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ENHANCED SYMPTOM RELIEF IN ALLERGIC RHINITIS THROUGH COMBINED CHEMICAL CAUTERY AND INTRANASAL STEROID THERAPY: A RANDOMIZED CONTROL STUDY

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Abstract

Introduction: Allergic rhinitis is a common condition affecting a significant portion of the population, leading to reduced quality of life and work performance. Traditional treatments often fall short of providing long-term relief, necessitating the exploration of alternative approaches such as chemical cautery of inferior turbinates. The study aims to evaluate the effectiveness of this approach in alleviating symptoms of allergic rhinitis. **Methodology and Research Design:** The study is a randomized controlled trial conducted at Saveetha Medical College and Hospital. Patients meeting specific criteria are divided into three groups 22 subjects in each: Group A receiving chemical cautery alone, Group B receiving steroid nasal spray alone, and Group C receiving a combination of both. Symptom severity is assessed before treatment and at 3-month and 6-month follow-ups. Statistical analysis is conducted using ANOVA, chi-square tests, and post hoc tests. **Results:** No significant differences are observed in age or gender distribution among the three groups. Before treatment, there are no significant differences in symptom severity among the groups. However, at the 6-month follow-up, significant improvements are seen in the combined treatment group C compared to the other two groups. Adverse effects are minimal, with pharyngitis being the most common complaint. **Discussion:** The combined approach of chemical cautery and steroid spray demonstrates superior efficacy in reducing symptoms of allergic rhinitis and inferior turbinate hypertrophy. This combined treatment offers promise for patients with higher initial symptom severity grades. Chemical cautery provides a viable alternative to surgical interventions, with minimal adverse effects. **Conclusion:** The study concludes that the combined treatment of chemical cautery of the inferior turbinate and steroid spray effectively alleviates symptoms of allergic rhinitis and inferior turbinate hypertrophy. This approach holds the potential for improving symptom control and quality of life in affected patients. The study provides valuable insights into a novel treatment approach for allergic rhinitis, paving the way for further research and clinical application.

INTRODUCTION

Allergic rhinitis stands out as the most prevalent form of chronic rhinitis, impacting 10-20% of the population. Severe allergic rhinitis has been linked to substantial declines in quality of life, sleep disturbances, and diminished work performance. Despite its prevalence, allergic rhinitis often goes underrecognized, misdiagnosed, and ineffectively treated, given the increasing global incidence and a rising number of individuals seeking medical advice for allergy-related symptoms. Typical manifestations of allergic rhinitis include nasal congestion, rhinorrhoea, sneezing, and nasal itching, along with ocular symptoms like redness, tearing, and itching[1]. Nearly half of allergic rhinitis patients endure symptoms for a minimum of four months annually.

Environmental irritant avoidance is a crucial aspect of management, it's often difficult to achieve in practice. Treatment options encompass both medical and surgical approaches[2,4]. Initially, medical treatments can alleviate nasal obstruction, but symptoms tend to recur in many cases. Nasal decongestants, effective for relieving

obstruction due to inferior turbinate hypertrophy, are limited in their long-term use due to the risk of rebound nasal congestion, known as rhinitis medica mentosa[2-4].

Chemical cauterization of inferior turbinate presents a straightforward method that can be easily implemented without anesthesia, often performed in outpatient settings. This method helps prevent complications such as crusting, bleeding, and pain commonly associated with surgical and electrocautery techniques. The middle portion of the inferior turbinate and adjacent areas of the septum is recognized as the "trigger area," stimulation of which can lead to symptoms like rhinorrhoea, sneezing, and nasal obstruction. Various studies have explored the effectiveness of chemical cautery, specifically using trichloroacetic acid, on inferior turbinate as a potential treatment for allergic rhinitis[2]. The present study aims to assess the efficacy of chemical cautery on inferior turbinate in patients experiencing moderate to severe allergic rhinitis, spanning both seasonal and perennial cases.

METHODOLOGY

The study will be initiated after clearance from the Institutional Ethics Committee of Saveetha Medical College and Hospital. The study design is a randomized controlled trial. The study population is the patients coming to the ENT department with symptoms of allergic rhinitis with inferior turbinate hypertrophy.

The inclusion criteria are patients with symptoms of allergic rhinitis, Patients with the symptom of nasal block with inferior turbinate hypertrophy, aged between 15 and 65 years.

