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Original Research Article

A Clinical Study to Determine the Effectiveness of Surgery in Cases of Allergic Rhinitis Refractory to Medical Treatment

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Abstract:

Background: Allergic rhinitis is a chronic IgE-mediated condition characterized by sneezing, itching, nasal obstruction, and rhinorrhea. Despite conventional medical treatments, some patients remain symptomatic and require alternative therapeutic approaches. This study evaluates the efficacy of surgical intervention in patients with allergic rhinitis refractory to medical management.

Methods: This prospective clinical study was conducted over 18 months at Owaisi Hospital and Research Centre (OHRC) and Princess Esra Hospital (PEH). Fifty patients diagnosed with refractory allergic rhinitis were included. Patients underwent a detailed clinical assessment, including history, physical examination, and diagnostic nasal endoscopy. Symptom severity was scored using a self-assessment scale for sneezing, itching, nasal obstruction, and rhinorrhea. Patients initially received a combination of azelastine and fluticasone nasal sprays with a short course of oral prednisolone. Refractory cases underwent surgical management, including septoplasty, submucosal diathermy, and functional endoscopic sinus surgery (FESS). Postoperative follow-up was conducted at one and three months.

Results: The study population had a mean age of 27.1 years, with a slight female preponderance (56%). Deviated nasal septum was present in 58% of patients, while 50% had turbinate hypertrophy. The preoperative mean daytime nasal symptom score (DTNSS) was 8.76. Postoperative scores significantly improved, with mean DTNSS reducing to 3.24 at one month and 0.86 at three months ($p < 0.001$). Surgical interventions, particularly septoplasty, demonstrated substantial efficacy in reducing symptom severity and improving nasal function.

Conclusion: Surgical intervention is an effective treatment for allergic rhinitis refractory to medical therapy. Significant reductions in symptom severity and improvements in nasal patency post-surgery underscore the potential of septoplasty, submucosal diathermy, and FESS in providing long-term relief. These findings support the inclusion of surgical options in the management of refractory allergic rhinitis to enhance patient outcomes and quality of life.

Keywords: Allergic Rhinitis, Refractory Allergic Rhinitis, Septoplasty, Submucosal Diathermy, Functional Endoscopic Sinus Surgery, Nasal Obstruction, Surgical Management, Symptom Severity.

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Introduction

Allergic rhinitis is a chronic IgE-mediated hypersensitivity disorder of the nasal mucosa, presenting with sneezing, itching, watery nasal discharge, and nasal obstruction. This condition often extends to the paranasal sinuses, resulting in associated complications such as allergic conjunctivitis and bronchial asthma. [1]

Individuals with atopic predispositions develop allergic rhinitis upon exposure to common aeroallergens like dust mites, weeds, grasses, mold spores, cockroaches, and pets. [2] In certain instances, food allergens may provoke similar reactions, especially in children. The condition significantly impacts quality of life, leading to social embarrassment, decreased academic and occupational performance, and substantial morbidity. [3] The prevalence of allergic rhinitis varies widely, affecting 10% to 20% of the population, with a higher incidence in males and peaking in young adulthood.

Despite the known genetic predisposition to allergic diseases, specific loci linked to allergic rhinitis remain elusive. However, associations with particular HLA alleles have been noted, especially concerning dust and mite allergens. [4] Environmental allergens play a crucial role in allergic rhinitis. Occupational exposure to allergens, such as latex, can lead to rhinitis, asthma,

urticaria, and anaphylaxis. Additionally, occupational rhinitis often coincides with asthma, with symptoms improving during periods away from the workplace. [5] Recent evidence indicates an increasing prevalence of hay fever in Western countries, attributed to enhanced diagnostic measures and heightened environmental pollution, which augments nasal responsiveness to allergens. Pollutants like sulfur dioxide, nitrogen dioxide, and ozone, along with indoor irritants like cigarette smoke, exacerbate the condition by promoting IgE production through various mechanisms. [6]

