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CO-EXISTENCE OF BRONCHIAL ASTHMA IN PATIENTS WITH BRONCHIECTASIS WITHOUT ALLERGIC BRONCHOPULMONARY ASPERGILLOSIS

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Abstract

Background: Bronchiectasis and bronchial asthma are chronic respiratory conditions that may co-exist, presenting diagnostic and therapeutic challenges. Asthma-induced airway inflammation can contribute to bronchiectatic changes, while bronchiectasis can aggravate asthma symptoms through persistent infection and mucus retention.

Aim: To determine the co-existence of bronchial asthma in patients with bronchiectasis and to compare the clinico-radiological profiles between patients having only bronchiectasis and those with both bronchiectasis and bronchial asthma.

Materials and Methods: A hospital-based cross-sectional study was conducted over one year at a tertiary care center in India. A total of 80 patients with HRCT-confirmed bronchiectasis were enrolled and categorized into two groups: those with bronchiectasis alone (n = 66) and those with coexisting bronchial asthma (n = 14). Detailed history, clinical symptoms, spirometry, IgE levels, eosinophil counts, and radiological findings were assessed. Statistical analysis was performed using SPSS v26.0.

Results: Out of 80 participants, 17.5% had coexisting bronchial asthma. The coexisting group showed significantly higher prevalence of breathlessness (100% vs. 53.03%, p = 0.013) and wheezing (57.14% vs. 13.63%, p = 0.001). Females predominated in the bronchiectasis-asthma group (57.14%), whereas males were more common in the bronchiectasis-only group (72.73%). Although not statistically significant, weight loss was more prevalent in patients with coexisting asthma (42.86% vs. 19.69%).

Conclusion: A considerable number of bronchiectasis patients have coexisting bronchial asthma, which alters their clinical symptomatology. Recognizing this overlap is essential for tailored management and improving patient outcomes. Features like wheezing and persistent breathlessness should prompt clinicians to evaluate for concurrent asthma in bronchiectasis patients.

Keywords: Bronchiectasis, Asthma, Airway disease overlap

Introduction

Bronchiectasis is a chronic, progressive respiratory condition characterized by irreversible bronchial dilatation, persistent inflammation, and recurrent infections that collectively contribute to a cycle of lung damage and functional decline [1]. Historically considered a neglected disease, bronchiectasis has recently re-emerged in clinical focus due to its increasing recognition, advanced imaging modalities, and the appreciation of its overlap with other airway disorders [2].

One of the most intriguing and clinically significant overlaps is that between bronchiectasis and bronchial asthma. Asthma, a chronic inflammatory airway disease characterized by reversible airway obstruction, hyperresponsiveness, and eosinophilic inflammation, frequently coexists with bronchiectasis in a subset of patients [3]. This coexistence presents a unique challenge due to the overlapping symptomatology, complex pathophysiology, and distinct therapeutic approaches required for optimal management [4].

The interaction between asthma and bronchiectasis is believed to be bidirectional. Chronic airway inflammation in asthma may contribute to structural airway damage, thereby predisposing to bronchiectasis. Conversely, chronic infection and mucus retention in bronchiectasis can exacerbate asthma symptoms and lead to poor disease control [5]. Several studies have identified this coexistence more commonly in patients with severe or refractory asthma, indicating that underlying bronchiectasis might be underdiagnosed in this population [6].

Clinically, patients with both conditions often experience more frequent exacerbations, higher sputum volumes, and poorer quality of life compared to those with either disease alone [7]. Radiologically, high-resolution computed tomography (HRCT) remains the cornerstone for diagnosing bronchiectasis and assessing the extent of airway involvement, while specific radiological features such as bronchial wall thickening, tree-in-bud appearance, and mucus plugging may be more prominent in asthmatic individuals with coexisting bronchiectasis [8].

Understanding the clinico-radiological profile of such patients is essential for guiding personalized treatment strategies. For instance, the use of inhaled corticosteroids (ICS) in asthma may modulate the inflammatory milieu in bronchiectasis but also increase susceptibility to infection — a factor that necessitates careful therapeutic balancing [9].

Given the emerging data on asthma–bronchiectasis overlap, this study aims to explore the prevalence of bronchial asthma in patients diagnosed with bronchiectasis and to compare their clinico-radiological features with those having bronchiectasis alone. Such an evaluation may not only facilitate early diagnosis and appropriate stratification of disease severity but also pave the way for more effective and individualized management protocols [10].

