



Original Research Article

Clinico demographic profile of patients with bronchiectasis – A cross sectional study

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ABSTRACT

Introduction: Bronchiectasis (BE) is a common but neglected chronic lung disease. Most epidemiological data are limited to cohorts from Europe and the USA, with few data from low income and middle income countries “Bronchiectasis” is a chronic debilitating respiratory condition, natural history of Bronchiectasis is variable, some patients have only a few chest infections per year with no disease progression overtime, while others have more frequent prolonged infective episodes and progress more quickly to respiratory failure with an associated increase in risk of death.^{1,2} A vicious cycle of infection and inflammation exists in damaged airways with patient suffering from persistent cough, purulent sputum production, recurrent chest infections and general malaise, associated with increased morbidity and reduced quality of life and socioeconomic, cost of long term management is significant.

Materials and Methods: 162 CT confirmed adult patients ≥ 18 years were included in the study, data of patients were retrieved demography, clinical features, causative factors, spirometry and imaging reports were studied and analysed.

Results: 162 adult patients were included in the study. Males (54%) and more than 50 years age group population [64%] was predominantly affected. 58% were non-smokers.

Chronic cough (100%) with sputum production (86%) and fatigue (78%) were the most common symptoms, digital clubbing and crackles were the most common examination findings. Dominant cause of BE was post infection (46%) followed by COPD (20%), ABPA (10%) and miscellaneous causes. Obstructive abnormality (42%) was the most common spirometric pattern observed. Higher incidence of cystic BE (57%) was found in our study.

Conclusions: Patients > 50 years and males were predominantly affected. Most of the study population had never smoked. Most common symptom found was chronic productive cough and fatigue. Etiology of BE is heterogeneous. Post Tuberculosis BE variety was common. BE in COPD patients was not less common. Central Bronchiectasis was not uncommon.

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1. Introduction

BE was originally described in 1819 by Laennec. BE is a chronic lung disorder characterized by permanent dilatation of Bronchi leading to impaired mucociliary clearance, chronic airway inflammation and bacterial colonization and is associated with chronic cough, daily sputum production and recurrent respiratory infection. BE not associated with Cystic-Fibrosis is known as non-Cystic-Fibrosis BE.

BE is a growing global health problem. In Europe and the USA, the reported prevalence of the disease has increased by more than 40% in the past 10 years. In India specific data on prevalence of BE are not available.^{1,2} The characteristics of patients from low income and middle income countries might be different to those in Europe.^{3,4} Prevalence of BE is estimated to be 50 to 500 per 1,00,000 people, based on European datasets.⁵ BE is associated with frequent acute exacerbation which are an independent predictor of progressive decline in respiratory function

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and poorer prognosis, compare to those with infrequent exacerbations.^{5–8} Clinical profile and presentation of BE patients have changed significantly with the introduction of antibiotics. A large study in 1940, mortality rate was 30% with most of the patients dying before the age of 40.⁹ High resolution computed Tomography (HRCT) scan is the “gold standard” for confirming the presence of BE and extent of the disease.¹⁰ BE is end result of pathological process involving a vicious cycle of inflammation, recurrent infection, bronchial wall damage that can occur in association with a variety of causes, such as infection, genetic abnormalities, inflammatory, environment, allergic, chronic aspirations, immunologic conditions, auto immune diseases, obstructing airway lesion and pre-existing COPD or Asthma.^{7,11,12} Proper analysis and rigid follow up of BE patients at specialized centres can result in proper etiological diagnosis of BE can alter the approach of therapy in most of the cases.^{13–15} Non-invasive, efficient, safe and effective technologies have emerged to both diagnose and treat this condition. Under diagnosis of these cases lead to significant delays in initiating appropriate therapy.¹⁶ Current clinical management includes treatment of concurrent etiologic conditions, promotion of airway clearance, and reduction in bronchial inflammation to suppress or to prevent chronic bronchial inflammation.¹⁷ Effective management can interrupt the vicious cycle of BE, complications which frequently occur. Persons with BE often require intensive and costly medical treatment over extended period of time.¹⁸

2. Materials and Methods

Objectives of the Study: This study was undertaken to evaluate the demography, clinical features, etiological factors, lung function, radiological features in patients with Bronchiectasis.

A cross sectional study was undertaken in the department of pulmonary medicine in tertiary care teaching medical College hospital for the period of two years. Comprehensive demographical, clinical, functional and imaging data were collected and reviewed. Smoking habits and laboratory reports were analyzed.

