

# Comparative Study Between The Effectiveness And Associated Adverse Effects Of Olopatadine And Alcaftadine When Used In Treating Allergic Conjunctivitis In A Tertiary Eye Care Centre Of Northern India

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## Abstract

**Background:** Since the last decade, there has been an exponential rise in the allergic disorders<sup>1</sup>. The highly prevalent ocular condition in clinical ophthalmology is ocular allergy. There are numerous factors contributing to its aetiology, including genetics, pollution of the air, exposure to the pets, etc. Since, a huge percentage of population requires the treatment of allergies, the treatment costs have increased<sup>3</sup>. Ocular conjunctivitis eventually causes blindness, if it remains untreated and unattended.

**Methods:** The study was an observer-masked, randomized, prospective, parallel-group study. Signs and symptoms were graded using Total Ocular Symptom Scoring System (TOSS). All patients aged between 18 and 60 years belonging to either gender, with mild-to-moderate allergic conjunctivitis presenting to outpatient department. The statistical analysis was done using software OPenEPI and SPSS version 20.

**Results:** Alcaftadine(0.25%) drops shows good final outcome with less adverse effects. Both the drugs are safe and effective in treating allergic conjunctivitis, but it was seen that alcaftadine appears to be superior to olopatadine (0.1%) in reducing the signs and symptoms associated allergic conjunctivitis.

**Conclusion:** Once daily alcaftadine 0.25 % eye drop showed better outcome than twice daily olopatadine 0.1 % eye drop in relieving symptoms of allergic conjunctivitis at both 1 week and 1 month follow up. Both eye drops were found to be safe and effective.

**Keywords:** Alcaftadine, Olopatadine, Allergic conjunctivitis.

## INTRODUCTION

Since the last decade, there has been an exponential rise in the allergic disorders<sup>1</sup>. The highly prevalent ocular condition in clinical ophthalmology is ocular allergy. There are numerous factors contributing to its aetiology, including genetics, pollution of the air, exposure to the pets, etc<sup>2</sup>. Since, a huge percentage of population requires the treatment of allergies, the treatment costs have increased<sup>3</sup>. Ocular conjunctivitis eventually causes blindness, if it remains untreated and unattended.

Allergic conjunctivitis comprises of perennial allergic conjunctivitis (PAC), seasonal allergic conjunctivitis (SAC), vernal keratoconjunctivitis (VKC), and atopic keratoconjunctivitis (AKC). SAC and PAC have different clinicopathological features from AKC and VKC. Still, both of them have common markers of allergy<sup>4</sup>. Ocular allergies constitutes of giant papillary conjunctivitis (GPC), which is being associated with contact lenses or ocular prosthesis. Still, it is not wise to consider them as culprit of actual allergic diseases, but they need to come to an immediate attention and be treated by ophthalmologists in association with experts of contact lenses<sup>5</sup>.

This disease is multifactorial in origin and the exact etiology remains unknown. However combination of factors like climatic changes, exposure to allergen, atopic dermatitis, genetic predisposition, and foreign bodies on the ocular surface like contact lenses, prostheses, cyanoacrylate glue and sutures may contribute to its prevalence. Recording the clinical

findings is the first step in diagnosing the cases of allergic conjunctivitis, but laboratory tests are usually used as an adjunct in supporting the diagnosis<sup>6</sup>. Skin testing is the other test that is helpful for determining specific allergens, which can be done by scratch tests or by injecting the allergen intra dermally. There is wide application of in-vitro tests for IgE antibodies for specific allergens. Intrinsic and extrinsic forms can be distinguished by allergic tests and this would further be helpful in the treatment<sup>7</sup>

The gold standard and the primary therapy is to avoid the allergen. The first line defence role is being played by artificial tears by inhibiting the portal of entry of foreign particles into the ocular surface. Anti-allergic medications including mast cell stabilizers, the antihistaminics and combination drugs may be used. The H<sub>1</sub> topical levocabastine hydrochloride is efficacious in reducing the inflammation of ocular surfaces on its topical administration to the eye<sup>8,9</sup>. These topical antihistaminics do not have any action on rest of the pro-inflammatory mediators and leukotrienes. Also their prolonged use can be irritating to the eyes<sup>10</sup>

### Alcaftadine

Preliminary data in the literature regarding alcaftadine [6, 11-dihydro-11-(1-methyl-4-piperidinylidene)-5H-imidazo [2, 1-b] [3] benzazepine-3-carboxaldehyde] have concluded that this drug has antihistamine properties various in vivo models. In guinea pig models, it showed alleviation of eosinophilic infiltration in allergic conjunctivitis<sup>28</sup>.

### Olopatadine

This compound is tricyclic consisting of various mechanisms of action against multiple allergic conditions. It is an antagonist for H<sub>1</sub> receptor and is also a mast cell stabilizer, having anti-inflammatory properties. Europe, Japan, and the United States have licensed the sale of Olopatadine as an ophthalmic solution.