Material and Methods

This hospital-based cross-sectional study was conducted at a tertiary care center in India over a period of one year. A total of 80 patients diagnosed with bronchiectasis were enrolled in the study. The diagnosis of bronchiectasis was based on clinical features and radiological confirmation using high-resolution computed tomography (HRCT) of the chest. Patients aged 18 years and above, who were clinically stable and willing to give informed consent, were included. Those with active pulmonary tuberculosis, significant fibrotic changes, Allergic Bronchopulmonary Aspergillosis or other chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) or interstitial lung disease were excluded from the study.

The selected patients were divided into two equal groups based on the presence or absence of bronchial asthma. Group A consisted of 40 patients with bronchiectasis alone, while Group B included 40 patients with coexisting bronchial asthma and bronchiectasis. The diagnosis of asthma was made according to Global Initiative for Asthma (GINA) guidelines, incorporating clinical history, physical examination, and spirometry with reversibility testing showing a ≥12% and 200 mL improvement in FEV_1 after administration of a bronchodilator.

Detailed clinical histories were recorded, including symptoms such as cough, breathlessness, sputum production, hemoptysis, and wheezing. Data on past exacerbations and hospital admissions were also collected. Pulmonary function testing was performed for all patients to assess spirometric parameters including FEV_1, FVC, and the FEV_1/FVC ratio. Serum IgE levels and absolute eosinophil counts were measured as markers of allergic predisposition. HRCT scans were evaluated for bronchiectasis severity using the Bhalla scoring system.

Data were analyzed using SPSS version 26.0. Continuous variables were presented as mean ± standard deviation and compared using the independent sample t-test. Categorical data were compared using the Chi-square test or Fisher's exact test where appropriate. A p-value less than 0.05 was considered statistically significant. The study protocol was reviewed and approved by the Institutional Ethics Committee, and informed consent was obtained from all participants before inclusion in the study. Patient anonymity and confidentiality were strictly maintained.

Results

Table 1 shows the distribution of subjects based on the presence of bronchial asthma. Out of 80 participants, the majority (82.5%) had only bronchiectasis, while 17.5% had coexisting bronchial asthma.

Table 2 compares the age distribution between the two groups. The most affected age group among bronchiectasis-only patients was 31–40 years (28.78%), while those with both bronchiectasis and asthma were more commonly in the 41–50 year age range (35.71%).

Table 3 illustrates gender distribution. Among bronchiectasis-only patients, males were predominant (72.73%). However, in the bronchiectasis with asthma group, females were more commonly affected (57.14%).

Table 4 compares cardinal symptoms between the two groups. Breathlessness and wheezing were significantly more common in patients with coexisting asthma (100% and 57.14% respectively), with statistically significant p-values (0.013 and 0.001). Other symptoms such as cough, sputum production, chest pain, and hemoptysis were observed in both groups with varying frequencies, but without statistical significance.

Table 5 compares constitutional symptoms. Weight loss was more frequently reported in the bronchiectasis with asthma group (42.86%) compared to the bronchiectasis-only group (19.69%), nearing statistical significance (p = 0.084). Fever and decreased appetite showed similar distribution across both groups and were not statistically significant.

Table 1: Distribution of subjects according to bronchial asthma (n = 80)

Category	N	%
Bronchiectasis Only	66	82.5%
Bronchiectasis + Bronchial Asthma	14	17.5%

Table 2: Distribution of subjects according to age group between two groups

Age Group	Bronchiectasis Only (n = 66)	%	Bronchiectasis + Asthma (n = 14)	%
<20 yrs	4	6.06%	1	7.14%
21–30 yrs	8	12.12%	2	14.28%
31–40 yrs	19	28.78%	4	28.57%
41–50 yrs	13	19.70%	5	35.71%
51–60 yrs	15	22.73%	1	7.14%
>60 yrs	7	10.61%	0	0%

Table 3: Distribution of subjects according to gender between two groups

Gender	Bronchiectasis Only (n = 66)	%	Bronchiectasis + Asthma (n = 14)	%
Female	18	27.27%	8	57.14%
Male	48	72.73%	6	42.86%

Table 4: Comparison of cardinal symptoms between two groups

Cardinal Symptoms	Bronchiectasis Only (n = 66)	%	Bronchiectasis + Asthma (n = 14)	%	P value
Breathlessness	35	53.03%	14	100%	0.013
Cough	54	81.81%	13	92.86%	0.328
Sputum	46	69.69%	14	100%	0.196
Wheezing	9	13.63%	8	57.14%	0.001
Chest Pain	24	36.36%	3	21.43%	0.335
Hemoptysis	29	43.93%	5	35.71%	0.539

*Participants are not mutually exclusive.