Exclusion Criteria are the aged below 15 and above 65 years, non-allergic rhinitis, associated nasal co-morbidities like Nasal Polyposis, Sinusitis, Deviated Nasal Septum, Autoimmune disease of the nose, recent nasal surgery, or anatomic defects of the nose, patients with life-threatening/chronic asthma, chronic respiratory illnesses like bronchiectasis, pulmonary tuberculosis, and other obstructive airway diseases, pregnant women, smokers are excluded, two recent courses of parenteral steroids within three months of screening for allergic rhinitis.

Research Design: A total of 66 participants in the age range of 15 to 65 years will be considered for enrolment in the study. Include subjects diagnosed with allergic rhinitis with inferior turbinate hypertrophy divided into three groups 22 participants in each group A, B, and C. Pretreatment symptom severity grade score (Figure 1) will be recorded for those patients.

For group, A patients are to be treated with TCA chemical cautery of hypertrophied inferior turbinate. The nasal mucosa will be anesthetized with a cotton wick soaked in a 4% lignocaine solution. After 10 minutes, a cotton-tipped applicator dipped in 10% TCA solution will be kept in contact with the anterior and middle part of the hypertrophied inferior turbinate for one minute. A nasal speculum is to be used for visualization of the inferior turbinate. Four sessions of this procedure should be carried out at weekly intervals.

For Group B patients are to be treated with steroid nasal sprays containing 27.5 ug fluticasone furoate per dose (0.015% w/w), twice a day for three months. The use of the steroid spray should be demonstrated to all patients.

Group C patients are to be treated with four sessions of combined treatment with TCA cautery of the inferior turbinate and steroid nasal sprays for three months.

Post-treatment SSG scores are to be recorded in all three groups. Post-treatment SSG – symptom severity grade to be recorded in all three groups for all patients.

Statistical Analysis: The statistical analysis was carried out using the software SPSS version 19. The characteristics of the samples were summarized in terms of mean (standard deviation) for continuous variables and frequency(percentages) for categorical variables. ANOVA was used to compare symptom severity scores between three groups, followed by a post hoc test for multiple comparisons, whereas the chi-square test was performed to compare the differences in the proportion symptom severity grade between three groups. P value <0.05 was considered statistically significant.

Patient's name:				
Age/Gender:				
No	Question	Yes (A)	Sometimes (B)	No (C)
1	Do you get nasal obstruction			
2	Do you get sneezing			
3	Do you get watery or mucoid nasal secretions			
4	Do you have nasal pain			
5	Do you get redness, itching of eyes and epiphora			
6	Do you get post nasal drip			
7	Do you get nasal bleeding			
8	Do you get headache			
9	Do you smoke			
10	Does your symptoms make you angry			
11	Do your allergic symptoms interfere sleep			
12	Because of your nasal symptoms, do you feel desperate			
13	Because of nasal symptoms, do you find that you are often irritable			
14	Because of rhinorrhea, is it difficult for you to read			
15	Do your allergy symptoms interfere with ability to work at your job or go to school			
16	Do you feel that allergic rhinitis problem has placed stress on your relationships with members of your family and friends			
17	Do you feel that you have no control over your allergy			
18	Does your symptoms get worse when you are under stress			
19	Does your allergy make you feel insecure			
20	Because of your allergic symptoms, do you often feel tired			
21	Does your allergy make you feel anxious			
22	Does your nasal symptoms make it difficult to relax			
23	Does allergy causes you to avoid travelling			
24	Does the symptoms contributes to a feeling of general ill health			
25	Does your symptoms makes you panicky			
	Total	A x 4	B x 2	C x 0
	Total score= (Ax4) + (Bx2) + (Cx0)			

Grade	Score	Severity of allergic rhinitis with ITH
1	0-16	Slight
2	18-36	Mild
3	38-56	Moderate
4	58-76	Severe
5	78-100	Catastrophic

Figure 1: SSG questionnaire with the severity of the SSG scale

RESULTS

Table 1: Age and gender analysis of participants

	Group A (Mean ± S. D)	Group B (Mean ± S. D)	Group C (Mean ± S.D)	P value
Age	36.5±10.16	36.5 ± 12.42	38.77 ± 13.47	0.784
Gender				
Male	13(59.1%)	14(63.6%)	15(68.2%)	0.822
Female	9(40.9%)	8(36.4%)	7(31.8%)	

Table 2: Mean and standard deviation of Symptom severity grade Scores of all groups

