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A COMPARATIVE STUDY OF EFFICACY OF ALCAFTADINE 0.25%, BEPOTASTINE BASILATE 1.5% AND OLOPATADINE HYDROCHLORIDE 0.2% IN ALLERGIC CONJUNCTIVITIS AMONG PATIENTS ATTENDED IN A TERTIARY CENTRE, NORTH BENGAL MEDICAL COLLEGE & HOSPITAL, DARJEELING, INDIA

Ophthalomology

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ABSTRACT

Introduction: Allergic Conjunctivitis has gradually become one of the common and significant eye conditions commonly seen in ophthalmic practice. It is quite common in Sub-Himalayan region. The current study was conducted to compare the efficacy of Alcaftadine 0.25%, Bepotastine Basilate 1.5% and Olopatadine hydrochloride 0.2% ophthalmic solutions in the treatment of allergic conjunctivitis at a tertiary level health care facility in the Sub-Himalayan region. **Materials & methods:** The present institution based descriptive observational study with perspective design was conducted at the Department of Ophthalmology of North Bengal Medical College and Hospital, Darjeeling. A total of 120 patients adult patients with mild-to-moderate allergic conjunctivitis presenting to outpatient department over one year randomized in three groups (A,B,C) of 40 patients each treated with Alcaftadine 0.25%, Bepotastine Basilate 1.5% and Olopatadine hydrocholoride 0.2% solutions. Resolution of sign and symptoms were noted and compared using Total Ocular Scoring System (TOSS) and Hyperemic scale from baseline to periodic follow-up, analyzed by ANOVA with repeated measure analysis or Kruskal-Wallis test accordingly; p value of less than 0.05 was considered statistically significant. Chi Square test was performed to analyze the difference in proportions. **Results:** The mean age among the groups were 28.42±8.25 years, 30.42±8.79 years and 26.23±7.45 years respectively. The mean TOSS score and mean hyperemic scale score decreased significantly from baseline among all the three group of patients and mean TOSS score decreased more significantly from baseline among the patients receiving topical 1.5% Bepotastine besilate eye drop. **Conclusion:** Alcaftadine and Bepostatine obtained better result in compare to Olopatadine in resolution of signs and symptoms in Allergic conjunctivitis, where Bepostatine had highest efficacy among the three drugs.

KEYWORDS

Alcaftadine, Bepostastine, Olopatadine, TOSS, allergic conjunctivitis, hyperemic scale

INTRODUCTION

Allergic conjunctivitis (AC) has gradually become one of the common and significant eye conditions commonly seen in ophthalmic practice. Allergic Conjunctivitis is inflammation of the conjunctiva which is the tissue that covers the inner part of eyelids, as well as the white part of the eye ball (Sclera). The common sign and symptoms are itching, redness, tearing and swelling of eyes[1]. Allergic conjunctivitis is a condition caused by allergen mostly occurs in spring time that involves immune mechanisms mediated by Immunoglobulin E (IgE) and mast cells[2]. Allergens that caused allergic conjunctivitis include both endogens and exogen. The common exogenous allergens include grass, trees, and dust, mold and flower pollens[3, 4]. The mainstay of treatment begins with removing the provoking allergen, which is difficult to achieve, as it is quite complex and multifactorial in causation. The ocular surface is also a largely exposed surface area, making it difficult in avoidance of environmental irritants[5].

The recommended treatment approach is the use of a topical pharmacologic medication to combat the inflammation combined with non-pharmacologic remedies, like cold compresses or artificial tears) for symptomatic relief[6]. The antihistaminic action reduces the early phase of ocular allergy response such as itching whereas mast cell stabilization inhibits the release of inflammatory mediators which is associated with late phase response of ocular allergy[7]. Dual-acting H1 receptor antagonist and mast cell stabilizer agents include Olopatadine, Ketotifen, Azelastine, Epinastine, Bepotastine and Alcaftadine.

