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ORIGINAL RESEARCH

Clinical effectiveness of olopatadine therapy in children with allergic conjunctivitis

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ABSTRACT

Background: Olopatadine hydrochloride is one of the most promising agents with a broad range of pharmacological effects. It has both antihistaminic and mast cell stabilizing properties. It is used in various allergic diseases, and its ophthalmic solution is used in allergic conjunctivitis. **Aims and Objectives:** To assess the clinical effectiveness of olopatadine therapy in children with allergic conjunctivitis. **Materials and Methods:** This was a prospective interventional study conducted to assess the clinical efficacy and safety of 0.2% olopatadine hydrochloride ophthalmic solution on 49 pediatric allergic conjunctivitis patients. 1-2 drops of the ophthalmic solution were administered once daily in each eye for 6 weeks. Scoring of redness, itching, watering, and photophobia was estimated at baseline, 2 week and 6 weeks. Adverse effects were noted at each visit if any. **Results:** The mean scores of redness, itching, watering, and photophobia were reduced after 2 weeks of treatment which was statistically significant ($P < 0.001$). **Conclusion:** Olopatadine hydrochloride 0.2% once daily administration was effective in reducing ocular signs and symptoms in allergic conjunctivitis in the pediatric population.

KEY WORDS: Olopatadine; Allergic Conjunctivitis; Children; Effectiveness

INTRODUCTION

Allergic conjunctivitis refers mainly to the type 1 hypersensitivity reactions involving conjunctiva. It is the second most common cause of ocular morbidity in India scoring almost 15-20% of cases attending ophthalmology clinics.[1] Allergic eye disease is also the leading cause of school absenteeism in children because of its distressful symptoms.[2,3] Thus, allergic conjunctivitis is an immunopathological reaction mediated by IgE.[4]

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Degranulation of conjunctival mast cells has a major role in ocular allergic disease, and thus, treatment should be concentrated on preventing it and also block histaminergic effects as histamine plays a primary mediator.[5]

Diagnosis is generally made through history and careful clinical observation. Since the presence of an antigen initiates the allergic cascade, avoidance of allergic antigen is the most important for all types of allergic diseases. The signs and symptoms of allergic conjunctivitis include conjunctival congestion (redness), chemosis, lid edema, ocular itching, discomfort, foreign body sensation, stinging, photophobia, and watering of eyes.

The pharmacologic agents that are available as ophthalmic solutions, used in the treatment of allergic conjunctivitis belong to diverse classes: (1) Antihistamines - which block H_1 receptors, e.g., levocabastine, azelastine, emedastine,

bepotastine, and alcaftadine; (2) Mast cell stabilizers - which increase the calcium influx to the mast cell and prevent changes in the membrane permeability resulting in the stability of membrane decreasing degranulation of mast cells,[6] e.g. sodium cromoglycate, nedocromil sodium, pemirolast, and lodoxamide; (3) Dual acting agents - they have both antihistaminic and mast cell stabilizing properties, e.g., olopatadine, ketotifen, azelastine, and epinastine; (4) Non-steroidal anti-inflammatory drugs, e.g., ketorolac, diclofenac, and flurbiprofen; (5) Corticosteroids, e.g., prednisolone, hydrocortisone, fluorometholone, loteprednol, and desonide. In severe cases, even immunomodulatory agents are used.[7]

Olopatadine hydrochloride is one of the most promising agents with a broad range of pharmacological effects. It has both antihistaminic and mast cell stabilizing properties. It revealed a higher affinity toward H_1 receptor compared to H_2 and H_3 histaminergic receptors and its selectivity toward H_1 receptor was superior to other ocular antihistamines such as ketotifen, pheniramine, and levocabastine.[8] Olopatadine is used in various allergic diseases, and its ophthalmic solution is used in allergic conjunctivitis. It is available for ophthalmic use as 0.1% solution used twice daily and recently 0.2% solution which has a longer duration of action is used as once daily dosing.[9]

There are many studies showing the effectiveness of olopatadine in the adult population. This study was conducted to evaluate the clinical efficacy and tolerability of olopatadine 0.2% ophthalmic solution administered twice daily in subjects aged <16 years suffering from allergic conjunctivitis.

MATERIALS AND METHODS

Study Design

This study was a prospective interventional study conducted in the Ophthalmic outpatient department, Father Muller Medical College Hospital, Mangalore, from December 2014 to April 2015. The study protocol was approved by the Institutional Ethics Committee.

Inclusion and Exclusion Criteria

All patients aged >4 years and <16 years with clinical diagnosis of allergic conjunctivitis with moderate to severe degree of clinical presentation were included in the study. Subjects with ocular disorders such as pterygium and dry eye were excluded from the study. Patients with known hypersensitivity to olopatadine including benzalkonium chloride which is used as preservative in the ophthalmic solutions were excluded. If the patient has used the study medication from 1 week before the start of the study and patients who were to discontinue contact lens during the study period were excluded. Pregnancy and lactation were also exclusion criteria of our study.

Method of Data Collection

A written informed parental consent and assent were taken from all the subjects who fulfilled the inclusion and exclusion criteria. Participant's demographic details and necessary medical and ocular details were taken at baseline. Enrolled subjects were prescribed olopatadine hydrochloride 0.2% ophthalmic solution once daily by ophthalmologists and were followed up for 6 weeks. The patient assessment was done at Visit 1 (at baseline), Visit 2 (at week 2), and Visit 3 (at week 6) during which they were examined for ocular signs and symptoms. The ocular signs assessed were conjunctival congestion, chemosis, lid edema using slit lamp biomicroscope that was graded according to the severity (Grade 0 - absent, Grade 1 - mild, Grade 2 - moderate, Grade 3 - severe) by the ophthalmologist; and ocular symptoms assessed were itching, discomfort, foreign body sensation, stinging, photophobia, and watering (Grade 0 - absent, Grade 1 - mild, Grade 2 - moderate, Grade 3-severe) by interviewing the patients. Adverse events were noted during subsequent Visits 2 and 3 if any.