Patients consent: obtained in written informed consent
Institutional ethical committee approval: obtained

2.1. Inclusion criteria

1. 162 CT confirmed adult Bronchiectasis patients ≥ 18 years.
2. Post infectious BE was considered in presence of clear history of previous respiratory infection along with clinical signs and symptoms suggestive of BE after an episode of respiratory infection and HRCT findings consistent with BE.

2.2. Exclusion criteria

1. Patients with Cystic Fibrosis

2.2.1. Modified medical research council dyspnoea scale

0	“I only get breathless with strenuous exercise”
1	“I get short of breath when hurrying on the level or walking up a slight hill”
2	“I walk slower than people of the same age on the level because of breathlessness or have to stop for breath when walking at my own pace on the level”
3	“I stop for breath after walking about 100 yards or after a few minutes on the level”
4	“I am too breathless to leave the house” or “I am breathless when dressing”

3. Results

Total 162 CT confirmed Bronchiectasis patients were enrolled in the study. Age of the study population ranged from 18 to 74 years and was predominantly composed of males (54%). Bronchiectasis in most of the cases (64%) occurred between the age of 50 to 74 years. 58% of the cases never smoked, 26% cases continue to smoke Cigarettes in spite of chronic persistent cough, sputum production and also counselling by family member and health care providers, 16% cases abandoned smoking after getting recurrent exacerbations and repeated counselling by health care providers and family members.

Table 1: Demographic data of patients with Bronchiectasis

Age (Years)	Male N	Female N	Total N
18 – 50	31	27	58 [36%]
> 50	56	48	104 [64%]
Total	87 [54%]	75 [46%]	162

Smoking Habits n – 162
Non Smokers n (%) – 94 [58%]
Ex-Smokers n (%) – 26 [16%]
Smokers n (%) – 42 [26%]

Table 2 Summarizes Respiratory signs and symptoms of Bronchiectasis patients. The most common symptom found in all the patients was chronic cough. 86% cases had daily mucopurulent sputum, dyspnoea (74%) of MMRC grade 1 to 3, most of the patients had fatigue (78%). 52 (32%) cases had mild to moderate haemoptysis at the time of admission to the Hospital also had recurrent Haemoptysis. A quarter of the patients had given history of pleuritic chest pain at the time of admission to the hospital. 30% had associated Rhino sinusitis with intermittent nasal discharge and recurrent headache, all the patients had to take ENT consultation. 62% had fever at the time of admission to hospital. More than half (68%) of the cases had clubbing of digitals. Physical examination finding in the records revealed presence of

crackles (100%) in all the cases and Wheeze in (46%) cases.

Table 2: Common signs and symptoms occurring in bronchiectasis.

Symptoms and Signs	Occurrence	(%)
Cough	162	100
Daily sputum production	139	86
Dyspnoea	120	74
Haemoptysis	52	32
Pleuritic Chest pain	36	22
Rhino sinusitis	49	30
Fatigue	126	78
Fever	100	62
Digital clubbing	110	68
Crackles	162	100
Wheez	75	46

Table 3 Shows the frequency of reported aetiologies.

42 (26%) cases had chronic chest symptoms from childhood, following respiratory infections and records revealed that after the recovery from above illness, they continue to have cough and sputum production with infrequent exacerbations and sometimes they had to be hospitalized. 45(28%) patients had given past history of Pulmonary Tuberculosis and had taken anti Tuberculosis treatment for 6 to 9 months. 33(20%) cases had chronic obstructive Pulmonary disease (COPD). All of them were either smokers or ex-smokers and had moderate to severe airflow obstruction in their lung function test. 16 (10%) cases had Allergic Broncho Pulmonary Aspergilosis (ABPA) their HRCT showed Central Bronchiectasis with thick mucus plugs in most of the cases and had frequent execrations, 8(5%) cases had Asthma. Few BE cases had connective tissue disease, immuno deficiency and other causes. Causes in most of the BE patients was due to postrespiratory infection and followed by COPD, ABPA and few cases had BE secondary to CTD and Immuno-deficiency, other cases were less common.

Table 3: Common causes of bronchiectasis

Causes	No	%
Post TB	45	28
Post – Infective [non-TB]	29	18
COPD	33	20
ABPA	16	10
Asthama	8	5
Connective Tissue Disease	3	2
Immuno Deficiency	5	3
Others	23	14

Spirometry was performed, once the patients were stable. 68(42%) Cases had obstructive pattern of abnormality in spirometry of which 13% showed good response to Bronchodilator reversibility test, 29% had irreversible airflow obstruction. 22% had restrictive abnormality, 36%

showed mixed pattern in Spirometry. Obstructive pattern of lung function was predominant.

