Original Article

ALLERGIC RHINITIS: STEROIDS, ANTIHISTAMINES AND MUCOCILIARY CLEARANCE

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ABSTRACT

Introduction:
Allergic rhinitis is very common disease. The efficacy of topical steroid/oral H-1 antihistamine or combined therapy in allergic rhinitis is controversial.

Objectives:
To see the efficacy of topical steroid/oral H-1 antihistamine/combined therapy on nasal mucociliary clearance in allergic rhinitis.

Study design:
A comparative study.

Setting:
ENT Unit, Madina Teaching Hospital, Faisalabad (A tertiary care hospital).

Subjects:
Random sampling. Thirty six patients in total.

Intervention:
Saccharine with dye: India ink (Indigocarmine) application on anterior end of inferior turbinate to check mucociliary clearance.

Methods:
To assess changes in mucociliary clearance time before and after application of topical steroid alone, oral H-1 antihistamine alone and steroid and antihistamine together at fifteen days, one month and two month intervals.

Results:
Patients were tested for nasal mucociliary clearance. The results showed statistically significant difference ($P < 0.05$) in group I and III but the results were not significant in group II($P > 0.05$).

Conclusions:
1. Topical steroids positively modify the nasal mucosal environment in terms of mucociliary clearance.
2. More studies are required in different control conditions to study the longterm effects of steroids and antihistamines on nasal mucosa.

Keywords: Mucociliary clearance, topical steroids, saccharine, loratidine

INTRODUCTION

Allergic rhinitis is very common disease of young adults and affects approximately 15% of the population in UK[1] although its prevalence in Pakistan is not reliably known.

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The symptomology of allergic rhinitis is associated with impairment of mucociliary clearance.[2,3,4,5] The rhinodiarrhoea associated with exposure of antigen is well known entity.[3,4,6] Although antihistamine and topical steroids are used as 1st line treatment. The controversy still exists among physicians in rationale of usage of either. The effect of drugs on MCC is one of the standard objective methods to judge the efficacy of drug in allergic rhinitis.[7] The study aims to evaluate the efficacy of steroid used alone or in combination with antihistamines on control of

allergic rhinitis assessed objectively by improvement in MCC.

Objective:

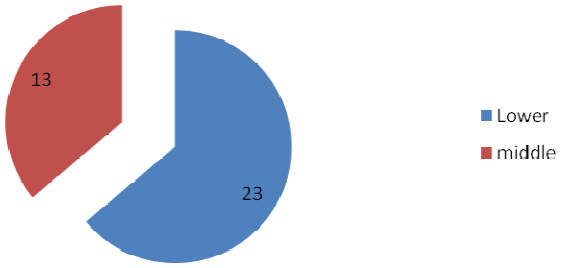
To see the efficacy of topical steroid/oral H-1 antihistamine/combined therapy on nasal mucociliary clearance in allergic rhinitis.

MATERIALS AND METHODS

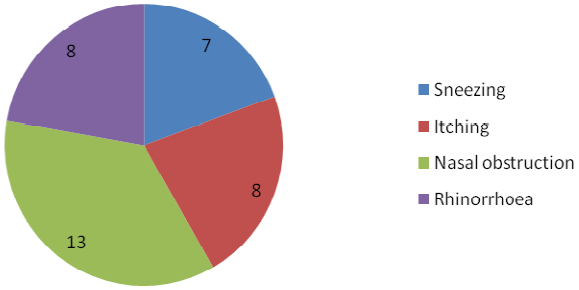
A comparative study of two month duration was conducted at Department of ENT Madina Teaching Hospital, Faisalabad (tertiary care unit) from February 1st to May 30th 2009. Thirty six patients of lower and middle class above 20 years of age both males and females having history of allergic rhinitis were included in study. Inclusion criteria were patients having history of allergic rhinitis with positive skin prick test and raised IgE levels. Exclusion criteria were concomitant asthma and history of any previous nasal surgery. Complete history and ENT examination was undertaken. The patients were randomly divided into three groups(group I receiving topical steroid-beclomethasone diproprionate, group II oral antihistamine-loratidine and group III receiving both) and mucociliary clearance time was assessed by application of saccharine mixed with indigocaramine 1cm behind the anterior end of inferior turbinate. The time taken until the patient tastes sweet/ change of colour in oropharynx just below the soft palate since its application was noticed by the examiner. The mucociliary clearance time was assessed before and at fifteen days, one month and two months interval after the application of beclomethasone diproprionate nasal spray (440 microgram/day), oral loratidine 10mg daily and combination of both. Data analysis will be performed using a commercial statistics program (statistical package for social sciences) computer program (SPSS, version 10.1, Chicago, IL).

