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Original Research Article

Comparative study to evaluate efficacy and safety of topical alcaftadine 0.25% versus topical olopatadine 0.2% eye drops in patients with allergic conjunctivitis in a tertiary care teaching hospital, Haldwani

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ABSTRACT

Background: Ocular component is the most prominent and disabling feature of allergy leading to symptoms like itching and watering of eyes causing significant irritation· Allergic conjunctivitis (AC) is one of the most common ocular conditions affecting adult and pediatric patients that requires treatment by ophthalmologists. AC and its debilitating symptoms like itching, watering of eyes and ropy discharge have interfered their day to day activities, difficulty in concentrating in work and has adversely affect the quality of life. Aim and objectives were to study and compare the efficacy and safety profile of topical alcaftadine versus topical o lopatadine eye drops in patient with AC. To compare efficacy of topical alcaftadine versus topical olopatadine eye drops, to observe adverse drug reaction of both eye drops.
Methods: A prospective, open labelled comparative hospital based study was conducted in the department of ophthalmology in collaboration with department of pharmacology GMC Haldwani, Uttarakhand. Patients with AC (n=120) were randomised into two groups: Alcaftadine 0.25% eye drop and olopatadine 0.2% eye drop once daily. Patients were assessed on the first day 2nd week and 4th week. Reduction in total severity score and efficacy was measured in both treatment groups. Safety was assessed by observing adverse drug reaction using WHO UMC Causality assessment scale and modified Hartwig Siegel's severity scale.
Results: A trend in significant improvement in patients treated with alcaftadine eye drop in comparison to patients treated with olopatadine eye drop at both second week and fourth week follow up. No adverse effects were reported with either eye drops in both groups.
Conclusions: Alcaftadine eye drop showed higher efficacy than olopatadine eye drop in relieving signs and symptoms of AC. Both treatment groups were found to be safe and effective.

Keywords: AC, Alcaftadine, Olopatadine

INTRODUCTION

Ocular component is the most prominent and disabling feature of allergy leading to symptoms like itching and watering of eyes causing significant irritation. AC is one of the most common ocular conditions affecting adult and pediatric patients that requires treatment by ophthalmologists.[1] AC and its debilitating symptoms like itching, watering of eyes and ropy discharge have interfered their day-to-day activities, difficulty in concentrating in work and has adversely affect quality of life.[2]

Epidemiology

Prevalence of AC is surprisingly high and is the most common allergic disorder. Numerous reports indicate that incidence and prevalence of allergic conditions have

increased dramatically all over the world during past 40 years and continuously rising.[3,4] Studies in developed countries have reported that 14-40% of the population suffer from AC.[5-8] International study of asthma and allergy in childhood spanning 52 countries reported that AC affects 1.4-39.7% of children and adolescents.

Pathophysiology

Ocular itching is the hallmark symptom of AC is often accompanied by tearing, conjunctival redness, eyelid swelling, and chemosis.[9] Histamine release and activation of histamine H_1 receptors in the conjunctiva leads to ocular itching, while stimulation of H_2 receptors on the ocular surface results in vasodilation that is associated with ocular redness, eyelid swelling and chemosis.[10,11] Recent evidence suggests that histamine binding to and activation of H_4 receptors also play an important role in AC.[12,13] Topical ophthalmic antihistamines are the primary treatment options for AC advised by ophthalmologist around the world. In the United States, alcaftadine 0.25% and olopatadine 0.2% are approved once-daily ophthalmic solutions, and olopatadine 0.1% is an approved twice-daily ophthalmic solution for AC.[14-16] Both olopatadine and alcaftadine are classified as dual-action antiallergic agents, directly inhibiting histamine receptor activation and indirectly reducing allergic responses by stabilizing mast cells.[17]

Basic pharmacology of drugs opted for study

Olopatadine

Olopatadine is an H_1 receptor antagonist and mast cell mediator release inhibitor.[18] It's available as 0.1% formulation used twice daily, and 0.2 % and 0.7 % formulations, both used once daily. All preparations are well tolerated and there is virtually no systemic absorption after ocular application.[19]