## MATERIAL AND METHOD

The study was an observer-masked, randomized, prospective, parallel-group study conducted at the Department of Ophthalmology, at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, Haryana. We took an approval for the study from the institutional ethical committee. Clinical signs and symptoms were used to diagnose allergic conjunctivitis. Signs and symptoms were graded using Total Ocular Symptom Scoring System (TOSS). All patients aged between 18 and 60 years belonging to either gender, with mild-to-moderate allergic conjunctivitis presenting to outpatient department between 2021 and 2022 were included after obtaining written informed consent. Those patients satisfying the inclusion criteria will be recruited.

### Inclusion criteria

- Patients who were diagnosed clinically as allergic conjunctivitis.
- Both males and females
- Patients presenting with signs and symptoms of allergic conjunctivitis.
- Those who have signed the informed consent.
- Patients prepared to follow up all visits.

### Exclusion criteria

- Pregnant women who are nursing.
- Patients who have history of an ocular herpetic infection
- Patient who are on any other topical drug therapy for ocular pathology like blepharitis, meibomitis or dry eye.
- Patient who are on steroidal therapy
- Patients on antihistamines within 7 days prior the trial initiation
- Patients infected with bacterial, fungal, viral, and protozoan ocular infection.
- Subjects with contact lenses.
- Allergic to any of the study medications, that could affect safety or trial parameters.
- Scheduled to undergo any ocular surgery or refractive surgery during study period.

Each patient has signed a consent in their regional language before they were admitted to study. Patients' data was collected using a case proforma and by personal interview. Patients were filtered out according to the data provided. Once the patient was selected for the study, a detailed clinical history of the patients was carried including the duration of AC complaint. After detailed history was obtained, through clinical examination of the patients was carried out in accordance with the department procedures. Visual insight of the patients were tested using Snellen's chart. First patient was examined on torch light, then detailed examination was performed on slit lamp with and without lid eversion of both eyes. Focus of examination was on tarsal and bulbar conjunctiva, limbus and cornea. Upon assessment, the presence or absence of papillae were noted and if papillae are present then size of the papillae were measured. The conjunctiva were examined for presence of any hyperaemia, chemosis and scarring. The limbus were examined for the presence of any limbal oedema or tranta spots. Cornea was examined for presence of SPK, epithelial erosions, ulcers, or keratoconus. Finally, eyelids were then examined for position, oedema, margin, and discharge. All of the above findings were graded. The symptoms were recorded at 15 min, followed by 1 day, 1 week and subsequently at 1 month. Ocular findings were recorded at baseline, 1 week and 1 month. Total ocular symptom scoring system (TOSS) was assessed at baseline, day 0,7,14 and 21. The data collected was tabulated in Excel sheet and statistical analysis was done using software OPenEpi and SPSS

version 20. We applied “t” test for quantitative data and for qualitative data, we applied “Chi Square test”. P value was calculated and value <0.05 was considered significant.

## RESULT

The present study was done on 100 patients coming to Ophthalmology OPD who had allergic conjunctivitis. This 100 patients then were further divided into 2 groups randomly. Group I- 50 patients were treated with Olopatadine 0.1% eyedrops and Group II- 50 patients were treated with Alcaftadine 0.25% eyedrops. The mean age for I group was 41.0 years and for II group was 41.8 years. Total number of male in group I were 35 and 32 in group II and total number of female were 15 and 18 respectively. The present study shows that among group I majority were farmers and among group II majority were clerk. It was seen that most common symptom among both group was redness of eye, followed by watering and discharge etc. Majority of cases had past history of allergic conjunctivitis. Among all the family 10 cases and 12 cases had positive family history among group I and group II respectively. Mean systolic blood pressure was 126.4±6.4mm Hg in I group and 124.5±4.9 mm of Hg in II group. Mean diastolic blood pressure was 79.4±4.2mmHg in I group and 80.6±3.9 mm of Hg in II group. Mean random blood sugar was 189.2±33.2 and 1010.6±326.6 mm of Hg among group I and group II respectively. Table 1 and Table 2. Shows symptoms when on treatment for both group I and II where seen to be decreased on each follow up, but it was seen that group II showed rapid decrease as compared to group I. On ocular examination most common finding was presence of papillae followed by discharge etc. The signs when observed during ocular examination at follow up group II showed rapid decrease in findings as compared to group I. Table 3. shows Total ocular symptom score was less in group II, statistical significance was seen at 7<sup>th</sup> day, 14<sup>th</sup> day and 21<sup>st</sup> day. Statistical significance was seen for conjunctival hyperaemia score. The Visual acuity was decreased more in group I than group II. In present study, adverse effects were comparatively increased in group I than group II. Figure 1. shows final outcome group II patients were more satisfied than group I. p value 0.04 shows statistical significance.