Alcaftadine is used to prevent eye irritation brought on by allergic conjunctivitis. Alcaftadine is an antagonist at three of the histamine receptors (1, 2 and 4). The main indication for Alcaftadine is for prevention of allergic conjunctivitis by blocking these three receptors. Alcaftadine has been shown to significantly reduce the effect of allergens. These effects on histamine receptors seem to show lower rates of itching, eosinophil recruitment and redness after exposure to an allergen. Side effects of Alcaftadine are mild and temporary burning/stinging of the eyes and very serious allergic reaction to this drug is rare [8].

Bepotastine is a second-generation antihistamine that works by blocking a certain natural substance (histamine) that causes allergic symptoms. Bepotastine Basilate works by blocking release of histamine which is responsible for allergic symptoms. Side effects of Bepotastine Basilate are mild test in the mouth, Headache; eye irritation, sore throat etc.[9]. Olopatadine inhibits histamine release from mast cells and a relatively selective antagonist of H1 receptors preventing type 1 immediate hyper-sensitivity. Olopatadine is not recommended for the treatment of eye irritation due to wearing contact lenses. Side effects of Olopatadine are headache, blurred vision, burning/stinging/redness/dryness of the eye and sometimes eye lid swelling etc.[8] Allergic conjunctivitis is quite common in Sub-Himalayan region.

AC is commonly under-diagnosed and under treated. In this context, the current study was conducted to compare the efficacy of Alcaftadine 0.25%, Bepotastine Basilate 1.5% and Olopatadine hydrochloride 0.2% ophthalmic solutions in the treatment of allergic conjunctivitis at a tertiary level health care facility in the Sub-Himalayan region.

MATERIALS AND METHODS:

The present institution based descriptive observational study with perspective design was conducted at the Department of Ophthalmology of North Bengal Medical College and Hospital, Darjeeling. All the adult patients aged 18 years and above belonging to either gender, with mild-to-moderate allergic conjunctivitis presenting to outpatient department between April, 2020-March, 2021. A total of 120 patients calculated at a confidence level of 95%, randomized in three groups of 40 patients each with an allocation ratio of 1:1:1 using computer-generated random number sequence were included after obtaining written informed consent. After obtaining all the necessary

approvals and permission, each group was selected to be treated with twice a day Alcaftadine 0.25%, Bepotastine Basilate 1.5% and Olopatadine hydrocholoride 0.2% solutions on day 1 (visit 1/baseline). Complete general, physical, and ophthalmologic examination was done. Patients were examined and their baseline symptoms and signs (TOSS) were recorded.

Patients were asked to attend OPD for follow up at regular intervals on day 7 (visit 2) and day 14 (visit 3) after administering the study drugs with improvement of sign and symptoms. Resolution of sign and symptoms were noted using Total Ocular Scoring System (TOSS) and Hyperemic scale. The TOSS Score utilizes symptoms of Itching, tearing, redness and swelling and with the range of 0-6 indicate severity of allergic conjunctivitis. The score was calculated for each patient at the time of initial baseline visit and at subsequent follow-up.

Hyperemic scale classifies conjunctival hyperemia into five levels of severities:
None: Normal conjunctival vessels without engorgement (score-0);
Trace: Trace flush, reddish pink, minimally dilated blood vessels of slightly increased density with normal underlying sclera easily visible (score-1);
Mild: Mild flush, reddish pink, mildly increased density of dilated deep blood vessels and pink appearance of sclera (score-2);
Moderate: Bright red color, with significantly tortuous and engorged deep blood vessels and minimal white scleral tissue visible between (score-3);
Severe: Deep bright diffuse redness, dense network of engorged vessels and no normal white scleral tissue visible beneath (score4)

All the data were analyzed by Microsoft Excel and Statistical Package for Social Sciences (SPSS version 20) software. Descriptive analysis was done in the form of proportions for categorical variables and mean or median for continuous variable. Data were checked for normal distribution using tests for normality and comparison of TOSS and hyperemic scale scores between and within group at different time points was performed by ANOVA with repeated measure analysis with Bonferroni corrections or Kruskal-Wallis test accordingly; p value of less than 0.05 was considered statistically significant.