RESULTS

Thirty six patients presented through outdoor. Fifteen out of thirty six (41.66%) were females and the rest (58.34%) were males. All of them were 20 years and above. Mean age of presentation was 25.46 years. All of them belong to lower or middle class of socioeconomic group. 36.11% belonged to middle class and 63.88% to lower class. All the patients were interviewed thoroughly for their history 19.44% presented with sneezing



Graph-I. Socioeconomic status



Graph-II. Major presenting complaints

as their major complaint, 22.22% with itching, 22.22% with rhinorrhoea and 36.11% with nasal obstruction. 83.3% had history of allergic rhinitis in one of their parents also. All the patients underwent full ENT examination. 69.44% had mild inferior turbinate hypertrophy and 30.5% had moderate hypertrophy. All of them also had mild hypertrophy of their middle turbinates. 66.66% had positive skin prick test for various allergens which are more prevalent in Faisalabad. All had total IgE count above 500mg/dl. Patients were randomly divided into three groups. Group I received topical nasal steroid–Beclomethasone diproprionate, group II received oral H-1 antihistamine–Loratidine and group III received both. Mucociliary clearance test with saccharine and dye (India ink) was performed in all before and at fifteen days, one and two month interval after the start of therapy. Rinoclenil (Beclomethasone diproprionate) nasal spray at a dose of 110 micrograms to each nostril twice a day was administered. Loratidine was given in a dose of 10 mg tablet daily. There were no drop outs in the follow up period. A significant difference was observed in nasal mucociliary clearance before and after steroid application ($P<0.05$) in group I and combination therapy group III but the difference was not significant in group II i.e. loratidine alone ($P>0.05$) (Table I, II, III), though the difference between group I and III was also not significant ($P>0.05$).

Table-I. Mucociliary clearance time in group-I

Patient No.	MCCT			
	0/M	**01/M**	**02/M**	**02/M**
1.	13.0 minutes	8.8 minutes	9.8 minutes	9.2 minutes
2.	13.4 minutes	9.8 minutes	9.1 minutes	9.4 minutes
3.	12.7 minutes	9.3 minutes	9.6 minutes	9.8 minutes
4.	14.0 minutes	9.2 minutes	9.4 minutes	9.1 minutes
5.	13.5 minutes	9.4 minutes	8.8 minutes	9.6 minutes
6.	12.7 minutes	9.8 minutes	8.3 minutes	8.8 minutes
7.	15.0 minutes	9.1 minutes	9.6 minutes	9.3 minutes
8.	14.2 minutes	9.1 minutes	9.6 minutes	9.2 minutes
9.	13.0 minutes	8.8 minutes	8.8 minutes	8.4 minutes
10.	11.7 minutes	9.8 minutes	9.3 minutes	8.8 minutes
11.	12.7 minutes	9.6 minutes	9.2 minutes	8.3 minutes
12.	15.0 minutes	8.8 minutes	8.4 minutes	8.6 minutes
Mean	13.40 minutes	9.29 minutes	9.15 minutes	9.04 minutes

Table-II. Mucociliary clearance time in group-II

Patient No.	MCCT			
	0/Month	**15/Days**	**01/Month**	**02/Month**
1.	12.5 minutes	10.5 minutes	11.9 minutes	11.9 minutes
2.	13.0 minutes	12.8 minutes	11.0 minutes	11.0 minutes
3.	13.0 minutes	11.1 minutes	11.6 minutes	11.6 minutes
4.	14.9 minutes	14.8 minutes	14.4 minutes	13.4 minutes
5.	13.4 minutes	11.9 minutes	10.9 minutes	11.9 minutes
6.	13.7 minutes	11.0 minutes	11.6 minutes	11.0 minutes
7.	12.2 minutes	11.6 minutes	12.2 minutes	11.6 minutes
8.	13.7 minutes	12.4 minutes	12.8 minutes	13.2minutes
9.	11.7 minutes	10.9 minutes	11.1 minutes	10.9 minutes
10.	12.7 minutes	10.6 minutes	10.4 minutes	10.6 minutes
11.	13.0 minutes	13.0 minutes	12.4 minutes	12.5 minutes
12.	14.2 minutes	12.2 minutes	12.9 minutes	12.8 minutes
Mean	13.16 minutes	11.9 minutes	11.93 minutes	11.86 minutes

