

COMPARATIVE STUDY OF SECOND GENERATION ANTI HISTAMINE (Cetirizine Hydrochloride 10mg) ALONE VERSUS ANTIHISTAMINE IN COMBINATION WITH LEUKOTRIENE RECEPTOR ANTAGONISTS (Montelukast Sodium 10mg) IN THE TREATMENT OF ALLERGIC RHINITIS

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ABSTRACT

Background: Allergic rhinitis is an inflammatory disease of the nasal mucosa, induced by an immunoglobulin E-mediated reaction in allergen-sensitized subjects. Allergen avoidance and pharmacotherapy are the cornerstones of allergic rhinitis management. Pharmacotherapy is individualized to the patient based on type of symptoms, their duration and severity, co-morbidities, response to prior treatment and patient preference. Classes of drugs used to treat allergic rhinitis include antihistamines, corticosteroids, mast cell stabilizers, decongestants, nasal anticholinergics, and leukotriene-receptor antagonists.

Objective: The objective of the study was to compare the Second Generation Antihistamine (Cetirizine) alone versus Antihistamine with Leukotriene Receptor Antagonist-LTRA (Montelukast Sodium) in the treatment of Allergic Rhinitis AR.

Method: It was single blind hospital-based study in which 200 patients were included. The patients were divided into two equal groups (Group-A and Group-B). Group-A was treated with Cetirizine hydrochloride 10mg/day alone while Group-B was treated with Cetirizine hydrochloride 10mg/day along with Montelukast Sodium 10mg/day.

Results: Among 100 Group-A patients, 35.0% were 15-20 years old and among 100 Group-B patients, 34.0% were 15-20 years old. 57.0% Group-A and 55.0% Group-B patients had seasonal allergy. Among Group-A patients, 26.0% had nasal mucosa pale on revisit and 79.0% patients had any remarkable sedation with dispensed medicine. But among Group-B patients, only 5.0% had nasal mucosa pale and swollen on revisit and only 5.0% patients had any remarkable sedation with dispensed medicine.

Conclusion: Study concluded that combination of cetirizine hydrochloride 10mg/day & montelukast sodium 10mg/day is more efficacious in the treatment of allergic rhinitis than cetirizine hydrochloride 10mg/day alone.

Keywords: Allergic rhinitis, cetirizine, montelukast, second generation anti histamine, leukotriene receptor antagonist.

INTRODUCTION

When nasal mucous membranes in allergen-sensitized individuals are inflamed due to immunoglobulin E (IgE) mediated reaction, the inflammatory disorder is termed as allergic rhinitis (AR).^[1] Nasal pruritus and congestion, rhinorrhea, sneezing are characteristic features of AR frequently complementing 60-70% of AR patients with itching and redness of eyes.^[2] AR symptoms are often troublesome, though not life threatening they execute substantial load on public population and badly impact work and quality of life.^[3]

An estimated 20-30% of the adult population in the western world is affected by allergic rhinitis. According to some sources, 1 out of 5 children is sensitive to

inhalant common allergens. Others estimate to over 40% the number of children suffering from this condition.^[4] In a survey conducted in India showed that 20-30% of the population suffers from allergic rhinitis^[5] while survey conducted in Pakistan showed that 24.6% of the population suffers from allergic rhinitis.^[6]

Allergen avoidance and pharmacotherapy are the cornerstones of allergic rhinitis management. Pharmacotherapy is individualized to the patient based on type of symptoms, their duration and severity, co-morbidities, response to prior treatment and patient preference. Classes of drugs used to treat AR include antihistamines, corticosteroids, mast cell stabilizers,

decongestants, nasal anticholinergics, and leukotriene-receptor antagonists.^[7]