The hypothesis that reduced exposure to infections in early childhood contributes to the development of atopic diseases has gained traction. Observations show a higher prevalence of allergic conditions in smaller, affluent families, particularly in developed nations. Improved sanitation, widespread immunization, and smaller family sizes reduce childhood infections, potentially diminishing the protective effect these infections confer against allergies. [7,8]

Complications of allergic rhinitis stem primarily from chronic nasal obstruction. This obstruction can disrupt sleep patterns, leading to fatigue, and plays a significant role in conditions such as hyposmia and sinusitis. Studies report a high concordance rate between allergic rhinitis and sinusitis, suggesting a causal relationship. [9]

Moreover, allergic rhinitis is frequently associated with nasal polyposis and has been implicated in the pathogenesis of middle ear disease. Research by Friedman et al. highlights the role of allergic reactions in eustachian tube dysfunction, with allergic mediators detected in the middle ear fluid of patients with otitis media with effusion (OME). [10]

Clinically, allergic rhinitis is defined by the presence of nasal discharge, sneezing, or nasal obstruction for more than one hour on most days, either seasonally or perennially. The hallmark symptoms—sneezing, pruritus, nasal obstruction, and watery nasal discharge—are particularly indicative of allergic rhinitis, with sneezing and pruritus being the most specific. Nasal obstruction, often refractory to standard medications, poses significant discomfort. [11]

Physical examination of patients typically reveals pale, boggy nasal mucosa and infraorbital congestion, known as allergic shiners. Additional findings may include polyps, septal deviation, or hypertrophic nasal turbinates. A thorough endoscopic otolaryngological examination, along with general examination including skin and chest assessments, is essential for accurate diagnosis. [12]

While conservative management—comprising allergen avoidance, pharmacotherapy, and immunotherapy—suffices for most patients, a subset remains refractory to these treatments. For these individuals, surgical intervention becomes necessary to enhance nasal patency and mitigate allergic responses, providing significant relief and improving overall quality of life. This study aims to evaluate the clinical efficacy of surgical intervention in patients with allergic rhinitis unresponsive to medical treatment.

Materials and Methods

Study Design: This was a prospective clinical study conducted over 18 months, from January 2021 to June 2022, at Owaisi Hospital and Research Centre (OHRC) and Princess Esra Hospital (PEH), affiliated with Deccan College of Medical Sciences.

Study Population: The study included all patients attending the ENT outpatient department during the study period who were diagnosed with refractory allergic rhinitis.

Inclusion Criteria

1. Patients aged 12 years and older with allergic rhinitis refractory to medical treatment.
2. Patients who provided informed consent for participation.

Exclusion Criteria

1. Pregnant females.
2. Patients with mild symptoms.
3. Patients with bronchial asthma or lower respiratory tract infections (LRTIs).
4. Patients who did not consent to the study.

Data Collection: A detailed history was obtained from all patients, including associated ENT complaints, known allergens, dietary habits, skin allergies, bronchial asthma, family history, drug history, and occupational history.

Symptom severity was self-assessed on a scale of 0-3 for sneezing, itching, nasal obstruction, and rhinorrhea.

- Grade 0: No symptoms
- Grade 1: Mild symptoms (do not interfere with daily activities or sleep)
- Grade 2: Moderate symptoms (interfere with daily activities or sleep)
- Grade 3: Severe symptoms (significantly impair function or sleep)

Clinical Examination: Informed consent was obtained, followed by a comprehensive clinical examination, including:

- General examination for skin atopy (urticaria or eczema) and allergic conjunctivitis.

- ENT examination for external signs (allergic salute and shiners), nasal mucosa evaluation (pale/bluish discoloration, edema, mucoid secretions), and structural abnormalities (turbinate hypertrophy, deviated septum, polyps, or masses).
- Ear examination for otitis media with effusion.
- Systemic examination focusing on respiratory signs of bronchial asthma.
- Diagnostic nasal endoscopy using the Lund & Mackay scoring system for polyps, edema, and nasal secretions.

