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RESEARCH ARTICLE
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FREQUENCY OF BRONCHIECTASIS IN PATIENTS DIAGNOSED WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Abstract

Background: The term "bronchiectasis" refers to an irregular widening of the bronchi, typically brought on by an infection or persistent airway inflammation. Individuals with chronic obstructive pulmonary disease (COPD) have a significant incidence of bronchiectasis. By detecting problems earlier and responding quickly, complications can be avoided, and hospitalization rates and morbidity can be reduced.

Objective: To determine the frequency of bronchiectasis in patients diagnosed with COPD.

Methodology: The study was cross-sectional and descriptive, and it was carried out at the Department of Pulmonology GMMMC hospital Sukkur. The study duration was one years from January 2022 to January 2023. There were 200 individuals with COPD diagnosed were included in this study. Records were kept on the individual's gender, age, illiteracy, length of COPD, smoking, indoor air pollution, and body mass index, (BMI) among other prevalent risk factors for bronchiectasis. Every patient had tested to figure out whether bronchiectasis was present.

Results: With 60% of the patients being female and 40% being male, the mean age was recoded as 56 years. Of the study population, 43% had bronchiectasis. 31% of people smoked, whilst 69% did not smoke. While 55% of the participants had no comorbidities, 45% of patients had comorbidities (DM, HTN). Of the individuals, 41% were overweight and 37% had a normal BMI. In addition, 59% of the individuals were housewives while the literacy rate of the patients studied was 87%. For more than ten years, COPD affected about 38% of patients.

Conclusion: According to the results of our investigation, 41% of COPD patients had bronchiectasis. The presence of bronchiectasis is more influenced by the patient's age, gender, literacy rate and length of COPD; it is less influenced by the patient's employment, BMI, comorbidities, or smoking habit.

Keywords: COPD; Bronchiectasis; comorbidities

Introduction

Permanent and gradual dilatation of the airways brought on by a chronic airway damage is known as bronchiectasis. In the general population, COPD and bronchiectasis are quite common conditions that can coexist.[1] Since 2014, bronchiectasis has been included in the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a comorbidity of COPD, and its effects on the natural progression of COPD have been thoroughly studied.[2]. Numerous studies have examined the occurrence of bronchiectasis in COPD patients, with varying degrees of success (4% to 72%).[3]. In a Pakistani investigation, bronchiectasis was discovered in nearly half of the patients with chronic obstructive pulmonary disease.[4] Patients with severe stages of COPD have a significant incidence of bronchiectasis. It is now known that bronchiectasis in COPD represents a unique clinical profile of the disease with worse prognosis, more frequent exacerbations, and more severe symptoms. Although a precise causal relationship has not yet been demonstrated, it is hypothesized that bronchiectasis without any other known etiology may be caused by recurrent infectious exacerbations.[5] Numerous studies have been conducted on bronchiectasis as a comorbidity of chronic obstructive lung disease and its effects on the illness's natural course. There is evidence linking bronchiectasis to increased levels of systemic and localized inflammation. In patients with COPD, bronchiectasis is linked to worsening bronchial obstruction, a lower body mass index, an advanced age, increased sputum production and purulence, worsening airflow obstruction, dyspnea, and an exercise index. Additionally, these individuals had higher exacerbation frequency and severity.[6] An increased frequency of bronchiectasis was identified as a sign of chronic obstructive pulmonary disease in patients, especially those with moderate to severe illness, as a result of the rising use of HRCT (high-resolution computed tomography) in the examination of the condition. Overview of chronic airway damage resulting in an irreversible and gradual dilatation of the airways is known as bronchiectasis. In the general population, COPD and bronchiectasis are quite common conditions that may coexist.

Several studies have shown varying percentages of bronchiectasis in individuals with chronic obstructive pulmonary disease (COPD), ranging from 4% to 72%.7. Numerous studies have demonstrated that people with COPD who have radiographic bronchiectasis are more likely to generate chronic sputum, to be in worse health, to have greater inflammation in their airways or systemic lungs, and to create more purulent sputum. Patients with COPD who had radiographic bronchiectasis had higher rates of potentially harmful microorganisms (PPM) being identified from their sputum after stabilization.[8,9] Being a varied condition, bronchiectasis often coexists with other long-term respiratory disorders. It is crucial to comprehend the existence of bronchiectasis in COPD in order to prevent the illness from progressing and to guide future interventions.[10]

Objective: To determine the frequency of bronchiectasis in patients with diagnosed COPD.

