Original Article

Comparative Evaluation of the Efficacy of Pharmacological Therapies in Allergic Rhinitis for Optimal Symptom Control and Improvement in Quality of Life

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Abstract

Background: Allergic rhinitis is a common chronic immunological disorder that significantly impairs quality of life. Multiple pharmacological therapies are available; however, comparative data on their efficacy in symptom control remain limited. The objective is to comparatively evaluate the efficacy of commonly used pharmacological therapies in allergic rhinitis for optimal symptom control and improvement in quality of life. **Material and Methods:** This prospective observational study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery at Terna Medical College and Hospital and NMMC Vashi from August 2013 to March 2015. A total of 120 patients with clinically diagnosed allergic rhinitis were randomly allocated into six groups (n = 20 each) to receive levocetirizine, desloratadine, mizolastine, intranasal azelastine, fluticasone propionate, or mometasone furoate. Patients were followed for 4 weeks with weekly assessments. Symptom severity scores, including nasal, ocular, functional, and emotional parameters, were recorded using a four-point scale. Statistical analysis was performed using ANOVA, Mann–Whitney U test, Wilcoxon rank-sum test, and Chi-square test, with $p \leq 0.05$ considered significant. **Results:** The majority of patients were in the 21–30 years' age group (46.7%), with a predominance of seasonal allergic rhinitis (71.7%). All treatment groups showed significant improvement in symptom scores ($p < 0.001$). Intranasal corticosteroids (fluticasone and mometasone) demonstrated the highest efficacy, achieving a 96% reduction in total symptom scores and were significantly superior to all other groups ($p < 0.001$). Intranasal azelastine was more effective than oral antihistamines (79% improvement). Among oral antihistamines, levocetirizine showed the greatest efficacy (77%). All medications were well tolerated, with only mild to moderate adverse effects reported. **Conclusion:** Intranasal corticosteroids are the most effective pharmacological agents for the management of allergic rhinitis and should be considered as first-line therapy. Intranasal azelastine is a better alternative to oral antihistamines, among which levocetirizine is the most effective.

Keywords: Allergic rhinitis; Intranasal corticosteroids; Antihistamines; Levocetirizine; Azelastine; Quality of life.

Received: 10 March 2026 **Revised: 25 March 2026** **Accepted: 07 April 2026** **Published: 07 April 2026**

Introduction

Allergic rhinitis is a highly prevalent chronic immunologic disorder characterized by inflammation of the nasal mucosa following exposure to allergens. It manifests clinically with symptoms such as rhinorrhea, nasal obstruction, sneezing, and nasal itching, which can significantly impair daily activities, sleep quality, and overall well-being. Owing to its chronic and recurrent nature, allergic rhinitis poses a considerable burden on both patients and healthcare systems.[1,2] A wide range of pharmacological agents is currently available for the management of allergic rhinitis, including antihistamines, intranasal corticosteroids, leukotriene receptor antagonists, and decongestants. These medications differ in their mechanisms of action, efficacy, safety profiles, and patient compliance. Despite the availability of multiple therapeutic options, achieving optimal symptom control and improving quality of life remain key challenges in clinical practice. It has major effect on health related quality of life. It is associated with development of squeal such as chronic rhinosinusitis, nasal polyp, serous otitis media, bronchial asthma, orthodontic problems and other ill effects of prolonged breathing, especially in children.3 Allergic rhinitis arises following an initial sensitization phase, in which allergens come in contact with nasal mucosa resulting in antibody (IgE) formation and development of atopy. Subsequently, depending upon the level of exposure and degree of sensitization, allergen can then triggers a humoral response, manifested by symptoms. There are three modalities of treatment—Allergen avoidance, Pharmacotherapy and Immunotherapy. Avoidance of allergen triggers is recommended as an important step in obtaining symptomatic relief but is often impractical. Therefore, symptomatic management by means of pharmacotherapy is required to some degree for every patient with allergic rhinitis.

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DOI:
10.21276/amit.2026.v13.i1.577

How to cite this article: Jain S. Comparative Evaluation of the Efficacy of Pharmacological Therapies in Allergic Rhinitis for Optimal Symptom Control and Improvement in Quality of Life. Acta Med Int. 2026;13(1):952-957.