Group	Symptoms severity grade Scores		
	Before Treatment (Mean ± S. D)	Post-treatment in 3rd month (Mean ± S. D)	Post-treatment at 6th month (Mean ± S. D)
Group A	52.50 ± 20.83	38.95 ± 19.95	35.41 ± 20.29
Group B	48.59 ± 18.9	41 ± 17.58	37.32 ± 17.27
Group C	53.14 ± 15.6	27.59 ± 14.53	16.77 ± 9.25
p-value	0.681	0.029	<0.001

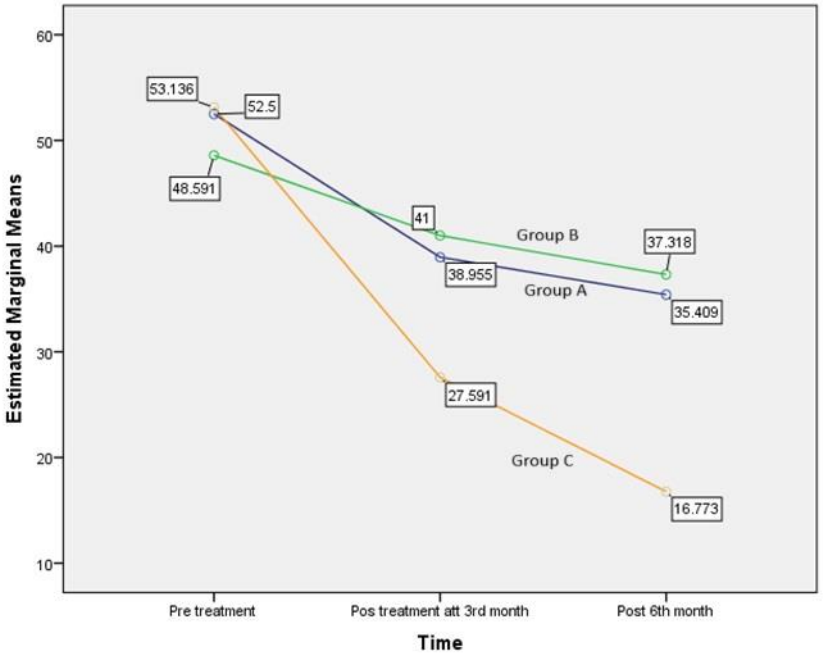
Table 3: Statistical comparison of three groups

Time			Mean Difference between the groups at different time points	p-value	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Before Treatment	Group A	Group B	3.909	1.000	-9.874	17.692
		Group C	-.636	1.000	-14.419	13.146
	Group B	Group C	-4.545	1.000	-18.328	9.237
Post-treatment in 3rd month	Group A	Group B	-2.045	1.000	-15.022	10.931
		Group C	11.364	.105	-1.613	24.340
	Group B	Group C	13.409*	.041	.432	26.386
Post-treatment at 6th month	Group A	Group B	-1.909	1.000	-13.990	10.172
		Group C	18.636*	.001	6.555	30.718
	Group B	Group C	20.545*	.000	8.464	32.627

Table 4: Results of the severity of allergic rhinitis at various time limits after treatment

Time points	Group	Symptom Severity Grade					p-value
		Slight	Mild	Moderate	Severe	Catastrophic	
Before Treatment	Group A	2(9.1%)	1(4.5%)	11(50%)	5(22.7%)	3(13.6%)	0.975
	Group B	3(13.6%)	1(4.5%)	11(50%)	6(27.3%)	1(4.5%)	
	Group C	1(4.5%)	1(4.5%)	12(54.5%)	6(27.3%)	2(9.1%)	
Post-treatment in 3rd month	Group A	4(18.2%)	7(31.8%)	7(31.8%)	2(9.1%)	2(9.1%)	0.109
	Group B	4(18.2%)	3(13.6%)	11(50%)	3(13.6%)	1(4.5%)	
	Group C	11(50%)	4(18.2%)	7(31.8%)	0(0%)	0(0%)	
Post-treatment at 6th month	Group A	4(18.2%)	7(31.8%)	7(31.8%)	3(13.6%)	1(4.5%)	0.004
	Group B	4(18.2%)	6(27.3%)	9(40.9%)	2(9.1%)	1(4.5%)	
	Group C	15(68.2%)	7(31.8%)	0(0%)	0(0%)	0(0%)	

FIGURE 2



The mean and standard deviation of the age of groups A, B, and C are 36.5±10.16, 36.5±12.42, and 38.77±13.47 respectively (table 1) with a p-value of 0.784, no statistically significant difference was found. Whereas in gender, there was male predominance among subjects, 42 out of 66 which is 63%, with females of 36%, with a p-value of 0.822, no statistically significant difference was found.