Outcome Measures

The primary outcome measure was change from baseline (CFB) in the mean scores of itching and redness at 3rd Visit (week 3). The secondary outcome measures included CFB in mean scores of itching and redness at Visit 2 and treatment-related adverse events.

Statistical Analysis

Statistical analyses were performed using SPSS version 19.0. Values were expressed as mean ± SD. 95% significance level with $P < 0.05$ was taken as the level of significance. Wilcoxon signed rank test was done to see any significant difference between the scores of Visits 1-3.

RESULTS

The present study enrolled 49 subjects with the mean age of 8.6 (3.4) years with 16 female and 33 male subjects.

The mean scores of ocular signs and symptoms are tabulated in Table 1. The mean scores between baseline and at 6th week were statistically significant ($P < 0.001$). Thus, olopatadine was very effective in reducing the signs and symptoms of allergic conjunctivitis.

The CFB in the mean scores for itching at Visit 3 was 1.75 (0.81), and the CFB in the mean scores for conjunctival congestion at Visit 3 was 1.61 (0.87). The CFB scores at Visits 1 and 2 in terms of itching and redness are shown in Figure 1.

Table 1: Mean scores of ocular signs and symptoms at baseline, Visits 1 and 2

Variable	Olopatadine 0.2% OD		
	Baseline	Visit 1	Visit 2
Redness	2.57	0.84	0.51
Chemosis	0.33	0.06	0.04
Lid edema	0.29	0.04	0.00
Itching	2.71	0.71	0.27
Discomfort	1.98	0.14	0.06
Foreingn body sensation	2.31	0.08	0.02
Stinging	2.16	0.02	0.00
Photophobia	0.65	0.02	0.00

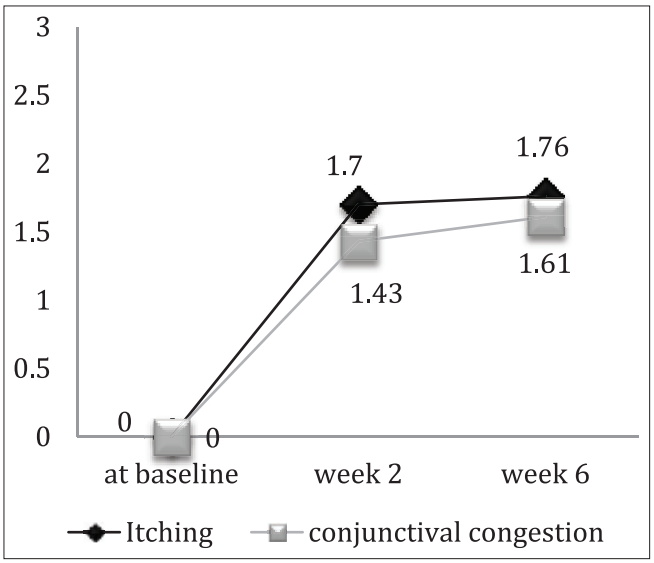

Figure 1: Change from baseline in the mean scores of itching and redness in the subjects

DISCUSSION

The efficacy of antihistamines in allergic conjunctivitis in adults has been evaluated using both placebo and active comparators, whereas in children studies are very few in Indian population. This study aimed at evaluating the effectiveness of olopatadine hydrochloride 0.2% ophthalmic solution applied once daily in pediatric subjects with allergic conjunctivitis.

According to our study results, olopatadine appeared significantly effective compared to baseline ($P < 0.001$) in allergic conjunctivitis. Thus, olopatadine is very effective in allergic conjunctivitis in children as it significantly reduced ocular signs and symptoms of allergic conjunctivitis from baseline. No adverse events were noted in the subjects. Many studies have compared 0.1% olopatadine administered twice a day; but in our study, we used recently recommended 0.2% ophthalmic solution of olopatadine which can be administered once daily as it improves the patient compliance specifically in children with allergic conjunctivitis.

In a study by Leonardi and Zafirakis, 100 patients with previous history and current ocular symptoms of allergic conjunctivitis were enrolled to understand the patient preference and 81% of the study subjects preferred olopatadine as they found it very effective in reducing signs and symptoms of allergic conjunctivitis.[5]

In the conjunctival allergen challenge studies, olopatadine 0.1% ophthalmic solution administered twice daily was more efficient than the comparator drugs, epinastine, and loteprednol etabonate 0.2% in decreasing the signs and symptoms of allergic conjunctivitis.[10,11] The efficacy of olopatadine 0.1% ophthalmic solution administered twice daily has been compared to once daily dose of olopatadine 0.2% in the prevention of ocular itching associated with allergic conjunctivitis over 24 h in a conjunctival allergen challenge model, did not show any significant difference between the two groups.[12] Olopatadine has a greater economic benefit over other drugs used to treat allergic conjunctivitis.[13]

The use of olopatadine in allergic conjunctivitis in children has no apparent risk of adverse events. Ophthalmologists and allergy specialists concerned with the treatment of moderate allergic conjunctivitis in children may consider olopatadine eye drops as the first choice to the control of ocular signs and symptoms of allergic conjunctivitis in children.

This study has few limitations as it had a small sample size and was conducted in a single center. There was no placebo control/active comparator group in the study. Further studies in children are recommended to know the superior efficacy of olopatadine over other agents used in allergic conjunctivitis.

CONCLUSION

Olopatadine hydrochloride 0.2% ophthalmic solution administered once daily is effective in providing good relief from the ocular signs and symptoms of allergic conjunctivitis in children.

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