Methodology: The study was cross-sectional and descriptive, and it was carried out at the Department of Pulmonology GMMMC hospital Sukkur. The study duration was one years from January 2022 to January 2023. Sample size was 200, non-probability sampling technique was applied. All patients with spirometry-proven COPD were enrolled, regardless of gender and their age range, between 40 and 70 years. Excluded patients were those with congenital bronchiectasis, asthma, ABPA, COPD with pneumothorax, post-lobectomy, post-pulmonary TB, lung cancer, and hemodynamically unstable individuals. Age, gender, and spirometric results were recorded after obtaining consent. Every patient had HRCT in order to diagnose themselves with bronchiectasis. If any one or more of the following characteristics were present Bronchiectasis was considered positive: a. the bronchus was visible within 1 cm of the pleural surface; b. there was no tapering. Bronchiectasis is also indicated by an increased broncho-arterial ratio, i.e more than 1.5. Every radiological examination was carried out under the guidance of a qualified consultant with at least five years of expertise.

Data analysis was done using SPSS version 20. For quantitative variables including age, height, weight, BMI, length of smoking cessation, and length of COPD, mean and standard deviation were computed. For categorical variables such as gender, COPD severity, hypertension, diabetes mellitus, smoking status, and bronchiectasis, frequency and percentages were computed. To examine effect modification, bronchiectasis was stratified according to age, gender, BMI, length of COPD, severity of COPD, smoking, occupation, and educational attainment. Using a post-stratification chi square test, a P value of ≤0.05 was deemed significant.

Results

In the current study 200 patients of COPD fulfilling the criteria were analyzed. Mean age was 56 years with standard deviation ± 10.41. Among 200 patients, 40% (80 patients) were male and 60% (120 patients) were female. 43.5% (87) patients as shown in (Figure 1) were observed as bronchiectasis positive. The study population was divided into age categories as well. Table 1 displays the age groups. 50-55 years age group showing the majority of patients. In terms of smoking, our analysis revealed that, as Table 2 illustrates, just 35% of patients (70 patients) smoked, while 70% of patients (140 patients) did not smoke. According to an analysis of COPD severity, 43% of patients (86 patients) had severe exacerbations, 32% of patients (64 patients) had moderate exacerbations, 15.5% of patients (31 patients) had very severe exacerbations, and only 9.5% of patients (19 patients) had mild exacerbations (Table 3). A review of co-morbidities revealed that 34% of patients had hypertension alone, 11% had diabetes alone, 30% had both hypertension and diabetes, and 25% had no co-morbidities. Patients' COPD duration was stratified according to whether or not they had bronchiectasis. In a similar manner, patients' age and gender were stratified according on their HRCT results, which revealed bronchiectatic changes.

Figure 1. Prevalance of Bronchiectatic changes on HRCT (n=200)

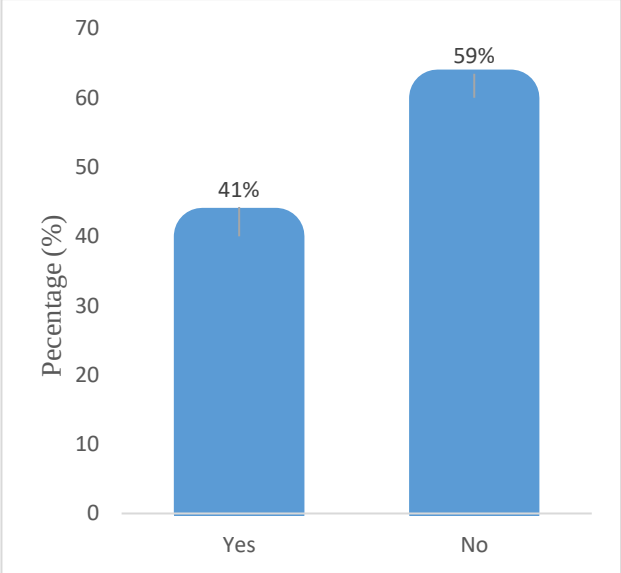

Table 1. Age groups distribution of study cases

Age	Frequency	Percentage
40 45 Years	30	15%
45 -50 Years	50	25%
50 -55 Years	75	37.5%
55 -60 Years	30	15%
60 -70 Years	15	7.5%
Total	200	100%

Table 2. Smoking status of study population

Smoking History	Frequency	Percentage
Smokers	70	35%
Non Smokers	130	65%
Total	200	100%

Table 3. Severity of COPD exacebations

Severity of COPD	Frequency	Percent
Mild	19	9.5%
Moderate	64	32%
Severe	86	43%
Very severe	31	15.5%
Total	200	100%