Table-III. Mucociliary clearance time in group-III

Patient No.	MCCT			
	0/M	**15/D**	**01/M**	**02/M**
1.	14.0 minutes	9.1 minutes	8.8 minutes	9.9 minutes
2.	13.5 minutes	8.8 minutes	8.3 minutes	8.6 minutes
3.	12.7 minutes	9.8 minutes	9.6 minutes	9.3 minutes
4.	13.0 minutes	8.8 minutes	8.6 minutes	8.2 minutes
5.	18.3 minutes	9.8 minutes	9.9 minutes	9.1 minutes
6.	13.4 minutes	9.3 minutes	9.6 minutes	8.8 minutes
7.	13.7 minutes	9.1 minutes	9.3 minutes	9.8 minutes
8.	12.2 minutes	8.8 minutes	9.2 minutes	8.8 minutes
9.	15.0 minutes	8.9 minutes	9.4 minutes	8.8 minutes
10.	14.2 minutes	9.4 minutes	9.4 minutes	8.3 minutes
11.	12.5 minutes	9.9 minutes	9.0 minutes	9.4 minutes
12.	14.4 minutes	9.6 minutes	9.4 minutes	9.4 minutes
Mean	13.90 minutes	9.27 minutes	9.20 minutes	9.03 minutes

DISCUSSION

Topical steroids and antihistamines alone or in combination are being used in treatment of allergic rhinitis quite extensively for decades in both modern world and third world countries. The proponents of each group[8,9,10,11] claims the results in terms of symptom control. It has been a well established fact that MCC is adversely effected in allergic rhinitis.[3,4] The exposure of antigen leads to rhinodiarrhoea which impairs the mucociliary clearance[3,4,5] and makes the patient more prone to rhinisinusitis[12,13] and the improvement of MCC is associated with symptom control.[7,15] The present study aims on judging the results of effects of topical steroid/oral H-1 antihistamine used alone or in combination on MCC which is reliable objective method of measuring the response of drug on nasal mucosa. This study was done on 36 patients over a period of two months. The patients were divided in three groups. In group I topical steroid beclomethasone diproprionate nasal spray was given while in group II oral H-1 antihistamine loratidine 10mg daily and in group III both drugs were started together. The pre and post treatment MCC showed improvement in all three groups however in group II in which oral H-1 antihistamine loratidine alone was given the difference between pre and post treatment MCC was not significant ($P>0.05$). While MCC was significantly improved ($P<0.05$) in group I and III after one month of treatment. The improvement of MCC after fifteen days of topical steroids was also seen by Naclerio *et al*.[14] Lee and Genath[15] in a similar study noticed improvement in MCC with use of topical beclomethasone after eight weeks of treatment though that was not significant as compared to ours. They also noticed that group of patients receiving combination therapy of loratidine and beclomethasone or loratidine used alone has shown no improvement in MCC and concluded that combination therapy has no added advantage. The onset of improvement of MCC in our study was obvious after 15 days of topical steroid treatment suggesting that onset of action of steroids is quite early and we agree with Fokens *et al.*[16] and Scadding[17] that topical steroid nasal spray is quite effective and exerts its effects early and attain maximum effects in few weeks. The non significant difference ($P>0.05$) between group I and III in our study after 2 months of treatment suggests that combination therapy has no added advantage over topical steroid used alone and our results are similar to Lee and Genath[15] and Can D *et al.*[18] Thus we conclude that oral H-1 antihistamine given alone or in combination with topical steroid has got no added advantage over topical steroid given alone. In our study the group II and III patient has got somnolence in 5% of cases although this was not part of study and does not effect the out come of study as none of the patients discontinued the treatment due to somnolence as oral drug was shifted to night time in these patients without affecting the out come.

CONCLUSION

1. Topical steroids positively modify the nasal mucosal environment in terms of mucociliary clearance.
2. More studies are required in different control conditions to study the long-term effects of steroids and antihistamines on nasal mucosa.

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