RESULTS:

In this present study 120 patients randomized into three groups as follows:
Group A (n=40): 0.25% Alcaftadine
Group B (n=40): 1.5% Bepotastine besilate
Group C (n=40): 0.2% Olopatadine

The mean age of the study population among Group A, B & C were 28.42±8.25 years, 30.42±8.79 years and 26.23±7.45 years respectively. In the current study, we found that among all the three group of patients, 18-30 years age group was the pre-dominant age group, followed by 31-50 years of age and 20% of the patients were above 50 years of age among all the groups; although, the difference in distribution of age among the group of patient was not statistically significant. Males were more among all the group of patients, which was also not statistically significant. Thus, the groups of patient were comparable in terms of baseline characteristics (Table 1).

The present study demonstrates that the mean TOSS score was similar among the three groups at baseline, which was not statistically significant. But, at subsequent follow up visit at 7 and 14 days, the mean TOSS score decreased significantly from baseline among all the three group of patients and the mean TOSS score reduced more among the patients receiving Topical 1.5% Bepotastine besilate eye drop, which was also statistically significant (Table 2 & Figure 1).

In this present study, we also found that at subsequent follow up visit at 7 and 14 days, the mean hyperemic scale score decreased significantly from baseline among all the three group of patients and the mean TOSS score reduced more at 7 days of follow up visit among the patients receiving Topical 1.5% Bepotastine besilate eye drop, which was also statistically significant (Table 3 & Figure 2).

DISCUSSION:

Allergic conjunctivitis is continuously becoming alarmingly prevalent condition significantly impacting the quality of life. Thus, it warrants a safe and effective treatment approach[10,11]. At present, there are multiple treatment options available; a combination of therapies is often utilized to treat the signs and symptoms of Allergic conjunctivitis. Nevertheless, these combinations often offer only suboptimal relief in the signs and symptoms, with the more potent treatment options posing a risk of harmful adverse drug effects. The present study was conducted among 120 patients randomized into three groups of 40 patients each in one group receiving topical eye drop of 0.25% Alcaftadine, 1.5% Bepotastine besilate and 0.2% Olopatadine to compare their efficacy in relieving signs and symptoms of allergic conjunctivitis.

Resolution of sign and symptoms were noted and compared among the three groups using Total Ocular Scoring System (TOSS) and Hyperemic scale score at baseline and subsequent follow-up visit of 7th & 14th day.

Table 1: Distribution of study subjects according to baseline characteristics among the groups

Baseline characteristics	Group A n (column %)	Group B n (column %)	Group C n (column %)	Chi square value, p value
Age (years)				5.74, 0.29
18-30	20 (50)	18 (45)	26 (65)	
31-50	12 (30)	14 (35)	06 (15)	
>50	08 (20)	12 (20)	08 (20)	
Sex				1.04. 0.59
Male	29 (72.5)	30 (75)	26 (65)	
Female	11 (27.5)	10 (25)	14 (35)	

Table 2: Distribution and association of mean (SD) TOSS score among the study subjects at different timeline of treatment

Timeline	Group A	Group B	Group C	p value
Baseline	7.82 (2.10)	7.71 (2.41)	7.69 (2.21)	0.961
Day 7	3.31 (1.12)	3.11 (1.32)	4.12 (1.1)	0.001
Day 14	0.61 (0.6)	0.51 (0.5)	0.91 (0.23)	0.001

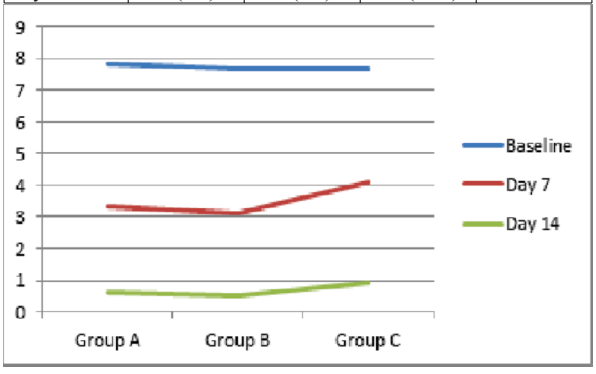

Figure 1: Distribution of mean (SD) TOSS score among the study subjects according to different timeline of treatment