The mean and standard deviation of groups before, at 3rd month of treatment, and after 6 months of treatment are tabulated in Table 3, in which group C has a significant improvement in symptom severity grade score than group A and group B as shown in figure 2.

Before treatment, statistical analysis between groups A and C showed a chi-square value of 0.636 (with 1-degree freedom and 95% confidence interval) with a p-value of 1.00. The post hoc test shows p- the value of 0.993, no statistically significant difference was found (table 3). Statistical analysis between groups B and C showed a chi-square value of -4.545 (with 1-degree freedom and 95% confidence interval) with

a p-value of 1.00. The post hoc test shows a p-value of 0.698, no statistically significant difference was found.

Six months following treatment, SSG scores were documented (table 4), and statistical comparison between group A with C and group B with C showed significant differences. Group A with C shows a chi-square value of 18.636, (1 degree of freedom and 95% confidence interval) with a post hoc test p-value of 0.001, and groups B and C show a chi-square value of 20.545, (1 degree of freedom and 95% confidence interval) with post hoc test p-value 0.0009, a statistically significant difference was found.

Overall adverse effect incidence was 10.1%. The most common adverse effect was pharyngitis. There were no reports of dryness of the nose or epistaxis during the study. None of the patients refused cauterization and nasal pain did not persist for more than a few minutes.

DISCUSSION

Our findings indicate that the most significant benefit to patients was observed with a combined approach involving trichloroacetic acid (TCA) chemical cauterization of the inferior turbinate along with steroid nasal spray. At the six-month follow-up, 68.2% of patients receiving this combined treatment achieved Symptom Severity Grading (SSG) levels 1-2, demonstrating a notably superior outcome compared to those treated solely with chemical cauterization of the inferior turbinate (18.2%) or steroid spray alone (18.2%).

Intranasal glucocorticosteroids (INSs) are considered the most efficacious pharmacological therapy for allergic rhinitis and are recommended as first-line treatment by the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines. However, the prolonged use of steroid nasal sprays is often linked to side effects such as bleeding, drying, and crusting[4,5], they generally maintain a favorable safety profile. This is particularly evident with newer INSs (like ciclesonide, mometasone furoate, and fluticasone furoate), which exhibit systemic bioavailability below 1%. Sozen et al[5]. compared the beneficial outcomes of nasal steroid spray with radiofrequency ablation for inferior turbinate hypertrophy (ITH), suggesting that nasal steroids could serve as a viable treatment for this condition.

Surgical intervention for inferior turbinate hypertrophy (ITH) typically involves techniques such as surface cautery using an electrosurgical probe, laser, or cryoprobe. Electrosurgery or laser treatments can also be conducted submucosally. Turbinate resection may be partial or total, with post-operative nasal packing commonly performed using gauze containing antibiotic ointment for several days. However, excessive turbinectomy can result in irreversible drying of the nasal passages (atrophic rhinitis). Additionally, both resection and surface cautery procedures can lead to prolonged crusting and healing, typically spanning a four-to-six-week period[2,6].

Ten percent trichloroacetic acid (TCA) exerts a local astringent effect by coagulating albumin. Treatment with TCA appears to reduce the sensitivity and excitability of nasal mucous membranes, particularly in cases involving nasal obstruction and watery rhinorrhoea. This results in improved nasal airflow resistance and decreased post-treatment responses during nasal provocation testing[6]. Yao et al.[7] observed that topical application of TCA not only alleviates symptoms like rhinorrhoea and sneezing

but also reduces mucosal infiltration of T cells (Th2 type), responsible for allergic rhinitis symptoms. This suggests that TCA inhibits the migration of these cells via its local action[7].

CONCLUSION

The study findings suggest that a combined approach involving trichloroacetic acid (TCA) chemical cauterization of the inferior turbinate and steroid spray can effectively alleviate symptoms associated with allergic rhinitis (AR) and inferior turbinate hypertrophy (ITH). Specifically, individuals with higher initial symptom severity grade (SSG) levels may experience the most significant improvement in symptom severity grades through this combined treatment. This approach offers promise in managing nasal obstruction due to ITH in patients with AR, potentially leading to better symptom control and quality of life.

Declarations:

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All authors contributed to the research article. All authors read and approved the final manuscript.

Institute ethical committee approval was obtained to carry out this study.

Informed Consent was obtained from the patients for investigations used in this manuscript.

Competing Interests: Authors have declared that no competing interests exist.

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