Table 4. Relation of COPD duration with bronchiectasis

Patient's duration of COPD	**HRCT showing bronchiectatic changes**		**Total**
	Yes	**NO**	
>1yrs	6 (3%)	17 (8.5%)	23 (11.5%)
1-2 yrs	24 (12%)	20 (10%)	44 (22%)
2-5yrs	14 (7%)	15 (7.5%)	29 (14.5%)
5-10yrs	38 (19%)	30 (15%)	68 (34%)
>10yrs	32 (16%)	17 (8.5%)	76 (38.%)
	100 (50%)	100 (50%)	200 (100.0%)

Table 5. Correlation between patient occupation, literacy rate & bronchiectasis

HRCT showing bronchiectatic changes	**Patient Literacy status**	**Patient Occupation**				**Total**
		Labor	**Office worker**	**Retired**	**Housewife**	
Yes	Illiterate	7	0	3	51	61
	Primary to secondary	2	3	7	5	17
	Graduate & post -graduate	0	0	1	0	1
	Total	**9**	**3**	**11**	**56**	**68**
No	Illiterate	15	0	4	63	82
	Primary to secondary	4	4	5	1	14
	Graduate & post -graduate	1	0	0	0	1
	Total	**29**	**7**	**9**	**64**	**97**

Discussion

All across the world, chronic obstructive pulmonary disease, or COPD, is a major cause of morbidity and an elevated death rate. It also poses a significant financial and social challenge. Despite the limited sample size used in the study, it was still deemed enough to represent the general pattern of bronchiectasis prevalence among COPD patients in Sindh. The average age in our research was 56 years old. Just 7.5% of our patients were older than 60, with 37.5% of those in the 50–55 age range. 41. percent of the patients had bronchiectasis, which is similarly similar to the results of the previous 13 studies carried out in Pakistan. A research by da Silva SM and colleagues obtained nearly the same findings.[14] According to the results of our investigation, the frequency of bronchiectasis in female patients was nearly double that of male patients. The majority of the patients in our research were either overweight or had normal BMIs, according to BMI analysis. The percentage of underweight people was extremely low (2%). Furthermore, it was observed that a lower proportion of the patients in this study—35 percent—

smoked than did non-smokers (65%). The length of COPD was a major factor in bronchiectasis presence. As COPD worsens over time, bronchiectasis becomes more prevalent. The existence of bronchiectasis also affects the disease's tendency to worsen. Individuals with bronchiectasis and COPD typically exhibit moderate (24%) or severe (21%) exacerbations upon presentation. Only a small percentage of individuals may have moderate or severe COPD exacerbations. The number of female patients with bronchiectasis was 42, whereas there were only 20 male patients with the condition in this study based on age and gender stratification of COPD patients with bronchiectasis. As a result, the number of female patients exceeded that of male patients. Furthermore, the majority of patients with positive bronchiectasis diagnoses were between the ages of 50 and 55. There was a lower prevalence of bronchiectasis in the age categories under 40–45 and above 60. Comparably, stratifying COPD patients' bronchiectasis based on their profession and literacy rates revealed that housewives had the highest rates of the condition and that nearly all of them were illiterate. The incidence of office workers with only a secondary education was lowest. In terms of our patients' educational backgrounds, we discovered that the vast majority of them were illiterate. The study's noteworthy finding was that smoking had no impact on the existence of bronchiectasis. As a matter of fact, patients who smoked had a lower incidence of bronchiectasis than patients who did not smoke. This demonstrated that the development of bronchiectasis in nonsmokers was caused by a few additional variables.

Chi-square test shows there is association between different factors of study i.e Patient's age, gender, BMI, duration of COPD, severity of COPD, comorbidities, smoking status and literacy status.

Thus, it may be said that a considerable portion of COPD patients have bronchiectasis. For its diagnosis, HRCT is the most effective diagnostic technique. The majority of illiterate persons had the highest frequency of bronchiectasis. As the rate of literacy rises, its frequency falls. Housewives are most impacted, most likely as a result of inadequate management of COPD due to their ongoing exposure to indoor pollution and lack of knowledge about their health. Bronchiectasis risk is also increased by the length of COPD. If the patient has had COPD for longer than five years, we should think about screening them for bronchiectasis. This is especially important if the patient is illiterate, has been exposed to indoor pollution at home or at work, or has co-occurring conditions like diabetes mellitus and hypertension.

In the long term, better symptom control and fewer consequences will result from early identification and treatment of bronchiectasis in COPD patients. Large-scale research have not examined bronchiectasis, which is detected by chest computed tomography in COPD patients, and its concomitant impact on prognosis. It is critical to comprehend the existence of bronchiectasis in COPD in order to guide future interventions and stop the disease's development.

Conclusion

According to the results of our investigation, 41% of patients with a diagnosis of COPD had bronchiectasis. The presence of bronchiectasis is influenced by the patient's age, gender, occupation, and length of COPD; it is less affected by the patient's BMI, comorbidities, or smoking habit.

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