**Table 1.** Symptoms when on treatment for group I

Symptoms	At 15 min	At 1 <sup>st</sup> day	At 1 <sup>st</sup> week	At 1 <sup>st</sup> month
Redness	45	43	42	41
Watering/ discharge	42	40	38	36
Foreign body sensation	40	38	36	35
Itching	35	33	32	32
Photophobia	32	28	26	25
Poor Overall comfort	18	15	15	14

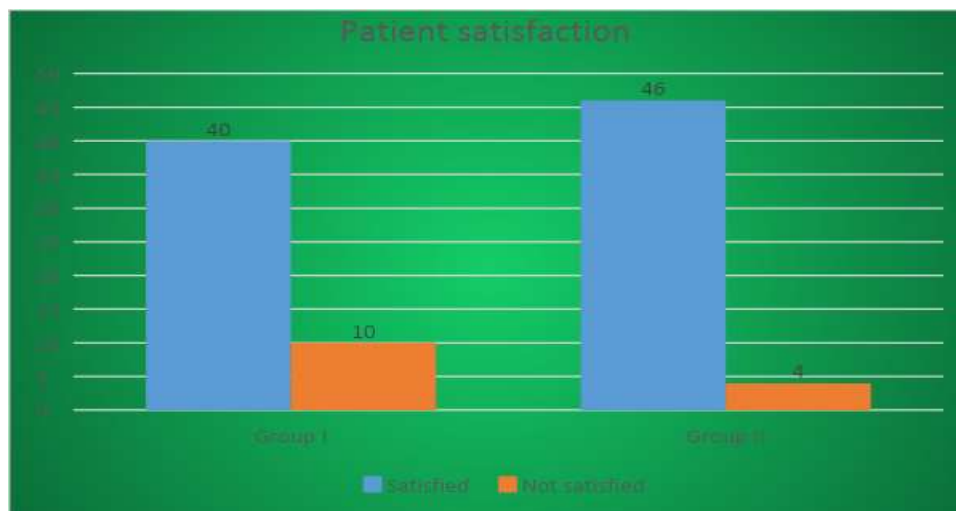
**Table 2.** Symptoms when on treatment for group II

Symptoms	At 15 min	At 1 <sup>st</sup> day	At 1 <sup>st</sup> week	At 1 <sup>st</sup> month
Redness	40	35	28	25
Watering/ discharge	38	32	25	16
Foreign body sensation	35	31	27	21
Itching	41	35	28	18
Photophobia	28	22	14	11
Poor Overall comfort	15	11	8	3

**Table 3.** Total ocular symptom score

Total ocular symptom score	Group I		Group II		P value
	The mean	SD	The mean	SD	
0 <sup>th</sup> day	8.1	0.93	7.9	1	0.2
7 <sup>th</sup> day	6.1	0.7	5.5	1.1	<0.001*
14 <sup>th</sup> day	3.6	0.9	2.7	0.8	<0.001*
21 <sup>st</sup> day	0.5	0.5	0.3	0.4	0.02*

**Figure 1.** Shows final outcome group II patients were more satisfied than group I. p value 0.04 shows statistical significance



## DISCUSSION

Present study shows age distribution where, among both group majority had age less than 30 years and average age for I group was 41.0 years and for II group was 41.8 years. Study by Sanjeev Kumar et al <sup>(128)</sup> showed that among all groups majority had age 30 or less than 30 years. Mean age was 29.3 years for alcaftadine and 29.45 years for olopatadine group. Study by Ayyappanavar S et al <sup>(133)</sup> showed that mean age in I group was 28.66 years and II group was 28.66 years. Hiroshi Nakatani et al <sup>(134)</sup> showed that mean age among I group was 33.2 years and II group was 38.7 years.

Present study shows that among I group majority were farmers and among II group majority were clerk. It was seen that most common symptom among both group was redness of eye, followed by watering and discharge etc. Sanjeev Kumar et al <sup>(128)</sup> had majority of males. Study by Ayyappanavar S et al <sup>(133)</sup> showed that majority were males among both groups. Even Hiroshi Nakatani et al <sup>(134)</sup> showed male preponderance. Present study showed majority of cases had past history among both groups. 10 cases had positive family history in I group and II group had 12 cases.

Study by Sanjeev Kumar et al <sup>(128)</sup> showed that as compared to olopatadine, alcaftadine is more beneficial for decreasing symptoms of allergic conjunctivitis, and showed statistical significance ( $p = 0.0007$ ). Donshik et al. <sup>(130)</sup> stated that all these three medications provided relief of allergic conjunctivitis symptoms. McLaurin EB, et al <sup>(132)</sup> also observed that patients on Alcaftadine presented with lesser mean itch than those on olopatadine. Present study showed total ocular symptom score was II group, statistical significance was seen at 7<sup>th</sup>, 14<sup>th</sup> and 21<sup>st</sup> day. Study by Sanjeev Kumar et al <sup>(128)</sup> showed that mean for I group was 8.41 and for II group was 8.25 and statistical significance was seen at 14<sup>th</sup> day. Study by Ayyappanavar S et al <sup>(133)</sup> showed that mean TOSS in I group was 7.68 and in II group was 7.65 and statistical significance was seen for 14<sup>th</sup> day. Present study showed statistical significance for conjunctival hyperaemia score and significant reduction was seen among alcaftadine group. Study by Sanjeev Kumar et al <sup>(128)</sup> showed that statistical significance was seen at 14<sup>th</sup> day, whereas present study showed for all follow up. Study by Ayyappanavar S et al <sup>(133)</sup> showed that statistical significance was not seen follow up. Hiroshi Nakatani et al <sup>(134)</sup> showed that low significance in patients treated with alcaftadine.

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