetonide, budesonide and beclomethasone dipropionate provide further support of the positive effect of INs in managing ocular allergy symptoms. Most of the published triamcinolone acetonide studies with ocular data are comparisons with an antihistamine (loratadine or astemizole). In 3 separate studies, triamcinolone acetonide was significantly more effective than or comparably effective with the antihistamine in reducing ocular symptoms as was reported in the meta-analysis of Weiner et al and in other publications.¹²

Similar evidence of a positive effect of INs on ocular allergy symptoms associated with seasonal AR can be found as far back as 1985 with beclomethasone dipropionate,¹³ although this early study did not find a significant improvement with the INs compared with an antihistamine. In a more recent study of patients with allergic or non-allergic chronic rhinosinusitis, Giger et al¹⁴ compared once daily with twice daily use of beclomethasone dipropionate and found a significant improvement for both groups in ocular tearing, itching and redness and in blepharodema.

Several mechanisms of action have been proposed to explain the effect of INs in reducing ocular symptoms related to AR. These possibilities include the following- (1) Improved drainage of the nasolacrimal duct related to the anti-inflammatory action of the INs reduces exposure of the conjunctiva to allergens, (2) Application of the steroid to the eye through either systemic absorption or nasolacrimal reflux, (3) Reduced nasal inflammation moderates the allergen caused increases in reflex neuronal activity and (4) The systemic immune effect as reflected by the decreased immune profile found in the lung when the upper airway is treated perhaps a further extension of the one airway, one disease concept.

CONCLUSION

Most of the patients with allergic rhinitis have one or more ocular symptoms such as itching in eyes, watering from eyes and/or redness of eyes. When eye symptoms are associated with seasonal allergic rhinitis, these patients bother more about eye symptoms. All intranasal corticosteroidal sprays are effective in controlling the eye symptoms in seasonal allergic rhinitis patients, but all are not equally effective. We conducted an observational study to know, which intranasal corticosteroid is more effective in controlling eye symptoms. We conclude that fluticasone furoate is more effective than other intranasal steroidal sprays.

REFERENCES

- [1] Baroody FM. Allergic rhinitis: broader disease effects and implications for management. *Otolaryngol Head Neck Surg* 2003;128(5):616-631.
- [2] Goetzel RZ, Long SR, Ozminkowski RJ, et al. Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting US employers. *J Occup Environ Med* 2004;46(4):398-412.
- [3] Fineman S. The burden of allergic rhinitis: beyond dollars and cents. *Ann Allergy Asthma Immunol* 2002;88(4 Suppl 1):2-7.
- [4] Allergies in America: a landmark survey of nasal allergy sufferers: executive summary. Available at: <http://www.myallergiesinamerica.com>.
- [5] Lebel B, Bousquet J, Morel A, et al. Correlation between symptoms and the threshold for release of mediators in nasal secretions during nasal challenge with grass-pollen grains. *J Allergy Clin Immunol* 1988;82(5 Pt 1):869-877.
- [6] Baroody FM, Foster K, Markarian A, et al. Nasal-ocular reflexes occur after nasal challenge with allergen. *J Allergy Clin Immunol* 2007;119(1):S162.
- [7] Philip G, Baroody FM, Proud D, et al. The human nasal response to capsaicin. *J Allergy Clin Immunol* 1994;94(6 Pt 1):1035-1045.
- [8] Hebert J, Danzig M, Gates D. Mometasone furoate improves total ocular symptom score in patients with allergic rhinitis. *J Allergy Clin Immunol* 2007;119(1):S61.
- [9] Baroody FM, Naclerio RM. Nasal-ocular reflexes and their role in the management of allergic rhinoconjunctivitis with intranasal steroids. *World Allergy Organ J* 2011;4(Suppl 1):S1-S5.
- [10] Kaiser HB, Naclerio RM, Given J, et al. Fluticasone furoate nasal spray: a single treatment option for the symptoms of seasonal allergic rhinitis. *J Allergy Clin Immunol* 2007;119(6):1430-1437.
- [11] Moller C, Ahlstrom H, Henricson KA, et al. Safety of nasal budesonide in the long-term treatment of children with perennial rhinitis. *Clin Exp Allergy* 2003;33(6):816-822.
- [12] Condemi J, Schulz R, Lim J. Triamcinolone acetonide aqueous nasal spray versus loratadine in seasonal allergic rhinitis. *Ann Allergy Asthma Immunol* 2000;84(5):533-538.
- [13] Beswick KBJ, Kenyon GS, Cherry JR. A comparative study of beclomethasone dipropionate aqueous nasal spray with terfenadine tablets in seasonal allergic rhinitis. *Curr Med Res Opin* 1985;9(8):560-567.
- [14] Giger R, Pasche P, Cheseaux C, et al. Comparison of once-versus twice-daily use of beclomethasone dipropionate aqueous nasal spray in the treatment of allergic and non-allergic chronic rhinosinusitis. *Eur Arch Otorhinolaryngol* 2003;260(3):135-140.