



Clinical Etiological and Radiological Profile of Bronchiectasis Patients in a Tertiary Care Center

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Citation of this Article: Dr. Koripi Kondalarao, Dr. H. Krishna Murthy, Dr. Vinod Achari, “Clinical Etiological and Radiological Profile of Bronchiectasis Patients in a Tertiary Care Center.” IJMSAR – March – 2024, Vol. – 7, Issue - 2, Page No. 15-24.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

ABSTRACT

Background

Bronchiectasis is a chronic suppurative condition that leads to morbidity and mortality due to its complications. HRCT is considered the gold standard for its diagnosis [2,3]. There are various clinical conditions, which can lead to this chronic illness like Post-infectious, ABPA, COPD, Malignancy, Connective tissue diseases and cases with unknown etiology [5]. As these conditions differ in their management and prognosis, hence the diagnosis of underlying etiology is important.

Aim and Objective

To assess the clinical presentation, etiology, radiological findings of bronchiectatic patients at our hospital.

Methodology

This is retrospective, medical record-based study done at Viswabharathi medical college and hospital. A total of 30 patients aged between 40-60 years with a diagnosis of bronchiectasis proven by HRCT were included.

Demographic features, clinical presentation, associated conditions and radiological features were collected. Results are tabulated and analysed.

Results

Out of 30 patients study population 40% were having post infectious etiology, followed by 26% cases of Lung cancer, 10% cases of copd, 10% cases of CTD's,

7% cases of ABPA and 7% cases of unknown etiology.

Conclusion

The purpose of this study was to point out certain important differences in the etiology, clinical, and radiological profile of patients with bronchiectasis. Majority of the patients were men, younger than 60 years of them post TB bronchiectasis was the leading cause.

Hemoptysis was the most frequent complication.

Keywords

Etiology, radiology, bronchiectasis, complications, clinical profile.

INTRODUCTION

Bronchiectasis is an abnormally, irreversibly dilated and thick-walled bronchi. This is an anatomic definition and is thought to have evolved from Laennec's original description of ectatic bronchi in pathological specimens(2,3).

It represents the end stage of a pathologic process that cause destruction of the bronchial wall and its supporting tissues. It remains an important cause of suppurative lung disease in the developing world.

The clinical manifestations include chronic cough and copious mucopurulent expectoration, often lasting months to years. Recently, the declining incidence of this disease in the developed world has been suggested.

The decline has been variously attributed to advent of improved living conditions, improved sanitation and nutrition, and introduction of childhood immunization, particularly against measles and pertussis.

Although CF-associated bronchiectasis has been studied extensively, non-cystic fibrosis bronchiectasis since long considered an orphan lung disease (6).

Recently there has been a growing interest in this rather neglected disease since it is the cause of significant morbidity and mortality(4).

As described by Coles vicious cycle model, bronchiectasis is associated with microbiological colonization of airways with recurrent infections and chronic inflammation leading to impaired mucociliary clearance and progressive lung damage (11).

AIM AND OBJECTIVES

To assess the clinical presentation, etiology, radiological findings of bronchiectatic patients at our hospital.

MATERIALS AND METHODS

Study Design

Retrospective, medical record based study.

Study period

6 months from October 2022 to March 2023.

Sample size

30

Inclusion Criteria

1. Patients aged between 40-60 years were included in the study.
2. Patients who are diagnosed to have bronchiectasis based on HRCT findings are included in the study.

Exclusion Criteria

1. Patients aged below 40 years and above 60 years were excluded from the study.
2. Patients with Interstitial lung disease and traction bronchiectasis were excluded.
3. In history, the emphasis was laid on previous severe lower respiratory tract infections, Pneumonia, Tuberculosis, COPD, smoking status, ABPA, signs and symptoms suggestive of

Connective tissue diseases, and duration of symptoms.

METHODOLOGY

The age was divided into two groups, i.e., age between 40-50 years, and 50-60 years. The duration of symptoms was also divided into three groups, i.e., between 1-5 years, 5-10 years, and >10 years. Workup to evaluate the diagnosis of bronchiectasis was done as per BTS(British thoracic society) guidelines for bronchiectasis (5).

Patients having cough with sputum was sent for AFB(acid fast bacilli), bacterial and fungal cultures. Sputum sample which grew two or more organisms was labeled to have a mixed population.

Bronchoscopy was performed in patients who had hemoptysis to localize the site of bleeding, in patients whose sputum culture did not grow any organism and the patients who were not improving clinically on empirical treatment and patients with focal bronchiectasis to rule out proximal obstruction.