Numerous types of drugs are available for this purpose and each has unique characteristics. The physician must tailor the regimen according to the patient symptoms and circumstances.[4] Even today, despite the advances in the understanding of the numerous chemical mediators of allergy, only two major categories of drugs are in common use for the management, namely antihistamines and corticosteroids. Antihistamines act to control the ―wet‖ symptoms of allergic rhinitis such as rhinorrhoea, sneezing and itching. Second generation or non-sedating antihistamines generally have multiple actions which often include direct effects on allergic mediators. Because they do not readily cross the blood-brain barrier, they either do not produce sedation or do so only in large doses. Their anticholinergic effects are much less pronounced and they are free of tachyphylaxis e.g. loratadine, cetirizine, desloratadine, levocetirizine, mizolastine. A third generation of antihistamines includes those that are used topically (e.g. livostin, azelastine) and ―designer‖ antihistamines that are metabolites and congeners of existing drugs with fewer potential side effects but increased effectiveness.[4] Fluticasone propionate and mometasone furoate are the most commonly used intranasal corticosteroids in the treatment of allergic rhinitis. They can all be administered once daily using a nasal spray and at recommended dosages that exhibit no major differences in the clinical efficacy or safety profiles in the treatment.[5,6] Currently, intranasal steroids represent the gold standard to which other treatments should be compared.[5] Therefore, a systematic assessment of the efficacy of commonly used drugs is essential to identify the most suitable therapeutic option for patients. Evaluating these treatments in terms of symptom relief and their impact on quality of life can aid clinicians in making evidence-based decisions and tailoring individualized treatment strategies for better patient outcomes.

Materials and Methods

Study Design and Setting: A prospective, time-bound observational study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery at Terna Medical College and Hospital, Nerul, Navi Mumbai, and its affiliated teaching hospital, NMMC Vashi, from August 2013 to March 2015.

Study Population: Patients attending the outpatient department (OPD) with clinical features suggestive of allergic rhinitis, including sneezing, nasal itching, watery nasal discharge (rhinorrhea), and nasal obstruction, were screened and enrolled in the study.

Inclusion Criteria

Patients of all age groups and both sexes presenting with classical symptoms of allergic rhinitis were included.

Exclusion Criteria

1. Structural nasal abnormalities such as gross deviated nasal septum, nasal polyps, or tumors
2. Requirement for surgical management
3. History of systemic/oral corticosteroid use within 30 days prior to enrollment
4. Use of any investigational drug within 30 days prior to study entry
5. Conditions or prior surgeries affecting gastrointestinal drug absorption
6. Known hypersensitivity to antihistamines, corticosteroids, or their formulations

Sample Size and Randomization

A total of 120 patients were included and randomly allocated into six groups (n = 20 per group). Each group received one of the following medications: levocetirizine, desloratadine, mizolastine, azelastine nasal spray, fluticasone propionate nasal spray, or mometasone furoate nasal spray.

Baseline evaluation included detailed history taking using a predesigned proforma and clinical examination. Baseline symptom scores were recorded prior to initiation of therapy. Patients were provided with diary cards to document daily symptoms and any adverse drug reactions throughout the study duration of 4 weeks. Patients were followed up weekly for four weeks. Treatment efficacy was assessed based on improvement in symptom severity scores.

At each visit, patients rated symptoms experienced over the preceding 7 days using a four-point ordinal scale:

- Nasal symptoms: sneezing, nasal itching, rhinorrhea, nasal obstruction
- Ocular symptoms: itching, watering, redness of eyes
- Functional impairment: frequent nose blowing, rubbing of nose/eyes, sleep disturbance, reduced work performance
- Emotional impact: irritability, frustration, restlessness, embarrassment

Only patients who completed all four follow-up visits were included in the final analysis.

Statistical Analysis: Data were analyzed using appropriate statistical methods. Continuous variables were expressed as mean ± standard deviation (SD) and range, while categorical variables were presented as frequencies and percentages. Comparisons among multiple groups were performed using analysis of variance (ANOVA), followed by the Mann–Whitney U test for pairwise comparisons. Within-group comparisons (pre- and post-treatment) were analyzed using the Wilcoxon rank-sum test. The Chi-square test was used for comparison of categorical variables. Non-parametric tests were applied due to the ordinal nature of symptom severity scores. A p-value of ≤ 0.05 was considered statistically significant.