Cetirizine 10mg, an H₁ receptor antagonist, has quick absorption with peak plasma concentration of one hour, in allergic reaction prevents eosinophil chemotaxis (motion of cells towards the site of chemical stimulation) hence, diminishes the late-phase reaction (develops 8–12 hours after allergen exposure mediated by mast cells).^[8,9] Cetirizine 10mg is categorized as moderate tranquilizer, hence its use is not recommended in patients, like pilots, who are working with their cognitive expertise.^[10] It has been shown in several comparative studies that in management of perennial and seasonal AR, Cetirizine 10mg has enhanced efficacy than placebo. With one and sustained 6 weeks use of Cetirizine 10mg has remarkably enhanced QOL scores of normal, mental, emotional, physical and social health.^[10,11]

Montelukast Sodium 10mg is used as efficacious and well tolerated oral medication for pediatrics and adults in treating AR and asthma. Montelukast Sodium 10mg selectively antagonizes cysteinyl leukotriene 1 (CysLT1) receptor so it is classified as an leukotriene-receptor antagonist (LTRA). Leukotriene are the chemical mediators which are released largely by cells like macrophages, eosinophils, basophils and monocytes in response to the inflammation. Leukotriene biologically act by activating and binding specific receptors and are synthesized when arachidonic acid is broken down in cell membranes. These mediators have their vital role in AR and asthma as they enhance the permeability of human blood vessels, contract smooth muscle of human airway and chemotaxis. Hence, the use of Leukotriene-Receptor Antagonist LTRAs, like Montelukast Sodium 10mg is effective in treating AR and Asthma and this is proved by many studies.^[12]

Several medicines are available to treat the disease but Cetirizine 10mg and Montelukast Sodium 10mg are more effective. Hence, current study is carried out to compare of second generation antihistamine (Cetirizine 10mg) alone versus antihistamine with leukotriene receptor antagonist-LTRA (Montelukast Sodium 10mg sodium) in the treatment of allergic rhinitis.

MATERIAL AND METHODS

It was single blind hospital-based study in which 200 patients were included. The patients were divided into two equal groups (Group-A and Group-B). Each group consisted of 100 patients. Group-A was treated with Cetirizine hydrochloride 10mg/day alone while Group-B was treated with Cetirizine hydrochloride 10mg/day along with Montelukast Sodium 10mg/day. Data was collected through questionnaire, which was

entered into computer using SPSS version 19.0. Frequencies and percentages were calculated and data was presented in tables and figures. Confidentiality of data was ensured and proper consent was obtained before data collection.

RESULTS

Table-1 exhibits that among 100 patients of Group-A (treated with Cetirizine 10mg alone), 35(35.0%) were 15-20 years old, 16 (16.0%) were 21-30 years old, 19 (19.0%) patients were 31-40 years old, 14 (14.0%) were 41-50 years old and 16 (16.0%) patients were 51-60 years old. The mean age of the patients was 31.75 years. Among 100 patients of Group-B (treated with Cetirizine 10mg+Montelukast Sodium 10mg), 34 (34.0%) were 15-20 years old, 31 (31.0%) were 21-30 years old, 9 (9.0%) patients were 31-40 years old, 11 (11.0%) were 41-50 years old and 15 (15.0%) patients were 51-60 years old. The mean age of the patients was 29.60 years.

Figure-1 describes that among 100 Group-A patients, 55 (55.0%) were males and 45(45.0%) were female patients. Likewise among 100 Group-B patients, 55 (55.0%) were males and 45(45.0%) were female patients.

Table-2 states that among 100 Group-A patients, 57 (57.0%) had seasonal type of allergy while 43 (43.0%) had perennial allergy. Among 100 Group-B patients, 55 (55.0%) had seasonal allergy while 45 (45.0%) had perennial allergy.

Table-3 identifies that among Group-A patients, all (100.0%) had nasal mucosa pale and swollen, nasal turbinate swollen and watery nasal secretion present at the time of examination. Likewise all (100.0%) patients of Group-B had nasal mucosa pale and swollen, nasal turbinate swollen and watery nasal secretion present on examination.