Investigations: Necessary investigations, including NCCT-PNS for nasal polyposis, were performed as part of the preoperative workup.

Treatment Protocol: Patients initially received a combination of azelastine nasal spray, fluticasone nasal spray, and a short course of oral prednisolone. Follow-up was conducted monthly for three months:

- Responders: Patients with mild persistent symptoms at the end of three months.
- Refractory: Patients with moderate-severe persistent symptoms underwent surgical management based on anatomical abnormalities:
- Submucosal diathermy for inferior turbinate hypertrophy.
- Septoplasty for deviated nasal septum.
- Functional endoscopic sinus surgery for nasal polyposis.

Follow-Up: Refractory patients were followed monthly for three months post-surgery, and their daytime nasal symptom score (DTNSS) was recorded at one and three months.

Statistical Analysis: Data were entered into Microsoft Excel 2016 and analyzed using SPSS version 24.0. Qualitative data were expressed as numbers and percentages, while quantitative data were presented as means and standard deviations. Statistical significance was evaluated using Chi-square test, independent sample t-test, and ANOVA, with a p-value < 0.05 considered statistically significant.

Results

A total of 50 patients were included in the study from January 2021 to June 2022. The age distribution of the patients showed that the majority belonged to the 11-15 year age group (22%), followed by the 36-40 year age group (20%). The mean age of the patients was 27.1 years. There was a slight female preponderance with 28 females (56%) and 22 males (44%).

Presence of Deviated Nasal Septum: Deviated nasal septum was present in 29 patients, with 13 patients (26%) having a deviation to the left, and 16 patients (32%) having a deviation to the right. The remaining 21 patients (42%) had a normal septum.

Type of Surgery Performed: The surgical management included septoplasty, submucosal diathermy, and functional endoscopic sinus surgery (FESS). Septoplasty was performed in 29 patients (58%), submucosal diathermy in 15 patients (30%), and FESS in 26 patients (52%). This shows that septoplasty was the most common surgical intervention.

Symptom Severity and Persistent Symptoms: Symptom severity was assessed using a self-assessment scale ranging from 0 to 3 for sneezing, itching, nasal obstruction, and rhinorrhea. The mean severity scores for sneezing, itching, nasal obstruction, and rhinorrhea were 2.48, 1.62, 2.64, and 2.14, respectively, indicating moderate to severe persistent symptoms in the majority of patients.

Scores Before and After Surgery: The total daytime nasal symptom score (DTNSS) was evaluated before surgery and at follow-up intervals of one and three months post-surgery. The preoperative DTNSS ranged from 3 to 11, with a mean of 8.76.

Postoperative scores showed significant improvement, with the mean DTNSS reducing to 3.24 at one month and further to 0.86 at three months. This decrease in scores was statistically significant ($p < 0.001$), demonstrating the effectiveness of surgical intervention in alleviating the symptoms of allergic rhinitis.

Overall, the results highlight the significant impact of surgical management on patients with allergic rhinitis refractory to medical treatment. The study's findings emphasize that patients who underwent surgery experienced a notable reduction in symptom severity, leading to improved quality of life. The detailed examination of symptom persistence and severity before and after surgical intervention provides robust evidence supporting the efficacy of surgical treatment in these cases.

