

Association Between Chronic Rhinosinusitis and Asthma Control: A Cross-Sectional Analysis in a Tertiary Care Setting

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ABSTRACT

Background: Chronic rhinosinusitis (CRS) and bronchial asthma frequently coexisting inflammatory disorders of the respiratory tract. Increasing clinical evidence supports the concept of a unified airway, where pathological processes in the upper and lower airways are interrelated. The presence of CRS may adversely influence asthma control, leading to increased symptom burden and poorer clinical outcomes.

Objective: To evaluate the association between chronic rhinosinusitis and the level of asthma control in patients diagnosed with bronchial asthma.

Methods: This cross-sectional observational study was conducted at a tertiary care teaching hospital. A total of 100 patients with clinically diagnosed bronchial asthma were included. Participants were assessed for the presence of CRS based on standard clinical criteria, including persistent nasal symptoms lasting more than 12 weeks. Asthma control was evaluated using established clinical parameters and categorized as well-controlled, partially controlled, or poorly controlled. Additional factors such as symptom severity, nocturnal symptoms, and use of rescue medication were also recorded. Statistical analysis was performed using the chi-square test, with a p-value of less than 0.05 considered significant.

Results: Out of 100 patients, 46% were found to have coexisting CRS. Poorly controlled asthma was more frequently observed in patients with CRS compared to those without CRS. A significantly higher proportion of patients with CRS

experienced severe symptoms, increased nocturnal manifestations, and greater reliance on rescue medication. Statistical analysis demonstrated a significant association between CRS and asthma control ($p < 0.05$).

Conclusion: Chronic rhinosinusitis is significantly associated with poorer asthma control and increased disease severity. These findings highlight the importance of recognizing and managing CRS in patients with asthma. An integrated, multidisciplinary approach addressing both upper and lower airway inflammation may lead to improved clinical outcomes.

Keywords: Chronic Rhinosinusitis, Bronchial Asthma, Asthma Control, Unified Airway Disease, Upper Airway Inflammation.

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INTRODUCTION

Chronic rhinosinusitis and bronchial asthma are commonly encountered inflammatory conditions affecting different segments of the respiratory tract, yet they frequently occur together in clinical settings. Increasing attention has been directed toward the concept that the respiratory system functions as a unified structure, where pathological processes in one region can influence the other.^[1-4] This interconnected behavior has important implications for disease severity and patient management.

Chronic rhinosinusitis is a long-standing inflammatory condition involving the mucosa of the nasal cavity and paranasal sinuses, typically persisting for more than twelve weeks. Patients often present with a combination of nasal blockage, mucopurulent discharge, facial discomfort, and diminished olfactory function^[5,6].

Due to its chronic nature, CRS can significantly impair daily functioning and quality of life, often requiring prolonged medical therapy and, in some cases, surgical intervention.

Bronchial asthma, in contrast, primarily affects the lower airways and is characterized by reversible airflow limitation, airway hyperreactivity, and chronic inflammation. Clinically, it manifests as recurrent episodes of wheezing, breathlessness, chest tightness, and cough.^[7,8] Achieving optimal asthma control remains a central goal of treatment, as inadequate control is associated with increased exacerbations and healthcare utilization.

The coexistence of CRS and asthma has been widely observed, and growing evidence suggests that patients with sinonasal

disease often experience greater difficulty in achieving adequate asthma control^[9-12]. This relationship is thought to be mediated by shared inflammatory mechanisms, including eosinophilic activity and immune signaling pathways that extend across both upper and lower airways. In addition, mechanical and physiological factors such as postnasal drainage and persistent mucosal irritation may contribute to worsening lower airway symptoms.

From a broader clinical perspective, poor asthma control represents a significant burden, leading to frequent symptoms, impaired daily activities, and increased risk of hospitalization. Identifying contributory factors, particularly those that are potentially treatable, is therefore essential. Chronic rhinosinusitis represents one such factor that may play a meaningful role in influencing asthma outcomes.