Table-4 is about patients investigations and found that among Group-A patients, blood samples were drawn from 100(100.0%) patients for complete blood count and 94(94.0%) patients submitted back the report of CBC. 58 (58.0%) patients Eosinophil count were between 7-8% and 42 (42.0%) had between 9-10%. Among the patients, only 10 (10.0%) submitted the sample for IgE and the report was positive for all these patients. All (100.0%) patients submitted nasal secretion for nasal smear. According to report 90 (90.0%) patients had frequent eosinophils and 10 (10.0%) had very frequent eosinophils. Among Group-B patients, blood samples were drawn from 100 (100.0%) patients for complete blood count and 95 (95.0%) patients submitted back the report of CBC. 71(71.0%) patients Eosinophil count were between 7-8% and 29 (29.0%) had between 9-10%. Among the patients, only 15

(15.0%) submitted the sample for IgE and the report was positive for all these patients. 90 (90.0%) patients submitted nasal secretion for nasal smear. According to report 80 (88.9%) patients had frequent eosinophils and 11 (11.1%) had very frequent eosinophils.

Table-5 highlights that among 100 Group-A patients, 26 (26.0%) had nasal mucosa pale and swollen on revisit. None of the patients had nasal turbinate swollen. 79 (79.0%) patients had any remarkable sedation with dispensed medicine. Likewise among 100 Group-B patients, only 5 (5.0%) had nasal mucosa pale and swollen on revisit. None of the patients had nasal turbinate swollen. Only 5 (5.0%) patients had any remarkable sedation with dispensed medicine.

Table-6 affirms that among 100 Group-A patients, blood samples were drawn from 85(85.0%) patients for complete blood count on revisit. All (100.0%) patients had Eosinophil count between 1-6% on revisit. 65 (65.0%) patients submitted nasal secretion for nasal smear on revisit. According to report 60 (92.3%) patients had rare eosinophils and 5(7.7%) had rare to frequent eosinophils on revisit. Among the patients, only 10(10.0%) submitted the sample for IgE and the report was found negative for all these patients on revisit. Among 100 Group-B patients, blood samples were drawn from 95 (95.0%) patients for complete blood count on revisit. All (100.0%) patients had Eosinophil count between 1-6% on revisit. Only 5 (5.0%) patients submitted nasal secretion for nasal smear on revisit. According to report all 5 (100.0%) patients had rare eosinophils on revisit. Among the patients, 15(15.0%) submitted the sample for IgE and the report was found negative for all these patients on revisit.

Table-1: Age distribution

Age (yrs)	Group-A		Group-B	
	Freq.	%age	Freq.	%age
15-20	35	35.0	34	34.0
21-30	16	16.0	31	31.0
31-40	19	19.0	9	9.0
41-50	14	14.0	11	11.0
51-60	16	16.0	15	15.0
Total	100	100.0	100	100.0
Mean±SD	31.75±13.34		29.60±13.43	

Table-2: Type of allergy

	Group-A		Group-B		P-value
	Freq.	%age	Freq.	%age	
Seasonal	57	57.0	55	55.0	0.00
Perennial	43	43.0	45	45.0	
Total	100	100.0	100	100.0	

Table-3: Signs on examination

	Group-A		Group-B	
	Freq.	%age	Freq.	%age
Nasal mucosa pale and swollen				
Yes	100	100.0	100	100.0
No	0	0.0	0	0.0
Total	100	100.0	100	100.0
Nasal turbinate swollen				
Yes	100	100.0	100	100.0
No	0	0.0	0	0.0
Total	100	100.0	100	100.0
Watery nasal secretion present				
Yes	100	100.0	100	100.0
No	0	0.0	0	0.0
Total	100	100.0	100	100.0