Table 3: Distribution and association of mean (SD) hyperemic scale score among the study subjects at different timeline of treatment

Timeline	Group A	Group B	Group C	p value
Baseline	1.5 (0.77)	1.48 (0.81)	1.49 (0.80)	0.993
Day 7	0.6 (0.21)	0.52 (0.23)	0.71 (0.23)	0.001
Day 14	0.007 (0.06)	0.006 (0.07)	0.06 (0.12)	0.008

The present study, we observed that mean age of the study population among Group A, B & C were 28.42±8.25 years, 30.42±8.79 years and 26.23±7.45 years respectively and most of the patients belonged to the age group of 18-30 years. These findings of our study corroborates with the study done by Ayyappanavar S et al.[12], Rosario N et al.[4] and Thong BY et al[13].

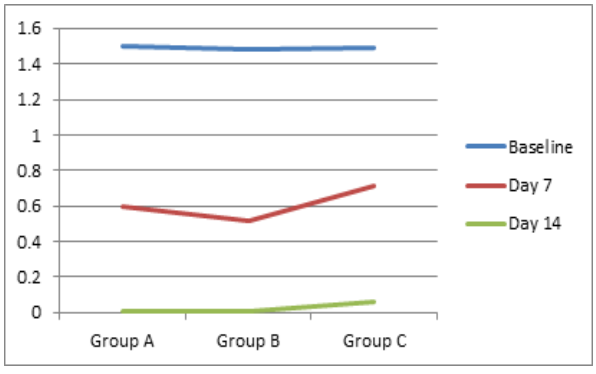

Figure 2: Distribution of mean (SD) hyperemic scale score among the study subjects according to different timeline of treatment

Male pre-dominance was found among all the three groups of patients, suggesting male gender susceptibility in Allergic conjunctivitis, which corresponds with the studies done by Kahol P et al.[14] in North India revealed higher prevalence of the disease in males (13.44%) than females (10.71%).

The present study observed that the mean TOSS score and mean hyperemic scale score decreased significantly from baseline among all the three group of patients and mean TOSS score decreased more significantly from baseline among the patients receiving topical 1.5% Bepotastine besilate eye drop. This finding of our study is in accordance with the study done by Dudeja et al. which proved equal efficacy of Olopatadine 0.1%, Bepotastine 1.5% and Alcaftadine 0.25% in resolution of symptoms in allergic conjunctivitis[15], Ajmani U et al[16]. Ayyappanavar S et al.[12] in their study "Comparative analysis of safety and efficacy of Alcaftadine 0.25%, Olopatadine hydrochloride 0.2% and Bepotastine besilate 1.5% in allergic conjunctivitis", reported that the total ocular symptom score (TOSS) showed a consistent decrease in subsequent visit in all the Groups and it was statistically significant, when compared from baseline to 14th day in all the groups. This finding is similar to our study finding. Studies done by McCabe et al.[9] and Manekar AV et al.[17] stated that Bepotastine provided better relief of ocular allergy symptoms and non-ocular symptoms associated with Allergic conjunctivitis compared to Olopatadine, which correspond to our study finding. Being a single centre institution based study, it somewhat limits the generalization of findings, therefore, the findings of the study would be more comparable and generalized if a multi-centric study design can be undertaken.

CONCLUSION:

All three topical ophthalmic medication used in the study is safe and effective in the treatment of allergic conjunctivitis. Our study showed that Alcaftadine and Bepostatine obtained better result in compare to Olopatadine in resolution of signs and symptoms in Allergic conjunctivitis, where Bepostatine had highest efficacy among the three drugs. Conjunctival hyperaemia decreased in all the three treatment groups but there was a significant reduction in Alcaftadine and Bepotastine groups at the follow up visit compared to Olopatadine. It can be used as an initial therapy in the symptom relief and alternative to the topical steroids used in mild-moderate allergic conjunctivitis.

Conflict of Interest-None to declare

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