Alcaftadine

Alcaftadine is a tricyclic piperidine aldehyde compound, metabolized to a carboxylic acid form in body. It has high affinity and specificity for H_1 and H_2 receptors and moderate affinity for the H_4 receptors. It's an inverse agonist of H_1, H_2 and H_4 receptors and also acts as mast cell stabilizer.[20] Thus, antihistaminic effect relieves the early phase and mast cell stabilization relieves the late phase of ocular allergic response.[21]

There are limited studies evaluating efficacy and safety of topical alcaftadine versus topical olopatadine and are mostly from the western countries. There is insufficient data in our country related to efficacy and safety profile studies topical alcaftadine versus topical olopatadine government medical college and associated Susheela Tiwari hospital is a large tertiary care, public and teaching hospital in Haldwani, Uttarakhand and has a high patient load. Random data shows many AC patients come here in ophthalmology department; hence the study was planned to evaluate efficacy and safety of topical alcaftadine versus topical olopatadine in this hospital.

Aim and objectives

Aim and objectives were to study and compare the efficacy and safety profile of topical alcaftadine versus topical olopatadine eye drops in patient with ac and to compare the efficacy of topical alcaftadine versus topical olopatadine eye drops, to observe the adverse drug reaction of both the eye drops.

METHODS

A prospective, open labelled comparative hospital-based study was conducted in the department of ophthalmology in collaboration with department of pharmacology GMC Haldwani, Uttarakhand. Clinical trial registration number was obtained with CTRI No: CTRI/2024/03/064161. Patients with AC (n=120) were randomised into two groups: Alcaftadine 0.25% eye drop and Olopatadine 0.2% eye drop once daily. Patients were assessed on the first day, 2nd week and 4th week. Reduction in total severity score and efficacy was measured in both treatment groups. Safety was assessed by observing adverse drug reaction using WHO UMC Causality assessment scale and Modified Hartwig Siegel's severity scale. Patients were randomized into two groups. Group A: Group A received topical alcaftadine 0.25% group B: Group B will receive topical olopatadine 0.2%.

Sample size

Total sample size calculated (n=120) i.e. n=60 subjects in each treatment group. Formula for sample size calculation for comparison between two groups when endpoint is qualitative were applied.[22]

Study intervention

The present study was conducted after getting approval from institutional ethical committee. Patients diagnosed with AC were enrolled to receive both eye drops (study medication).

After patient's enrolment they were informed about the risk, benefits and consent was taken from the patient for participating in this study.

Study duration

Duration of the study was twelve months (June-2023 to June -2024). Patients in two groups were assessed on the first day i.e. at the baseline, 2nd week and 4th week.

Inclusion criteria

Patient aged 5-20 years of age with history of AC presenting to OPD will be enrolled.

Exclusion criteria

Subjects undergone any ocular surgical intervention within three months, patients on steroid therapy, immunotherapeutic agents, patients using other topical eye drops (ocular lubricants), patients used any investigational medication within one month of the study, patients with known hypersensitivity to olopatadine and alcaftadine and pregnant and lactating women were excluded.

Clinical grading systems

Grading system for clinically classifying the patient into different cateogries,was structured with reference to suggested grading systems by dos Santos et al, Uchio et al and Atzin Robles-Contreras et al.[23-25]

Statistical analysis

Data were compared using student 't' test for quantitative data (severity score and reduction in severity score in both the treatment group) and Chi-square for qualitative data (no. of patient improved by either drug in mild and moderate category).

Results was expressed as mean±SD. P value was calculated, referring to the appropriate drug. P<0.05 was taken to indicate a significant difference.

Total severity score calculated at each visit and categorised as mild: 1-9, moderate: 10-18, and severe: 28-36**.**

Assessment parameters

Assessment parameters were as shown in the following Tables 1 and 2.

Table 1: Evaluation of grade of subjective symptoms and severity.

Symptoms	Score	Severity
Itching	3	Severity
	2	Severe
	1	Mild
	0	Moderate
Watering	3	No symptoms
	2	Severe
	1	Mild
	0	Moderate
Photophobia	3	No symptoms
	2	Severe
	1	Mild
	0	Moderate
Foreign body sensation	3	No symptoms
	2	Severe
	1	Mild
	0	Moderate
	0	No symptoms
Burning sensation	3	Severe
	2	Mild
	1	Moderate
	0	No symptoms

Table 2: Evaluation of grade of objective sign severity over slit lamp.