Results

[Table 1] shows that the age group of patients in different groups of study. Each group mean age (years) is given, Highest 32.15 years mean age in group III and lowest 27.38 years in Group II and maximum up to 70 years of patients are given. But maximum 21 – 30 years of age group of patients is 46.7% and minimum is 2.5% in 61 – 70 years of age group.

[Table 2] shows the sex distribution of patients in different groups of study. In this study the total numbers of males were 61(50.8%) and females 59(49.2%). There were more number of males in Groups IC and II (65%) and more number of females in group IIIA (70%).86(71.7%) of subjects were suffering from seasonal allergic rhinitis and 34(28.3%) from perennial allergic rhinitis. Among the patients with seasonal allergic rhinitis

majority of the patients 36(41.9%) were symptomatic during winter season followed by rainy season 28(32.6%) and summer 22(25.6%).

Table 1: Age group distribution of Patients by Group

Age Group (years)	Group IA	Group IB	Group IC	Group II	Group IIIA	Group IIIB	Total	Percentage
≤ 20	3	2	3	2	3	2	15	12.5
21 – 30	10	6	10	12	9	9	56	46.7
31 – 40	5	8	4	2	4	7	30	25.0
41 – 50	1	4	1	2	2	1	11	9.2
51 – 60	1	0	1	1	1	1	5	4.2
61 – 70	0	0	1	1	1	0	3	2.5
TOTAL	20	20	20	20	20	20	120	100.0
MEAN	29.95	27.38	30.20	30.35	32.15	30.70	30.92	
RANGE	19 – 60	16 – 50	15 – 65	09 - 65	17 – 70	17 - 56	09 - 70	

Table 2: Sex wise distribution of Patients by Group

Sex	Group IA	Group IB	Group IC	Group II	Group IIIA	Group IIIB	Total	Percentage
Male	11	8	13	13	6	10	61	50.8%
Female	9	12	7	7	14	10	59	49.2%
TOTAL	20	20	20	20	20	20	120	100%

[Table 3] shows the family history of patients in different groups of patients. In this study 60(50%) had positive family history and 60(50%) had negative family history.

Table 3: Family history of Patients by Group

Family History	Group IA	Group IB	Group IC	Group II	Group IIIA	Group IIIB	TOTAL
Positive	12	9	7	11	10	11	60
Negative	8	11	13	9	10	9	60
Total	20	20	20	20	20	20	120

[Table 4] shows sneezing was present in all the subjects included in the study in all the groups. Fluticasone and mometasone were superior and effective in relieving the symptom in all the subjects of their groups. Followed by azelastine group (80%) and levocetirizine group (80%) respectively.

Table 4: Nasal Symptom (Sneezing) of Patients by Group (Using Wilcoxon Signed rank test for before and after symptoms)

Sneezing	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Present	20	4 (20%)	20	7 (35%)	20	8 (40%)	20	4 (20%)	20	0 (0%)	20	0 (0%)
Absent	0	16 (80%)	0	13 (65%)	0	12 (60%)	0	16 (80%)	0	20 (100%)	0	20 (100%)
P-value	0.000		0.000		0.005		0.000		0.000		0.000	
Significant at 5% level*	Yes		Yes		Yes		Yes		Yes		Yes	

*P – VALUE i.e., P < 0.05

Table 5: Nasal Symptom (Itching) of Patients by Group (Using Wilcoxon Signed rank test for before and after symptoms.

Itching	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Present	20	1 (5%)	20	5 (25%)	20	5 (25%)	20	3 (15%)	20	0	20	0
Absent	0	19 (95%)	0	15 (75%)	0	15 (75%)	0	17 (85%)	0	20 (100%)	0	20 (100%)
P-value	0.000		0.000		0.000		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

Itching in the nose was present in all the subjects included in the study in all the groups. Fluticasone and mometasone were superior and effective in relieving the symptom in all the subjects of their groups. Followed by levocetirizine group (95%) Azelastine group (85%) respectively. Intranasal steroids were superior to all other groups but significantly better when compared with desloratadine and mizolastine. (P < 0.05).