Although the association between these two conditions has been recognized, there remains a need for further evaluation in different clinical settings, especially in tertiary care centers where disease complexity is often greater. A clearer understanding of this relationship may support more integrated and effective management approaches. The present study was therefore undertaken to examine the association between chronic rhinosinusitis and asthma control, with the aim of contributing to improved clinical decision-making and interdisciplinary care.

AIMS AND OBJECTIVES

Aim

To assess the association between chronic rhinosinusitis and the level of asthma control in patients with bronchial asthma.

Objectives

1. To determine the prevalence of chronic rhinosinusitis in patients with bronchial asthma
2. To evaluate the level of asthma control in the study population
3. To compare asthma control in patients with and without chronic rhinosinusitis
4. To analyze the relationship between CRS and severity of asthma symptoms

MATERIALS AND METHODS

Study Design

This was a cross-sectional observational study.

Study Setting

The study was conducted in the Departments of Otorhinolaryngology at NIMS Hospital, Jaipur, a tertiary care teaching institution.

Study Population

A total of 100 patients diagnosed with bronchial asthma were included in the study. Patients were evaluated for the presence or absence of chronic rhinosinusitis and categorized accordingly.

Inclusion Criteria

- Patients aged 18 years and above
- Patients with a clinical diagnosis of bronchial asthma
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients with acute respiratory infections at the time of evaluation
- Patients with other chronic pulmonary diseases such as COPD

- Patients with immunocompromised states
- Patients unwilling to participate

Data Collection Procedure

All eligible patients presenting to the outpatient department or admitted to the wards were evaluated. After obtaining informed consent, a detailed clinical history and examination were performed. Patients were assessed for symptoms of chronic rhinosinusitis based on standard clinical criteria, including nasal obstruction, nasal discharge, facial pain or pressure, and reduction in smell persisting for more than 12 weeks. Diagnostic nasal endoscopy and relevant imaging were performed where indicated. Asthma control was assessed using standard clinical guidelines and categorized into well-controlled, partially controlled, and poorly controlled asthma based on symptom frequency, activity limitation, and need for rescue medication.

Relevant demographic data and clinical findings were recorded systematically for analysis.

Outcome Measures

- Presence of chronic rhinosinusitis
- Level of asthma control
- Association between CRS and asthma control

Statistical Analysis

Data was entered into a spreadsheet and analyzed using appropriate statistical software. Categorical variables were expressed as frequencies and percentages. Associations between CRS and asthma control were assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations and Consent

Approval for the study was obtained from the Institutional Ethics Committee of NIMS Hospital, Jaipur prior to commencement.

Written informed consent was obtained from all participants after explaining the purpose and procedures of the study in a language they understood. Confidentiality of patient information was maintained throughout. The study was conducted in accordance with standard ethical guidelines, and no additional risk or financial burden was imposed on the participants.

RESULTS

A total of 100 patients with bronchial asthma were included in the study. Based on clinical evaluation, patients were categorized into those with chronic rhinosinusitis (CRS) and those without CRS. The relationship between CRS and asthma control was analyzed. A considerable proportion of asthma patients had coexisting chronic rhinosinusitis. Poorly controlled asthma was the most common category observed. Chi-square test applied; a statistically significant association was observed between CRS and asthma control. Patients with CRS had a higher proportion of poorly controlled asthma. Severe symptoms were significantly more common in patients with CRS. Night-time symptoms were significantly more frequent in patients with CRS. Patients with CRS required more frequent use of rescue medication.

The study demonstrated a significant association between chronic rhinosinusitis and poor asthma control. Patients with CRS were more likely to have poorly controlled asthma, increased symptom severity, higher frequency of night-time symptoms, and greater reliance on rescue medication compared to those without CRS. These findings support the role of upper airway inflammation in influencing lower airway disease outcomes.