Diagnosis of post TB or post pneumonia bronchiectasis was made when the suggesting symptoms followed soon after a severe respiratory infection.

Patients with a history of asthma and evidence of proximal bronchiectasis was evaluated further with Serum IgE, Aspergillus specific IgE, and Aspergillus skin test.

These patients were labelled to have underlying ABPA based on established ISHAM criteria for the diagnosis of ABPA(16).

Radiologically and histopathologically proven cases of lung cancers were screened for bronchiectasis, among them adenocarcinoma constituted the highest number of cases of bronchiectasis followed by

squamous cell cancer, large cell cancer and lymphomas.

The mechanism of development of bronchiectasis in these cases were external compression, intraluminal obstruction of the mass and lymph nodes followed by associated conditions like COPD and immunosuppression.

In patients with smoking history >15 pack years, diagnosis of bronchiectasis was made secondary to COPD, with spirometric diagnosis of post-bronchodilator obstructive airway impairment and evidence of background emphysema, and if symptoms appeared after a pertinent workup inconclusive of other condition which can lead to bronchiectasis and history of significant smoking.

For the patients with a history suggestive of arthritis and Connective tissue diseases, workup done including rheumatoid factor, anti-CCP, and antinuclear antibody (ANA) profile. An extended panel for Connective tissue diseases was sent if these results were negative but history did point towards any other connective tissue disorder.

If all of the above-mentioned workups did not point toward a specific diagnosis, patients were labelled to have idiopathic bronchiectasis.

Radiological extent of bronchiectasis was divided into UUL, BUL, ULL,BLL, ML&LL, DUB (all the lobes of one hemithorax involved)], DBB (bilaterally if two or more lobes are involved)].

In all patients spirometry was performed. The spirometric data were categorized into obstructive and possible restriction/nonspecific as per the ATS/ERS task force statement on standardization of lung function testing (17).

RESULTS

A total of 30 patients with the diagnosis of bronchiectasis based on HRCT findings were enrolled from 2022-2023. In this cohort, 60% (n = 18) were men. The age of the patients was divided into two groups: between 40 to 50 and 50 to 60 years. The demographic features were depicted in Table 1.

The majority of them (83.2%, n = 25) were younger than 60 years of age. Out of 30 patients, 95.9% (n =

28) were admitted with an exacerbation while rest 4.1% (n = 2) had chronic stable bronchiectasis and admitted with other medical issues.

Majority of these patients had a duration of symptoms in between 5-10 years 58.2% (n-17) between 1-5 years with 29.1% and 12.8% had chronic symptoms for greater than 10 years.

The clinical characteristics of patients are summarized in Table 2.

Pie Chart Showing Distribution of Gender

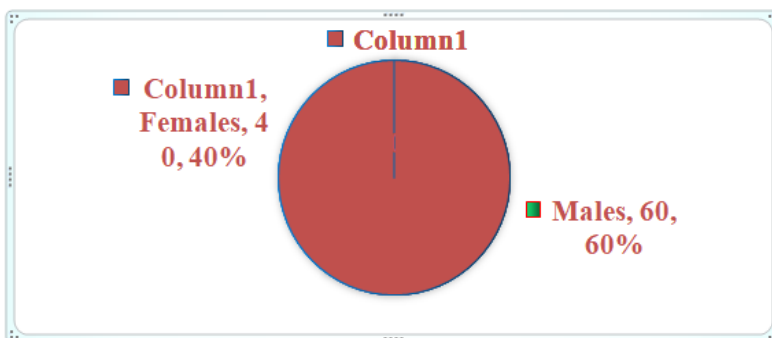


Table 1: Depicting Demographic Features of the Patients.

PARAMETERS	FREQUENCY
AGE(years)	
40-50	22
50-60	8
GENDER	
Males	18
Females	12
DURATION OF SYMPTOMS(years)	
1-5	10
5-10	15
>10	5

Table 2: depicting the clinical characteristics of the patients:

SIGNS AND SYMPTOMS	NUMBER OF PATIENTS
COUGH	28
SPUTUMPRODUCTION	27
NO SPUTUMPRODUCTION	03
DYSPNEA	24
CREPTS ON AUSCULTATION	20
FEVER	16
CLUBBING	18
WHEEZING	06
MEDICALLY MANAGED	22
REQUIRED ONCOLOGICAL REFERENCE	06
DIED	5