Table 6: Nasal Symptom (Rhinorrhoea) of Patients by Group (Using Wilcoxon Signed rank test for before and after symptoms)

Rhinorrhoea	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Present	20	5 (25%)	20	9 (45%)	20	7 (35%)	20	7 (35%)	20	1 (5%)	20	1 (5%)
Absent	0	15 (75%)	0	11 (55%)	0	13 (65%)	0	13 (65%)	0	19 (95%)	0	19 (95%)
P-value	0.000		0.001		0.000		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

Intra nasal steroids were effective in relieving the symptom in 95% followed by levocetirizine in 75%. Intranasal steroids were superior but significantly better when compared with desloratadine, mizolastine and azelastine (P<0.05).

Table 7: Nasal Symptom (Nasal Obstruction) of Patients by Group (Using Wilcoxon Signed rank test for before and after symptoms)

Nasal Obstruction	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Present	20	6 (30%)	20	6 (30%)	20	9 (45%)	20	7 (35%)	20	3 (15%)	20	6 (30%)
Absent	0	14 (70%)	0	14 (70%)	0	11 (55%)	0	13 (65%)	0	17 (85%)	0	14 (70%)
P-value	0.000		0.000		0.001		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

All the drugs were effective in relieving the symptom. Fluticasone relieved the symptom effectively in 85% followed by levocetirizine, desloratadine and mometasone in 70% respectively. However, there was no statically significant difference in between the groups compared.

Intra nasal steroids were effective in relieving the symptom in all the subjects of their group. Azelastine was effective in relieving the symptom in 85% followed by levocetirizine in 70%. Fluticasone and mometasone was effective in relieving the symptom in all the subjects followed by azelastine in 75%. Intranasal steroids were significantly superior (P < 0.05) when compared to antihistamines. Intra nasal steroids were effective in relieving the symptom in all the subjects of their groups. Azelastine was effective in relieving the symptom in 85% followed by levocetirizine in 75%. Intra nasal steroids were significantly superior (P<0.05) when compared to oral antihistamines.

Table 8: Practical Problems of Patients by Group (Using Paired t test for before and after symptoms)

Practical Problem	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Mean (SD)	9.55 (1.70)	2.55 (0.76)	9.20 (1.64)	2.75 (0.97)	8.85 (1.63)	2.85 (0.75)	9.10 (1.59)	2.20 (0.95)	8.70 (1.75)	0.45 (0.69)	8.65 (1.79)	0.55 (0.76)
Mean diff. (SD)	7.00 (1.62)		4.45(1.57)		6.00(1.45)		6.90(1.55)		8.25(1.89)		8.10(1.68)	
P-value	0.000		0.000		0.000		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

Table 9: Emotional Morbidity of Patients by Group (Using Paired t test for before and after symptoms)

Emotional Problem	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Mean(SD)	7.85 (1.42)	2.10 (0.55)	8.15 (1.66)	2.35 (0.75)	7.65 (1.69)	2.40 (0.60)	7.70 (1.72)	2.05 (0.39)	7.80 (1.54)	0.30 (0.47)	7.65 (1.63)	0.25 (0.44)
Mean diff.(SD)	5.75 (1.45)		5.80(1.54)		5.25(1.68)		5.65(1.66)		7.50(1.43)		7.40(1.67)	
P-value	0.000		0.000		0.000		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

All the drugs were effective in reducing the Emotional morbidity. However intranasal steroids were significantly superior (P< 0.01) when compared to antihistamines.