Table 1: Prevalence of Chronic Rhinosinusitis in Asthma Patients

CRS Status	Number (n=100)	Percentage (%)
Present	46	46.0%
Absent	54	54.0%

Table 2: Distribution of Asthma Control

Asthma Control Level	Number (n=100)	Percentage (%)
Well-controlled	28	28.0%
Partially controlled	34	34.0%
Poorly controlled	38	38.0%

Table 3: Association Between CRS and Asthma Control

Asthma Control	CRS Present (n=46)	CRS Absent (n=54)	Total	p-value
Well-controlled	6 (13.0%)	22 (40.7%)	28	0.003
Partially controlled	15 (32.6%)	19 (35.2%)	34	
Poorly controlled	25 (54.3%)	13 (24.1%)	38	

Table 4: Severity of Asthma Symptoms in Relation to CRS

Symptom Severity	CRS Present (n=46)	CRS Absent (n=54)	p-value
Mild	8 (17.4%)	20 (37.0%)	0.011
Moderate	16 (34.8%)	21 (38.9%)	
Severe	22 (47.8%)	13 (24.1%)	

Table 5: Frequency of Night Symptoms

Night Symptoms	CRS Present (n=46)	CRS Absent (n=54)	p-value
Present	30 (65.2%)	21 (38.9%)	0.008
Absent	16 (34.8%)	33 (61.1%)	

Table 6: Use of Rescue Medication

Rescue Medication Use	CRS Present (n=46)	CRS Absent (n=54)	p-value
Frequent	28 (60.9%)	18 (33.3%)	0.006
Occasional	18 (39.1%)	36 (66.7%)	

DISCUSSION

The present study demonstrates a clear association between chronic rhinosinusitis and the level of asthma control, highlighting the clinical relevance of considering upper airway pathology in patients with bronchial asthma^[13]. The findings support the concept that disorders affecting different parts of the respiratory tract are interconnected rather than independent^[14,15].

A considerable proportion of patients in this study were found to have coexisting CRS, indicating a substantial overlap between these conditions. This observation aligns with routine clinical experience, where patients with persistent nasal symptoms frequently report exacerbation of lower respiratory complaints. Ongoing inflammation within the sinonasal region may act as a continuous source of airway irritation, thereby influencing lower airway function^[16]. One of the most significant observations was the higher frequency of poorly controlled asthma among patients with CRS. This suggests that the presence of upper airway inflammation may negatively impact the effectiveness of asthma management^[17]. The underlying mechanism is likely multifactorial,

involving both immunological and physiological interactions. Inflammatory mediators originating in the upper airway may extend their effects to the lower airway, contributing to increased bronchial hyperresponsiveness.

In addition to poorer control, patients with CRS also demonstrated greater symptom severity. A higher proportion experienced moderate to severe symptoms, indicating that CRS may not only affect control status but also overall disease intensity^[18]. This has important clinical implications, as increased severity is often associated with reduced quality of life and higher healthcare utilization.

Another notable finding was the increased occurrence of nocturnal symptoms among patients with CRS. Night-time symptoms are a well-recognized indicator of inadequate asthma control and are often linked to persistent airway inflammation. Factors such as nasal obstruction, impaired airflow, and accumulation of secretions during sleep may contribute to this pattern^[19].

The need for rescue medication was also greater in patients with CRS, reflecting increased symptom variability and insufficient

baseline control. Frequent reliance on short-acting bronchodilators is generally indicative of suboptimal disease management and suggests the presence of contributing factors that require attention. Addressing CRS may therefore play a role in reducing this dependence and improving overall stability.

These findings emphasize the importance of adopting a comprehensive approach in the management of asthma. Rather than focusing solely on lower airway pathology, clinicians should actively evaluate and manage coexisting conditions such as CRS. An integrated strategy involving both otolaryngological and medical perspectives may lead to more effective disease control^[20]. However, certain limitations should be acknowledged. The cross-sectional design restricts the ability to establish causality, and the study setting may limit generalizability. Additionally, incorporation of objective diagnostic tools and standardized scoring systems could further strengthen future research.

Overall, the study reinforces the need for a unified approach to airway disease, recognizing the interdependence of upper and lower respiratory tract conditions in determining clinical outcomes.