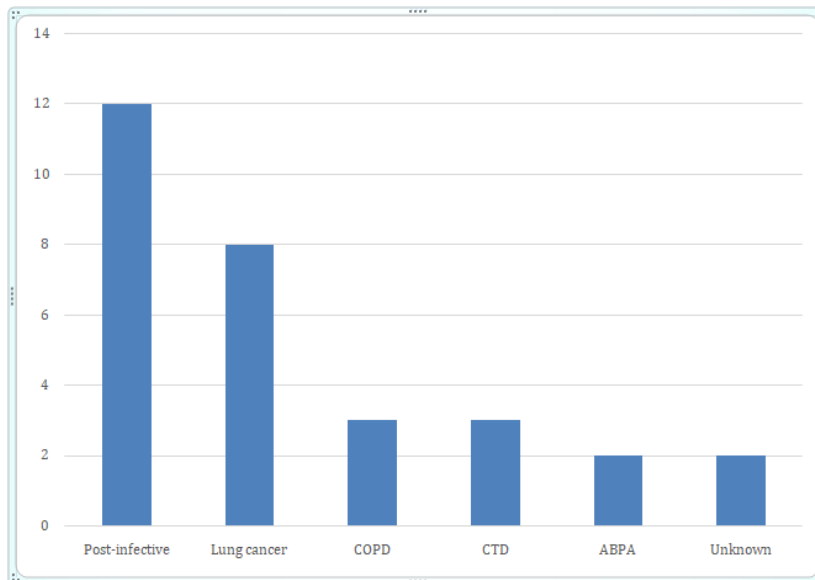
The etiology of bronchiectasis was identified in 91% (n = 27) while in 9% (n = 3) cause remained unknown. Figure 2 shows post infectious bronchiectasis was the most common cause (40%, n = 12) out of which a history of TB was present in 85% (n = 10/12) and a history of pneumonia in 15% (n = 2/12).

It was followed by Lung cancer (26%, n = 8), COPD (10%, n = 3), Connective tissue diseases (10%, n-3), ABPA (7%, n-2)and Unknown etiology (7%,n-2).

Spirometry was normal in only 2.6% (n = 5) cases. Severe Obstructive impairment was observed in 68.9% (n = 20) , moderate obstruction observed in 11.4% (n = 3) had restrictive impairment present in 10%(n=3). Due to advanced age or severity of symptoms, 4 patients (10%) were sent for spirometry but they were unable to perform the spirometry.

Spirometric Data Showing Different Patterns Causing Bronchiectasis:

SPIROMETRY	FEV1	FEV1/FVC	NUMBER OF CASES
Severe obstruction	<0.7	<40%	20
Moderate obstruction	<0.7	<60%	3
Restrictive pattern	<0.7	>90%	3



Radiologically the patient were categorized based on the findings in the chest x ray and Hrct chest, where 16(54%) have ring shadows, parallel lines on x ray and 30(100%) have dilated cystic bronchi, tram track opacities on HRCT chest.14(46%) cases have normal x ray findings.

RADIOLOGY	PRESENT	ABSENT
CHEST XRAY FINDINGS (Ring shadows, Parallel lines and Tram track lines).	16 (54%)	14(46%)
HRCT findings (Dilated cystic bronchi, air-fluid levels, Tram track opacities and signet ring sign.)	30 (100%)	—

In terms of radiological pattern, the majority of the cases with post TB bronchiectasis were associated with either unilateral upper lobe or bilateral upper lobe bronchiectasis found in 72% (9/12) of patients and nearly 1/4th i.e. 9% (1/12) of patients had diffuse unilateral disease involving all lobes of a hemithorax.18%(2) of patients develop bronchiectasis from other infections like pneumonia involving unilateral lower lobe.

Table 4: depicting the involvement of the lobes of the lungs

RADIOLOGY N (%)	POST Tubercular (10)	LRTIS	LUNG CANCER (8)	COPD (3)	CTD (3)	ABPA (2)	UNKNOWN ETIOLOGY (2)
UUL	3		-	-	-	-	-
BUL	6		2	-	-	2	-
DBB	-		-	1	-	-	1
DUB		2	4	-	-	-	-
BLL	-		-	2	2	-	1
ULL	1		2	-	1	-	-

Most of the lung cancer cases were associated with Diffuse unilateral bronchiectasis 50% (4/8) followed by 25%(2/8) with bilateral upper lobe and 25%(2/8) unilateral lower lobe.

The majority of the patients with bronchiectasis secondary to ABPA, Lung cancer, COPD, idiopathic, CTD, had either diffuse bilateral bronchiectasis or bilateral lower lobe bronchiectasis. These are depicted in Table 4.