Table 1: Age Distribution

Age Group (years)	Frequency	Percent
6 - 10	5	10
11 - 15	11	22
16 - 20	8	16
21 - 25	7	14
26 - 30	6	12

31 - 35	3	6
36 - 40	10	20
Total	50	100

Table 2: Presence of Deviated Nasal Septum

Condition	Frequency	Percent
Left	13	26
Right	16	32
Normal	21	42
Total	50	100

Table 3: Type of Surgery Performed

Type of Surgery	Performed	Not Performed	Total
Septoplasty	29 (58%)	21 (42%)	50
Submucosal Diathermy	15 (30%)	35 (70%)	50
FESS	26 (52%)	24 (48%)	50

Table 4: Mean Values of Persistent Symptoms

Symptom	Minimum	Maximum	Mean	P Value
Sneezing	2	3	2.48	0.001
Itching	1	2	1.62	
Nasal Obstruction	2	3	2.64	
Rhinorrhea	0	3	2.14	

Table 5: Scores before Surgery and After Surgery

SCORE	N	Minimum	Maximum	Mean	SD	P Value
DTNSS-Pre Rx	50	3	11	8.76	1.492	0.001
DTNSS-Post Rx (1M)	50	1	5	3.24	1.041	Sig
DTNSS-Post Rx (3M)	50	0	2	0.86	0.67	F=345

Discussion

Allergic rhinitis is a common and debilitating condition that significantly impacts patients' quality of life. This study aimed to evaluate the effectiveness of surgical interventions in patients with allergic rhinitis refractory to medical treatment. The findings reveal critical insights into the demographic characteristics, symptom severity, and surgical outcomes of these patients. [13]

The study included 50 patients, with a slight female preponderance (56% female, 44% male). The age distribution highlighted a majority in the 11-15 year age group (22%), with another significant portion in the 36-40 year age group (20%). This distribution underscores the prevalence of allergic rhinitis across different age groups, affecting both adolescents and adults. [14] Deviated nasal septum was a common finding, present in 58% of patients, split between left (26%) and right (32%) deviations. Additionally, turbinate hypertrophy was observed in half of the patients.

These structural abnormalities are known to exacerbate symptoms and complicate the management of allergic rhinitis, necessitating surgical correction to improve nasal airflow and reduce symptoms. [15] The study focused on three main types of surgical interventions: septoplasty, submucosal diathermy, and functional endoscopic sinus surgery (FESS). Septoplasty was the most frequently performed procedure, undertaken in 58% of patients, followed by FESS (52%) and submucosal diathermy (30%). The high prevalence of these procedures reflects the significant role of structural correction in managing refractory allergic rhinitis. [16]

Symptom Severity and Improvement: Patients' symptoms were assessed using a self-assessment scale for sneezing, itching, nasal obstruction, and rhinorrhea. Preoperative mean severity scores indicated moderate to severe persistent symptoms, with nasal obstruction being the most prominent (mean score of 2.64). Postoperative evaluations showed a significant reduction in symptoms, with mean DTNSS dropping from 8.76 preoperatively to 3.24 at one month and 0.86 at three months post-surgery.

This substantial improvement underscores the efficacy of surgical interventions in providing long-term relief from allergic rhinitis symptoms. [17,18] The results align with previous studies that highlight the benefits of surgical intervention in patients unresponsive to medical therapy. Surgical correction of structural abnormalities such as deviated septum and turbinate hypertrophy has been shown to enhance nasal patency, reduce inflammatory responses, and improve overall

quality of life. Additionally, the use of FESS in managing nasal polyposis and chronic sinusitis associated with allergic rhinitis has been well-documented, further supporting the findings of this study.

Implications for Clinical Practice

The findings of this study have significant implications for clinical practice. They suggest that for patients with allergic rhinitis refractory to medical management, surgical intervention should be considered as a viable and effective treatment option. It highlights the need for a thorough evaluation of nasal anatomy and symptom severity to tailor surgical interventions appropriately. Furthermore, the significant postoperative improvement in symptoms underscores the potential for these procedures to provide lasting relief and enhance patients' daily functioning and quality of life.

Conclusion

Surgical intervention is a highly effective treatment for patients with allergic rhinitis unresponsive to medical therapy. The significant reduction in symptom severity and improvement in nasal function post-surgery highlight the importance of considering surgical options for managing refractory cases. This study supports the role of septoplasty, submucosal diathermy, and FESS in providing substantial and sustained relief from allergic rhinitis symptoms, ultimately improving patient outcomes and quality of life.