Grade/level	Mild	Moderate	Severe
Papillae	Micro <0.3 mm	Macro 0.3-0.5 mm	0.5-<1 mm
Conjunctiva	Hyperaemia	Hyperaemia+ partial swelling	Hyperaemia+ diffuse thin chemosis
Cornea	Sectoral SPKs	Diffuse SPKs	Erosion of epithelium
Limbus (Oedema)	<½ of limbal circumference	½ or >½ of limbal circumference	>½ of limbal circumference

RESULTS

Mean age of alcaftadine 0.25% treated group was 11±5.26 and that of olopatadine 0.2% treated group was 10.6±5.87 years. Numbers of males in alcaftadine treated group and olopatadine treated group were 48 and 46 respectively and number of females were 12 and 14 respectively.

Table 4 shows distribution of mean severity score for all patients in both treatment groups at the time of presentation and after 2nd and 4th week of treatment. Mean severity score at presentation in both alcaftadine and olopatadine group were comparable with no significant difference (p=0.874, statistically not significant). Both the drugs showed downward shift in mean severity score which was greater in alcaftadine treated group than in olopatadine treated group. In alcaftadine 0.25% treated group, at the time of presentation, mild cases were 0 (0%), moderate cases were (22) 36.6% and severe cases were (38) 63.3%. After 2nd week of treatment, moderate cases (22) 36.6% were improved to mild; and severe cases (38) 63.3% were improved to moderate. After 4th week of treatment, moderate cases (22) 36.6% all were recovered, severe cases (38) 63.3% were improved to mild category (32) 84.2%.

In olopatadine 0.2% treated group, at the time of presentation mild cases were 0 (0%), moderate case were 23 (38%), and severe cases were 37 (62%). After 2nd week of treatment, moderate cases 23 (38%), were improved to mild, and severe cases 37 (62%) improved to moderate After 4th week of treatment, moderate cases 23 (38%), 16 cases (69%) improved to mild, and severe cases 37 (62%) improved to mild category 29 (78 %).

Table 3: Patient demographic in two treatment groups: age and gender distribution.

Variables	Alcaftadine 0.25%	Olopatadine 0.2%	P value
Age (in years) (Mean±SD)	11±5.26	10.6±5.87	0.4091
Gender distribution (Mean±SD)	30±25.4	30±22.6	
Male	48	46	0.3722
Female	12	14	

Table 4: Mean severity score in both treatment groups.

Time of assessment	Olopatadine 0.2%, mean±SD	Alcaftadine 0.25%, mean±SD	P value
At time of presentation	2.61±0.49	2.63±0.48	0.874
2nd week	1.65± 0.48	1.5±0.50	0.718
4th week	0.98± 0.46	0.5±0.50	0.58

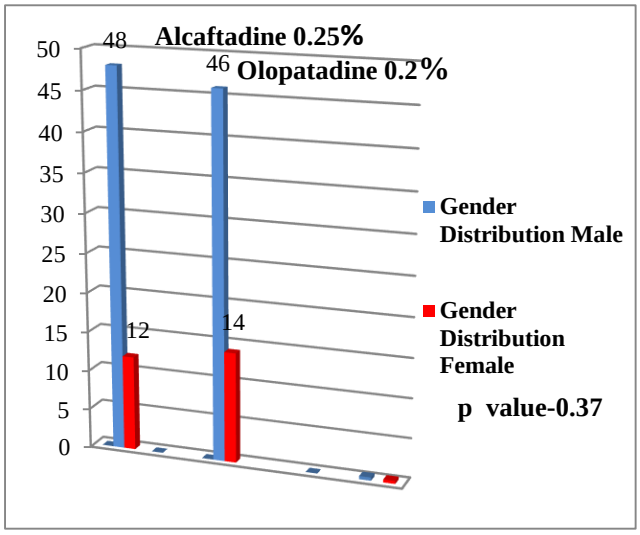

Figure 1: Gender distribution in two treatment group.