These patients were also assessed for any associated complications. Hemoptysis was the most frequent complication.

DISCUSSION

Data from the studies conducted by Dimakou K et al, Faverio P et al, and Araujo D et al mean age of patients with bronchiectasis was between 60 and 67 years and the majority were women [3,15,18]. However, in this study majority of patients were men

18 (60%) and 25 (83.2%) of the total patients were younger than 60 years of age.

In terms of clinical signs and symptoms, cough was the most frequent symptom found in 28 (92.4%) patients with daily sputum production in 27 (90%) patients which is comparable to the study conducted by Dimakou K et al, Pasteur Mc et al, Dhar R et al [3,5,9].

This is however interesting to note that despite a large number of the patients had upper lobe bronchiectasis, yet they had complaints of daily sputum production instead of having dry bronchiectasis.

The productive cough in this group can be explained by the fact that post TB sequelae are just not limited to bronchiectasis, as these patients can also have bronchial distortion, obstructive airway disease unrelated to bronchiectasis, fibrosis, cavitation to name few (19).

Some of these patients having localized bronchiectasis, had a severe airflow obstruction or nonspecific impairment with very low FEV1 and FVC. So in post TB patients, it is difficult to comment if all the symptoms are due to bronchiectasis only.

The majority of the patients in the current study were admitted with an exacerbation of daily symptoms which is likely explained by the inpatient setting of this study.

Lung cancer being the second common cause, radiologically and histopathologically proven cases of lung cancers were screened for bronchiectasis, among them adenocarcinoma constitutes the highest number of cases of bronchiectasis.

The 3rd most common cause of bronchiectasis in this study is COPD. Majority of the patients in this group were older than 46 years of age, without evidence of alpha one antitrypsin deficiency and with a smoking history of >15 pack-year.

Biomass fuel exposure, Huqqa/Sheesha smoking are the other risk factors which we cannot estimated by pack-year of smoking.

In this cohort, only 7% of the cases remain idiopathic, where as study conducted by Dimakou K et al, Pasteur Mc et al, Dhar R et al comprises idiopathic cases of 18-22 percent [3,5,9].

The majority of the patients with bronchiectasis secondary to ABPA, COPD, idiopathic, Connective tissue diseases, had either diffuse bilateral bronchiectasis or bilateral lower lobe bronchiectasis.

Like studies conducted by Dimakou K et al, Dhar R et al Cherniack NS et al, Guan WJ XU G et al obstructive impairment was the predominant spirometric pattern in our study too (69%) [3,9,21,22].

Patients with low FEV1 and FVC could not be classified into restrictive pattern and pseudo restriction because of unavailability of plethysmograph in our Institute because of air trapping or extrapulmonary causes of restriction.

It is one of the limitations of this study. It is important that only four patients had normal spirometry. As mentioned earlier, the majority of the patients in our cohort had post TB bronchiectasis, and these patients can have other post TB sequelae leading to abnormal spirometry.

Hemoptysis was the most frequent complication. It was submassive to massive hemoptysis in majority of cases.

A large proportion of these patients responded to antibiotics alone, five of them required bronchial artery embolization and four of them were referred to surgeons for lobectomy.

CONCLUSION

In conclusion, our study does point out certain important differences in the etiology, clinical, and radiological profile of patients with bronchiectasis when compared to data from Europe and the USA. Majority of the patients were men, younger than 60 years and post TB bronchiectasis was the leading cause of bronchiectasis.

Hemoptysis was the most frequent complication. Large multicenter study is needed to draw some more generalised conclusions, as this is a single center study.

ABBREVIATIONS

COPD: Chronic obstructive Pulmonary disease

ABPA: Allergic bronchopulmonary aspergillosis

HRCT: High resolution computed tomography

CTD: Connective Tissue Diseases

TB: Tuberculosis
CF: Cystic fibrosis
ANA: Anti nuclear antibody
Anti-CCP: anti-cyclic citrillunated peptide
UUL: Unilateral upper lobe
BUL: Bilateral upper lobes
ULL: Unilateral lower lobe
BLL: Bilateral lower lobes
ML and LL: Middle lobe and lingual lobe
DUB: Diffuse unilateral bronchiectasis
DBB: Diffuse bilateral bronchiectasis
ISHAM: International Society for Human and Animal Mycology
FEV1: Forced expiratory volume in 1 sec
FVC: Forced vital capacity
USA: United States of America
AFB: Acid fast bacilli.

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