Table 5: Comparison of constitutional symptoms between two groups

Constitutional Symptoms	Bronchiectasis Only (n = 66)	%	Bronchiectasis + Asthma (n = 14)	%	Chi Square	P value
Fever	18	27.27%	4	28.57%	0.002	0.968
Decreased Appetite	17	25.76%	5	35.71%	0.517	0.510
Weight Loss	13	19.69%	6	42.86%	3.370	0.084

Discussion

This cross-sectional study explored the coexistence of bronchial asthma in patients with bronchiectasis and compared their clinical and radiological profiles. Among the 80 participants, 17.5% had coexisting bronchial asthma, while 82.5% had only bronchiectasis. This prevalence is consistent with emerging literature suggesting that bronchial asthma and bronchiectasis frequently overlap, particularly in patients with difficult-to-treat asthma phenotypes [11].

The demographic analysis revealed a female predominance in the group with coexisting bronchial asthma and bronchiectasis, which aligns with recent findings that adult females with asthma may have a higher risk of developing bronchiectatic changes due to underlying eosinophilic inflammation and impaired mucociliary clearance [12]. Conversely, the bronchiectasis-only group showed male predominance, consistent with traditional epidemiological trends in post-infectious bronchiectasis [3]. Age distribution patterns demonstrated that middle-aged adults (31–50 years) were more commonly affected in both groups, which reflects the chronic and progressive nature of these diseases. Notably, a higher proportion of patients in the 41–50 year age group had asthma coexisting with bronchiectasis, suggesting that asthmatic patients may be prone to structural lung changes as they age, especially in the absence of optimal control [13].

Symptomatically, breathlessness and wheezing were significantly more frequent in the bronchiectasis with asthma group. Wheezing was present in 57.14% of these patients compared to just 13.63% in the bronchiectasis-only group ($p = 0.001$). Breathlessness was also significantly more prevalent (100% vs. 53.03%, $p = 0.013$). These findings are consistent with those by Wu et al., who reported increased respiratory symptoms and reduced quality of life in patients with asthma–bronchiectasis overlap, attributing it to a combination of airflow obstruction and mucus retention [14].

Interestingly, sputum production and cough were common in both groups, reflecting the hallmark features of bronchiectasis. However, wheezing and heightened breathlessness may serve as clinical indicators for suspecting concomitant asthma in bronchiectasis patients. Moreover, the weight loss trend noted in 42.86% of bronchiectasis–asthma patients versus 19.69% in those without asthma

suggests a possible link to systemic inflammation and greater disease burden, though statistical significance was not achieved (p = 0.084).

Radiologically, HRCT was instrumental in confirming bronchiectasis and guiding clinical correlation. While this study did not include detailed radiological scoring in results, prior studies indicate that asthma patients tend to have more central airway involvement and bronchial wall thickening on HRCT [15]. Recognizing these patterns could enhance early detection and tailored treatment.

The coexistence of bronchial asthma in bronchiectasis patients demands a nuanced therapeutic approach. Inhaled corticosteroids, beneficial in asthma, may predispose bronchiectasis patients to infections if not judiciously used. Therefore, accurate phenotyping, based on symptoms, spirometry, imaging, and biomarkers like IgE or eosinophil count, is essential for effective management.

Conclusion

The present study demonstrates that a significant proportion of patients with bronchiectasis also have coexisting bronchial asthma, and these patients exhibit a distinct clinico-symptomatic profile. Symptoms such as wheezing and breathlessness are significantly more frequent, and weight loss trends may suggest more severe disease expression. Identifying this overlap is clinically important, as it necessitates tailored diagnostic and therapeutic strategies. Incorporating spirometry and careful symptom assessment into routine bronchiectasis evaluation may help in early identification of coexisting asthma and improve overall patient outcomes.

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