Table-4: Investigation

	Group-A		Group-B		P-value
	Freq.	%age	Freq.	%age	
Blood sample drawn for complete blood count (CBC)					
Yes	100	100.0	100	100.0	
No	0	0.0	0	0.0	
Total	100	100.0	100	100.0	
Patient submitted back the report of CBC					
Yes	94	94.0	95	95.0	1.00
No	6	6.0	5	5.0	
Total	100	100.0	100	100.0	
Patient Eosinophil count					
1-6%	0	0.0	0	0.0	0.33
7-8%	58	58.0	71	71.0	
9-10%	42	42.0	29	29.0	
Total	100	100.0	100	100.0	
Patient submitted the sample for IgE					
Yes	10	10.0	15	15.0	0.28
No	90	90.0	85	85.0	
Total	100	100.0	100	100.0	
IgE report					
Positive	10	100.0	15	100.0	
Negative	0	0.0	0	0.0	
Total	10	100.0	15	100.0	
Patient submitted nasal secretion for nasal smear					
Yes	100	100.0	90	90.0	0.00
No	0	0.0	10	10.0	
Total	100	100.0	100	100.0	
Patient's nasal smear report					
Frequent eosinophils	90	90.0	80	88.9	0.00
Very frequent eosinophils	10	10.0	10	11.1	
Total	100	100.0	90	100.0	

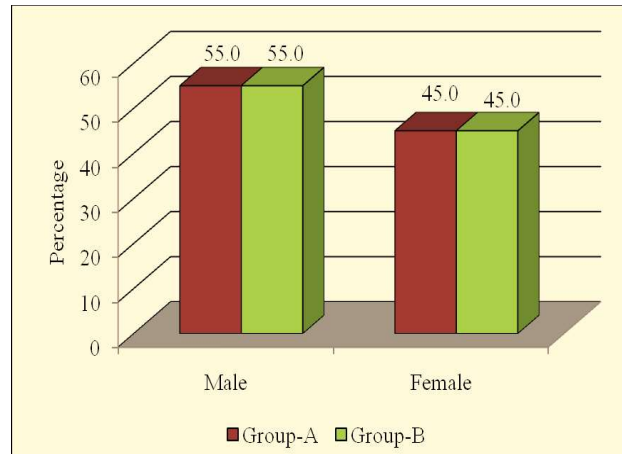


Figure-1: Gender distribution

Table-5: Signs on revisit

	Group-A		Group-B		P- value
	Freq.	%age	Freq.	%age	
Nasal mucosa pale and swollen					
Yes	26	26.0	5	5.0	0.00
No	74	74.0	95	95.0	
Total	100	100.0	100	100.0	
Nasal turbinate swollen					
Yes	0	0.0	0	0.0	0.00
No	100	100.0	100	100.0	
Total	100	100.0	100	100.0	
Any remarkable sedation with dispensed medicine					
Yes	79	79.0	5	5.0	0.00
No	21	21.0	95	95.0	
Total	100	100.0	100	100.0	

Table-6: Investigation on revisit

	Group-A		Group-B		P- value
	Freq.	%age	Freq.	%age	
Blood sample drawn for CBC					
Yes	85	85.0	95	95.0	0.01
No	15	15.0	5	5.0	
Total	100	100.0	100	100.0	
Patient Eosinophil count					
1-6%	100	100.0	100	100.0	0.00
>6%	0	0.0	0	0.0	
Total	100	100.0	100	100.0	
Patient submitted the sample for IgE					
Yes	10	10.0	15	15.0	0.28
No	90	90.0	85	85.0	
Total	100	100.0	100	100.0	
IgE report					
Positive	0	0.0	0	0.0	
Negative	10	100.0	15	100.0	
Total	10	100.0	15	100.0	

Patient submitted nasal secretion for nasal smear					
Yes	65	65.0	5	5.0	0.00
No	35	35.0	95	95.0	
Total	100	100.0	100	100.0	
Patient's nasal smear report					
Frequent eosinophil s	60	92.3	5	100.0	0.00
Very frequent eosinophil s	5	7.7	0	0.0	
Total	65	100.0	5	100.0	