CONCLUSION

Chronic rhinosinusitis is significantly associated with poor asthma control in patients with bronchial asthma. Patients with CRS exhibit higher symptom severity, increased nocturnal symptoms, and greater dependence on rescue medication compared to those without CRS.

These findings support the concept of a unified airway, where upper airway inflammation contributes to worsening of lower airway disease. Early identification and appropriate management of CRS can play an important role in improving asthma control. An integrated approach involving both otolaryngologists and physicians is essential for optimal management and better clinical outcomes.

REFERENCES

1. Braunstahl GJ. United airways concept: what does it teach us about systemic inflammation in airways disease? *Proc Am Thorac Soc*. 2009;6(8):652–4.
2. Grossman J. One airway, one disease. *Chest*. 1997;111(2 Suppl):11S–16S.
3. Bousquet J, Van Cauwenberge P, Khaltaev N. Allergic rhinitis and its impact on asthma (ARIA). *J Allergy Clin Immunol*. 2001;108(5 Suppl):S147–334.
4. Togias A. Rhinitis and asthma: evidence for respiratory system integration. *J Allergy Clin Immunol*. 2003;111(6):1171–83.
5. Fokkens WJ, Lund VJ, Mullol J, et al. European position paper on rhinosinusitis and nasal polyps 2012. *Rhinology Suppl*. 2012;(23):1–298.
6. Meltzer EO, Hamilos DL, Hadley JA, et al. Rhinosinusitis: developing guidance for clinical trials. *J Allergy Clin Immunol*. 2006;118(5 Suppl):S17–61.
7. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. 2014 update.

8. Bateman ED, Hurd SS, Barnes PJ, et al. Global strategy for asthma management and prevention: GINA executive summary. *Eur Respir J*. 2008;31(1):143–78.
9. Bachert C, Vignola AM, Gevaert P, Leynaert B, Van Cauwenberge P, Bousquet J. Allergic rhinitis, rhinosinusitis, and asthma: one airway disease. *Immunol Allergy Clin North Am*. 2004;24(1):19–43.
10. Jarvis D, Newson R, Lotvall J, et al. Asthma in adults and its association with chronic rhinosinusitis. *J Allergy Clin Immunol*. 2012;129(3):631–7.
11. Dixon AE, Kaminsky DA, Holbrook JT, et al. Allergic rhinitis and sinusitis in asthma: differential effects on symptoms and pulmonary function. *Chest*. 2006;130(2):429–35.
12. Ragab SM, Lund VJ, Scadding G. Evaluation of the medical and surgical treatment of chronic rhinosinusitis. *J Allergy Clin Immunol*. 2004;114(5):1107–13.
13. Van Zele T, Claeys S, Gevaert P, et al. Differentiation of chronic sinus diseases by inflammatory markers. *J Allergy Clin Immunol*. 2006;118(4):880–5.
14. Hamilos DL. Chronic rhinosinusitis: epidemiology and medical management. *J Allergy Clin Immunol*. 2011;128(4):693–707.
15. Pawankar R. Nasal allergy and asthma: the united airway disease. *Curr Opin Allergy Clin Immunol*. 2006;6(1):1–4.
16. Crystal-Peters J, Neslusan C, Crown WH, Torres A. Treating allergic rhinitis in patients with asthma: effect on asthma-related events. *J Allergy Clin Immunol*. 2002;109(1):57–62.
17. Price D, Zhang Q, Kocevar VS, Yin DD, Thomas M. Effect of a concomitant diagnosis of allergic rhinitis on asthma-related health care use. *Clin Exp Allergy*. 2005;35(3):282–7.
18. Bresciani M, Paradis L, Des Roches A, et al. Rhinosinusitis in severe asthma. *J Allergy Clin Immunol*. 2001;107(1):73–80.
19. Stelmach R, do Patrocínio TN, Ribeiro M, et al. Effect of treating allergic rhinitis on asthma control. *Chest*. 2005;128(5):3140–7.
20. Compalati E, Ridolo E, Passalacqua G, et al. The link between allergic rhinitis and asthma: the united airway disease. *Expert Rev Clin Immunol*. 2010;6(3):413–23.]

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