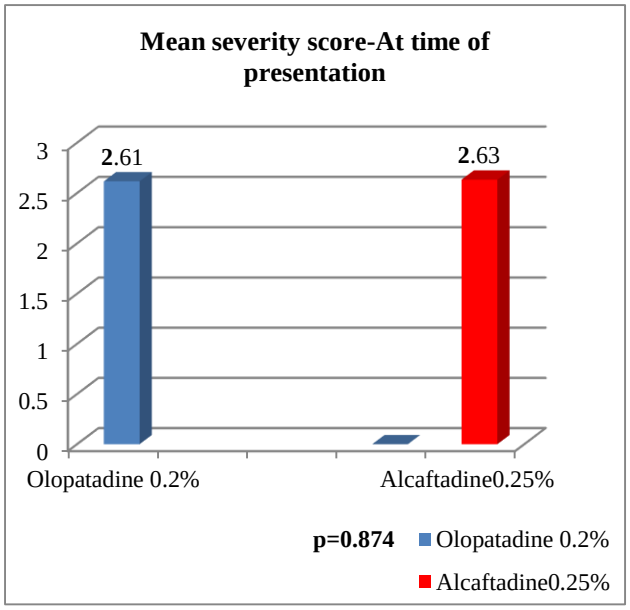

Figure 2: Mean severity score in both the treatment groups.

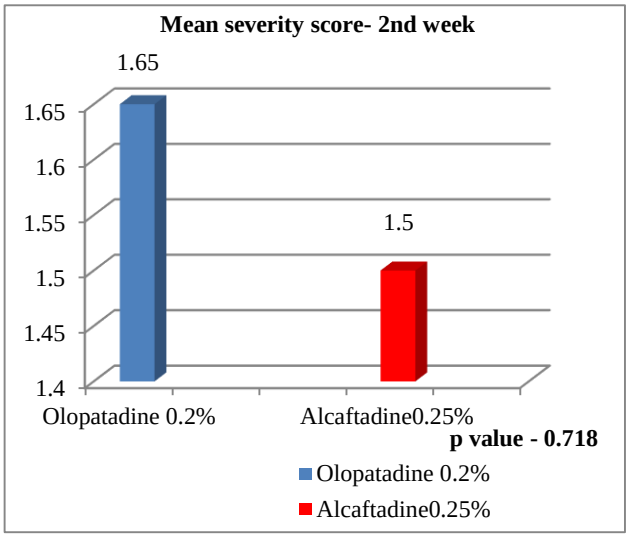

Figure 3: Mean severity score in both the treatment groups.

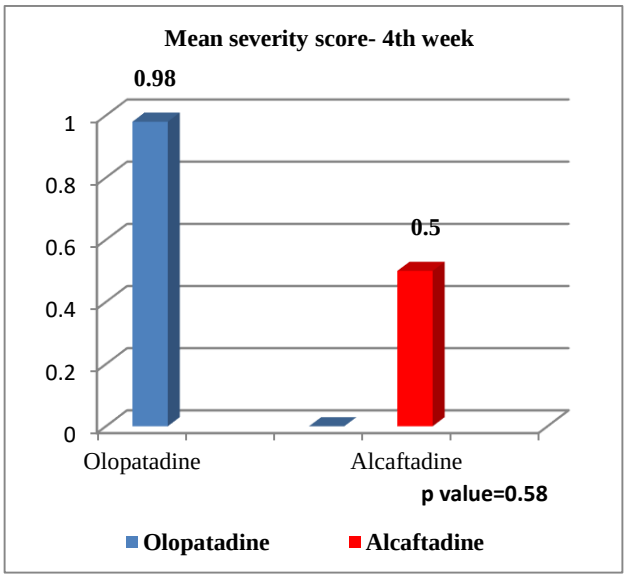

Figure 4: Mean severity score in both the treatment groups.

Table 5: Mean reduction severity score 2nd and 4th week in olopatadine group versus alcaftadine group.

Treatment group	At 2nd week, mean reduction±SD	At 4th week, mean reduction±SD
Olopatadine 0.2%	0.96±0.01	1.63±0.03
Alcaftadine 0.25%	1.13±0.02	2.13±0.02
P value	0.032	0.002

Table 5 shows mean reduction in severity scores achieved in both treatment groups at 2nd and 4th week of treatment. Mean reduction in severity score was higher in Alcaftadine treated group at both 2nd and 4th weeks post treatment and the difference were statistically significant, p=0.002 and 0.032 respectively.