Table 10: Total Symptoms Score of Patients by Group (Using Paired t test for before and after symptoms)

Practical & Emotional Problem	Group IA		Group IB		Group IC		Group II		Group IIIA		Group IIIB	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Mean(SD)	27.70 (3.36)	6.35 (1.81)	27.80 (3.89)	7.50 (2.12)	26.75 (3.60)	7.85 (1.42)	27.70 (3.97)	5.85 (1.69)	26.55 (3.87)	0.95 (1.28)	26.40 (3.73)	1.15 (1.04)
Mean diff. (SD)	21.35 (3.90)		20.30 (3.40)		18.90 (3.81)		21.85 (3.45)		25.60 (3.82)		25.25 (3.61)	
Percentage	77%		73%		71%		79%		96%		96%	
P-value	0.000		0.000		0.000		0.000		0.000		0.000	
Significant at 5% level*	YES		YES		YES		YES		YES		YES	

*P – VALUE i.e., P < 0.05

All the treatment groups had comparable mean total symptom scores at baseline indicating similar severity of symptoms among all patients at the start of the study. All the drugs were effective in reducing the total symptom scores significantly (P< 0001). On comparison in between the groups it was found that intranasal steroids were significantly superior (P < 0.001) when compared to all other groups (oral and intranasal antihistamines).

Among the oral antihistamines (IA, IB & IC) levocetirizine was superior and significantly better (P <0.05) when compared to mizolastine. Intranasal Azelastine was superior to oral antihistamines (IA, IB, & IC) and significantly better

(P<0.01) when compared to mizolastine.

Table 11: Adverse Effects

Adverse effects	Group-IA	Group-IB	Group-IC	Group-II	Group-IIIA	Group-IIIB
Fatigue/ tiredness	2 (10%)	1 (5%)	2 (10%)	-	-	-
Headache	1 (5%)	2 (10%)	2 (10%)	-	1 (5%)	1 (5%)
Dry mouth	1 (5%)	2 (10%)	2 (10%)	-	-	-
Gastrointestinal upset (nausea, vomiting)	1 (5%)	2 (10%)	1 (5%)	-	-	-
Somnolence	1 (5%)	-	1 (5%)	3 (15%)	-	-
Nasal dryness	-	-	-	3 (15%)	2 (10%)	2 (10%)
Crusting	-	-	-	-	-	1 (5%)
Epistaxis	-	-	-	2 (10%)	2 (10%)	1 (5%)
Nasal septal perforation	-	-	-	-	-	-
Bitter taste	-	-	-	2 (10%)	-	-

All the adverse effects noted were mild-moderate. No patients withdrew because of adverse effects. Among the oral antihistamines most common adverse effects noted were fatigue /tiredness (10%), headache (10%), dry mouth (10%), nausea (10%) and somnolence (5%). In intranasal azelastine group adverse effects encountered were bitter taste (10%), nasal dryness (15%), somnolence (15%) and epistaxis (10%). Among intranasal corticosteroids incidence of adverse effects were comparable between the two drugs. Common adverse effects noted are nasal dryness (10%), epistaxis (10%), crusting (5%) and headache (5%).

Discussion

In our study there were more number of males in groups IC& II (65%) and more number of females in group IIIA (70%). However, allergic rhinitis per se does not differ in its presentation and clinical course between males and females. Hence this difference in sex does not affect the comparison of groups, who were selected after randomization.

In the present study to evaluate the efficacy of six drugs Levocetirizine, Desloratadine, Mizolastine, Azelastine nasal spray, Fluticasone nasal spray, and Mometasone nasal spray 120 subjects diagnosed to have allergic rhinitis were treated with one of the six drugs after randomization for four weeks.

Levocetirizine was effective in relieving the total symptom scores (nasal and non-nasal symptoms) significantly (P <0.001) in 77% of cases. This was in accordance with following studies. In a study conducted by Ciprandi G, Cirillo I, Vizzaccaro A, Tosca MA (2004),[6] it was found that levocetirizine treatment induced significant symptom relief (P = 0.0009) and improved nasal air flow (P = 0.038). In another study by Leynadier F, Mees K, Arendt C, Pinelli ME (2001),[4] levocetirizine was found to be significantly superior to placebo in reducing the mean total symptom score over the 2 weeks (P = 0.001). In another study by Klimek L and Hundorf I (2002),[8] on average, 80-90% of all patients with allergic disease were observed to be symptom free or have a marked improvement in symptoms at the final examination. In another study by Ciprandi G, Cirillo I, Vizzaccaro A, Tosca MA (2005),[9] it was found that levocetirizine treatment induced: significant symptom relief (p<0.001), improved nasal airflow (p<0.001), reduction of reversibility percentage (p<0.05), and increase of total airflow after decongestion test (p<0.03).