References

1. Ponsonby AL, Couper D, Dwyer T. Cross-sectional study of the relation between sibling number, asthma, hay fever, and eczema. Arch Dis Child 1998; 79:328-33.
2. Matricardi PM, Rosmini F, Ferrigno L. Cross-sectional, retrospective study of the prevalence of atopy among Italian military students with antibodies against hepatitis A virus. BMJ 1997; 314:999-1003.
3. Etiological factors in inflammatory sinus disease. IN: Naclerio RM, Anil Gungor, editor. Disease of the sinuses, diagnosis and management. BC Decker Inc. 2001.
4. Wright ED, Hurst D, Miotto D. Increased expression of major basic protein and interleukin-5 in middle ear biopsy specimens from atopic patients with persistent otitis media with effusion. Otolaryngol Head Neck Surg 2000; 123:533-8.
5. Spector S, Nicklas RA, Chapman J. For the joint task force on practice parameters. American Academy of Allergy, Asthma, and Immunology; Joint Council of Allergy, Asthma, and Immunology. Symptom severity assessment of allergic rhinitis: part 1. Ann Allergy Asthma Immunol 2003; 91:105-114.
6. Yoo JB, Yoon JH. Surgical management of allergic rhinitis. J Korean Med Assoc 2004; 47(7):672-678.
7. Small P, Frankiel S, Becker A. Rhinitis: A practical and comprehensive approach to assessment and therapy. J Otolaryngol 2007; 36.
8. Celedon J, Palmer L, Weiss S. Asthma, rhinitis, and skin test reactivity to aeroallergens in families of asthmatic subjects in Anqing, China. Am J Respir Crit Care Med 2001; 163:1108-1112.
9. Greisner W, Settipane R, Settipane G. Coexistence of asthma and allergic rhinitis: a 23-year follow-up study of college students. Allergy Asthma Proc 1998; 19:185-8.
10. Horowitz E, Diemer FB, Poyser J. Asthma and rhinosinusitis prevalence in a Baltimore city public housing complex [abstract]. J Allergy Clin Immunol 2001; 107.
11. Chakir J, Laviolette M, Turcotte H. Cytokine expression in the lower airways of non-asthmatic subjects with allergic rhinitis: influence of natural allergen exposure. J Allergy Clin Immunol 2000; 106:904-910.
12. Jareoncharsri P, Thitadilok V, Bunnag C et al. Nasal endoscopic findings in patients with perennial allergic rhinitis. Asian Pac J Allergy Immunol 1999; 17(4):261-7.
13. Cauwenberge PV, Bachert C, Passalacqua G, Canonica GW, Durham SR. Consensus statement on the treatment of allergic rhinitis. Allergy 2000; 55:116-134.
14. Spector S, Nicklas RA, Chapman J. For the joint task force on practice parameters. American Academy of Allergy, Asthma, and Immunology; Joint Council of Allergy, Asthma, and Immunology. Symptom severity assessment of allergic rhinitis: part 1. Ann Allergy Asthma Immunol 2003; 91:105-114.
15. Price D, Bond C, Bouchard J. International primary care respiratory group (IPCRG) Guidelines: Management of allergic rhinitis 2006; 15:58-70.
16. Holgate ST. The epidemic of allergy and asthma. Nature 1999; 402(6760).
17. Braunstahl GJ, Kleinjan A, Overbeek SE. Segmental bronchial provocation induces nasal inflammation in allergic rhinitis patients. Am J Respir Crit Care Med 2000; 161:2051-2057.
18. Thomas M, Kocevar VS, Zhang Q. Asthma-related healthcare resource use among asthmatic children with and without concomitant allergic rhinitis. Pediatrics 2005; 115:129-134.