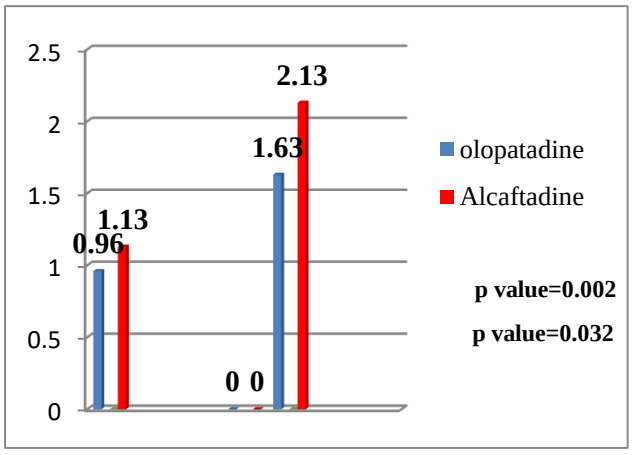

Figure 5: Mean reduction severity score 2nd and 4th week in olopatadine versus alcaftadine group

DISCUSSION

This study was based on total 120 patients, out of which 60 patients belonged to alcaftadine 0.25% treated group and 60 patients belonged to olopatadine 0.2% treated group. There was no significant difference among the groups alcaftadine 0.25 % and olopatadine 0.2% regarding mean age (11±5.26 vs 10.6±5.87; p=0.4091) and sex distribution p=0.3722. Mean severity score at presentation in both alcaftadine and olopatadine group were comparable with no significant difference (p=0.874, statistically not significant). Both the drugs showed downward shift in mean severity score which was greater in alcaftadine treated group than in olopatadine treated group. In alcaftadine 0.25% treated group, at the time of presentation, mild cases were 0 (0%), moderate cases were (22)36.6% and severe cases were (38) 63.3%. After 2nd week of treatment, moderate cases (22) 36.6% were improved to mild; and severe cases (38) 63.3% were improved to moderate. After 4th week of treatment, moderate cases (22) 36.6% all were recovered, severe cases (38) 63.3% were improved to mild category (32) 84.2%.

In olopatadine 0.2% treated group, at the time of presentation mild cases were 0 (0%), moderate cases were 23 (38%), and severe cases were 37 (62%). After 2nd week of treatment, moderate cases 23 (38%), were improved to mild, and severe cases 37 (62%) improved to moderate After 4th week of treatment, moderate cases 23 (38%), 16 cases (69%) improved to mild, and severe cases 37 (62%) improved to mild category 29 (78%). Mean reduction in severity scores achieved in both treatment groups at 2nd and 4th week of treatment. Mean reduction in severity score was higher in Alcaftadine treated group at both 2nd and 4th weeks post treatment and the difference were statistically significant, p=0.002 and 0.032 respectively as evident from Table 5. Ackerman et al showed better results with alcaftadine 0.25% than olopatadine 0.2% in relief of itching in ocular allergy. In a previous study, Greiner et al showed that alcaftadine had earlier onset of action than olopatadine and its effects were more sustained compared to olopatadine. As seen in previous studies on alcaftadine and olpatadine.[26,27] Treatment with both drugs were found to be safe and generally well tolerated, but with alcaftadine 0.25 % there was comparatively early alleviation of signs and symptoms of disease and effects were sustained.

Limitations

The primary limitation of the study was its shorter time period. Studies with longer follow up may reveal more insight into the long-term effects of both the drugs.

CONCLUSION

The result of the present study had shown that alcaftadine 0.25% eye drops showed higher efficacy than olopatadine 0.2% eye drops in revealing ocular signs and symptoms at both 2nd and 4th week follow up. These findings were statistically significant. Our study showed in alcaftadine 0.25% group there was comparatively early alleviation of signs and symptoms of disease compared to olopatadine 0.2% group. No adverse effects were observed during the entire course of study. Further studies including clinical use of these drugs are needed to substantiate the above mention findings of the present study. Both drugs were found to be safe and well tolerated.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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