DISCUSSION

Several medicines are available to treat the disease but Cetirizine 5mg to 10mg/day and Montelukast Sodium 10mg/day are more efficacious. Keeping in mind the efficacy of these medicines present study was carried out among Allergic Rhinitis patients visiting Lahore General Hospital Lahore and different clinics of Lahore. To acquire appropriate outcomes, total 200 patients were included in the study. These patients were divided into two equal groups (Group-A and Group-B). Each group was consisted on 100 patients. Group-A was treated with Cetirizine 10mg/day alone while Group-B was treated with Cetirizine 10mg/day along with Montelukast Sodium 10mg/day. Allergic rhinitis is prevalent among all age group people. Study revealed that most of the patients in both groups were upto 30 years old and remaining proportion was more than 30 years old. Dykewicz and colleagues (1998) asserted in their study that allergic rhinitis could occur among individuals in any part of life but mostly in 80% cases it develops by the age of 20 years.^[13]

Study revealed that in both groups, male were in majority as 55.0% patients were males and 45.0% patients were females. A similar study carried out by Pefura and coworkers (2015) confirmed that female patients were in majority (57.3%).^[14]

When the type of allergy was assessed among patients, study divulged that mainstream, 57.0% Group-A and 55.0% Group-B patients had seasonal allergy while remaining proportion in both groups had perennial allergy. During study patients were examined to ensure the signs of allergic rhinitis and to initiate treatment adequately. Study disclosed that all (100.0%) patients in both groups had nasal mucosa pale & swollen, nasal turbinate swollen and watery nasal secretion present. Gupta and Matreja (2010) pointed out in their study that through physical examination, patients can be diagnosed for pale and swollen nasal mucosa, nasal turbinate swollen and nasal secretion. A

complete history and physical examination are ample for initial diagnosis and to initiate treatment.^[15]

It is pertinent to mention here that for proper investigation, blood samples of all patients of both groups were drawn for complete blood count (CBC). 94.0% Group-A patients and 95.0% Group-B patients submitted back the report of CBC. Study revealed that none of the patients in both groups had normal Eosinophil count because range was between 7-10%. Immunoglobulin E is most effective method to assess the allergic rhinitis but study showed very discouraging results that only 10.0% Group-A patients and 15.0% Group-B patients submitted samples for IgE and their reports were positive. Study further identified that 100.0% Group-A patients and 90.0% Group-B patients submitted nasal secretion for nasal smear. Among Group-A patients, 90.0% had frequent eosinophil count and 10.0% had very frequent eosinophil count while among Group-B patients 88.9% had frequent eosinophil count and 11.1% had very frequent eosinophil count. A similar study undertaken by Kumar and collaborators (2014) confirmed that 67.2% patients had frequent eosinophil.^[16]

It is very encouraging to note that on revisit 26.0% Group-A and only 5.0% Group-B patients had nasal mucosa pale and swollen. Study further highlighted that 79.0% Group-A patients had sedation with dispensed medicine while among Group-B patients, sedation was observed in only 5.0% patients showing that Cetirizine 10mg/day+Montelukast Sodium 10mg/day are more effective to treat the patients with allergic rhinitis.

Study disclosed that on revisit, blood samples of 85.0% Group-A patients and 95.0% Group-B patients were drawn for complete blood count. It is significant to mention that on revisit, all patients in both groups had normal Eosinophil count i.e. between 1-6%. Likewise 60.0% Group-A patients and only 5.0% Group-B patients on revisit had rare eosinophils according to nasal smear report which confirmed further efficacy of Cetirizine 10mg/day+Montelukast Sodium 10mg/day. As immunoglobulin E is most effective method to assess the allergic rhinitis, study showed that 10.0% Group-A patients and 15.0% Group-B patients who submitted samples for IgE had their reports negative on revisit after treatment.

CONCLUSION

Study concluded that combination of Cetirizine hydrochloride 10mg/day & Montelukast sodium 10mg/day is more efficacious in the treatment of Allergic Rhinitis than Cetirizine hydrochloride 10mg/day alone.

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