This result was in accordance with following studies. In a study conducted by Agrawal DK (2001),[10] it was found that clinically destoratadine effectively controls both nasal and non-nasal symptoms of seasonal allergic rhinitis including nasal congestion. In another study by Horak F, Stübner UP, Zieglmayer R, Harris AG (2002),[11] found that nasal obstruction, as measured by nasal airflow, was less severe with desloratadine than with placebo (P < 0.02). Individual and combined seasonal allergic rhinitis symptom severity scores, including nasal congestion and sneezing, were significantly lower with desloratadine than with placebo (all P < or = 0.003).

In this study mizolastine was effective in relieving the total symptom scores significantly (P < 0.001) in 71% of cases.

This result was compared favourably with following studies. In a study by Bachert C et al (2001),[12] showed that symptoms improved in 93% and decreased by at least 50% in 86% of patients, 78% reported improvement after the first drug intake and 51% from the firsthour. 69% considered mizolastine more effective than other antihistamines taken previously.

In our study azelastine nasal spray was effective in relieving the total symptom scores significantly (P< 0.001) in 79% of cases.

This result compared favourably with following studies. In a study conducted by Lassig W, Wober W et al (1996),[13] showed that all symptoms showed a statistically significant improvement at the final visit, as did the overall sums of the scores. These changes were clinically significant. Overall assessment of efficacy by the physicians and patients was very good and good in more than 85% of patients. 70% of patients required no concomitant medication.

In this study fluticasone nasal spray was effective in relieving the total symptom scores significantly (P <0.001) in 96% of cases. This result compared favourably with following studies.

In a study by Holm AF et al (1999),[14] fluticasone nasal spray group experience significantly less sneezing and nasal itching compared with placebo group. The total symptom score in fluticasone nasal spray group declined significantly in comparison with base line (P = 0.007) and placebo group(P=0.009).

In this study mometasone furoate nasal spray was effective in relieving the total symptom scores significantly (P<0.001) in 96% of cases. In a study by Hebert JR, Nolop K, Lutsky BN (1996),[15] demonstrated at the end of treatment, complete or marked relief was obtained in 77% of patients with mometasone furoate 100 micrograms/day and 79% with mometasone furoate 200 micrograms/day. It was concluded that mometasone furoate

adequately controls symptoms of moderate to severe seasonal allergic rhinitis, offers the advantage of once daily treatment and is well tolerated.

In our study Intranasal corticosteroids were significantly superior ($P < 0.01$) when compared with intranasal antihistamines. In a study by Berlin JM, Golden SJ, Teets S, Lehman EB, Lucas T, Craig TJ (2000),[16] the results demonstrated that topical nasal corticosteroid performed superiorly to the antihistamine nasal spray in improving sleep, day time sleepiness, sneezing, ocular and nasal pruritus, and nasal congestion.

Among oral antihistamines most common adverse effects noted in our study were fatigue/tiredness (10%), headache (10%), dry mouth (10%), nausea (10%) and somnolence (5%).

In a study by Klimek L, Hundorf I (2002),[8] the most common adverse effects noted were tiredness, headache, gastrointestinal complaints, dizziness and dry mouth. The drug levocetirizine showed good tolerability in 95% of cases.

A study by Berlin JM, Golden SJ, Teets S, Lehman EB, Lucus T, Craig TJ (2000),[16] reported adverse effects of azelastine as distinct bitter taste and sedation.

In our study common adverse effects noted in intranasal steroid groups were nasal dryness (10%), epistaxis (10%), crusting (5%) and headache (5%). All the adverse effects noted in our study were mild – moderate and no patient withdrew because of adverse effects.

Conclusion

Allergic rhinitis is one of the most common immunological disorders and represents a significant chronic health condition affecting a large proportion of the population. In the present study, the condition was observed to be more prevalent among younger individuals, with the majority of patients presenting with seasonal allergic rhinitis. Intranasal corticosteroids demonstrated significantly greater efficacy compared to all other treatment groups. Intranasal azelastine was found to be more effective than oral antihistamines. Among the oral antihistamines, levocetirizine showed superior clinical efficacy.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Paparella MM, Shumrick DA, editors. Otolaryngology.3rd ed: Philadelphia: W.B Saunder‘s company, 1991;1873-4.
2. Kaliner MA. Allergic Rhinitis. In: Mygind N, Naclerio RM, editors. Allergic and non-allergic rhinitis clinical aspects: Philadelphia: W.B. Saunders Company, 1993;153.
3. Durham SR. Mechanisms and treatment of allergic rhinitis. In: Kerr AG. ScottBrown‘s otolaryngology. 6th ed. Vol.4: Oxford: Butter worth. Heinemann, 1997;4/6/1-16.
4. Mabry RL. Allergic Rhinitis. In: Cummings CW, Fredrickson JM, Harker LA, Krause CJ, Schuller DE, Richardson MA, editors. Otolaryngology Head and Neck Surgery. 3rd ed; Missouri, USA: Mosby, 1998;902-8.
5. Naclerio RM, Mygind N. Intranasal Steroids. In: Mygind N, Naclerio RM, editors. Allergic and non-allergic rhinitis clinical aspects: Philadelphia: WB Saunder‘s company, 1993;114-22.
6. Ciprandi G. Cirillo I, Vizzaccaro A, Tosca MA. Levocetirizine improves nasal obstruction and modulates cytokine pattern in patients with seasonal allergic rhinitis: a pilot study. Clin Exp Allergy. 2004 Jun;34(6):958-64.
7. Leynadier F, Mees K, Arendt C, Pinelli ME. Efficacy and safety of Levocetirizine in seasonal allergic rhinitis. Acta Otorhinolaryngol Belg. 2001;55(4):305-12
8. Klimek L, Hundorf I. Levocetirizine in allergic diseases: an open multi centre practice study of efficacy and tolerability. Allergologie. 2002;25 (1st Suppl):S1-S7
9. Ciprandi G, Cirillo IG, Vizzaccaro A, Tosca MA. Levocetirizine improves nasal symptoms and airflow in patients with persistent allergic rhinitis: a pilot study. Eur Ann Allergy Clin Immunol. 2005 Jan;37(1):25-9.
10. Agrawal DK. Pharmacology and clinical efficacy of desloratadine as an antiallergic and anti-inflammatory drug. Expert Opin Investig Drugs. 2001 Mar;10(3):547-60.
11. Horak F, Stübner UP, Zieglmayer R, Harris AG. Effect of desloratadine versus placebo on nasal airflow and subjective measures of nasal obstruction in subjects with grass pollen-induced allergic rhinitis in an allergen-exposure unit. J Allergy Clin Immunol. 2002 Jun;109(6):956-61.
12. Bachert C, Vovolis V, Margari P, Murrieta –Aguttes M, Santoni JP. Mizolastine in the treatment of seasonal allergic rhinoconjunctivitis: a European clinical experience with 5408 patients managed in daily practice (PANEOS SAR study). Allergy. 2001 Jul;56(7):653-9.
13. Lasssig W, Wober W, Hoflich C, Bahre M, Roloff A. Topical therapy of allergic rhinitis in childhood: Allergodil (AZEP) nasal spray -- non-sedating in children. Curr Med Res Opin. 1996;13(7):391-5
14. Holm AF, Godthelp T, Fokkens WJ, Severijnen EA, Mulder PG, Vroom TM, Rijntjes E. Long-term effects of corticosteroid nasal spray on nasal inflammatory cells in patients with perennial allergic rhinitis. Clin Exp Allergy. 1999 Oct;29(10):1356-66
15. Hebert JR, Nolop K, Lutsky BN. Once–daily mometasone furoate aqueous nasal spray (Nasonex) in seasonal allergic rhinitis: an active and placebo-controlled study. Allergy. 1996 Aug;51(8):569-76.
16. Berlin JM, Golden SJ, Teets S, Lehman EB, Lucus T, Craig TJ. Efficacy of a steroid nasal spray compared with an antihistamine nasal spray in the treatment of perennial allergic rhinitis. J Am Osteopath Assoc. 2000 Jul;100(7 Suppl):S8-13.