Chest X-Ray followed by HRCT chest was done for all the cases, whose history suggestive of Bronchiectasis. Radiologists imaging reports were analysed, Bilateral lower lobe involvement of BE was found in 62% patients, 20% had either middle/upper or multilobar involvement. 10% had Central Bronchiectasis with mucoid Impaction giving finger in glove/tooth paste like appearance in CT image of majority of cases. 8% had localized involvement (single lobe). 57% had cystic Bronchiectasis and 33% had cylindrical Bronchiectasis and 10% had combined cylindrical and cystic type of BE. None had varicose type of BE. Bilateral diffuse involvement of Bronchiectasis was found in majority of the patients, very few cases had localized involvement of lungs.

4. Discussion

This study evaluated, demographic clinical manifestations, etiological factors, spirometry and radiological features in 162 HRCT confirmed Bronchiectasis patients determined by using standard protocol and diagnostic tests. Majority of patients (64%) belonged to the age group > 50 years, with males [54%] being predominantly affected, was in-line with other studies.^{2,10,19} Higher incidence of BE in males was due to heavy smoking. Prevalence of BE in Asians were suggested to be higher than that of Westerners.^{3,20,21} In contrast with BE patients in high income countries are predominantly older and females.^{11,13,20,22} The reasons for difference in prevalence among Asian and Western populations have been suggested to be higher prevalence of pulmonary infection and Pulmonary Tuberculosis in Asians.^{23,24}

Majority of the study patients (58%) never smoked, 26% were smokers, 16% were ex-smokers, this is comparable with other studies.^{2,11,13,25,26} Those patients who had COPD with BE were either smokers or ex-smokers. All females were non-smokers but most of them were exposed to indoor bio mass smoke while cooking, similar finding seen in other studies.^{27,28}

Analysis of symptoms of BE showed chronic productive cough was the dominant symptom, and was in line with other studies.^{11,19,25,26,29} Majority of the patients had daily sputum which was either mucoid or mucopurulent. 3/4th of patients had dyspnoea; similar result was seen in other studies^{11,13,19,25,26} and higher incidence of dyspnoea reported by Utpat et al (92%).²⁹ Persistent Mucus purulent sputum and grade 3 dyspnoea was associated with poorer lung function. 32% cases had reported mild to moderate haemoptysis at the time of admission to the hospital and had recurrent haemoptysis, which was also mild to moderate for many years and most of them had to be hospitalised. Similar incidence was reported in earlier studies.^{13,25} Higher incidence (44%) was reported by

Utpat et al. in other study.²⁹ Haemoptysis was commonly associated with Bronchiectasis; it varies from mild to massive Haemoptysis some patient's required medical line of treatment and 7 patients required invasive line of management. Many patients (30%) who had Rhino Sinusitis are most commonly associated with BE.^{25,29} 78% of the study patients had chronic fatigue, which often reduced their physical activity and impaired quality of life, had to lose their jobs consequently their family income was significantly affected and most of them were depressed. Similar incidence was reported in other studies.^{11,25} Digital clubbing (68%) was most commonly associated with BE which comparable with previous studies,^{19,29} in contrary study by King et al. had reported only 2% digital clubbing in patients with BE.²⁵ High incidence of digital clubbing in our studies may be due to chronic respiratory infection and frequent exacerbations. All the patients had crackles on Respiratory System examination and is in accordance with other studies.^{19,29} Lower incidence was reported in other studies.^{25,26} Half of the patients had wheezing which was identical with earlier studies^{19,29}. But lower incidence rate was reported in other studies.^{25,26}

BE aetiology could be identified in a large proportion of patients (86%). Post infection (46%) was the most frequent underlying cause of BE in our study. Similar findings found in other studies^{2,13,30}. Out of which TB (28%) was the most common cause of BE and is comparable with other studies.^{2,13,30,31} TB is a leading cause of BE in Eastern Europe and Asia^{22,32} it is not a common comorbidity in western population and is very much lower than found in our study. Higher incidence of TB was reported by Jalaly et al. (48%),^{19,27,33–36} In Asia TB is thought to be an important underlying cause of BE.³⁷ The reasons for different prevalence among Asian and western populations have been suggested to be higher prevalence of pulmonary infection & Pulmonary Tuberculosis in Asians. Most of the post infective non TB BE patients (18%), had given past-history of childhood respiratory infections following which they continue to have cough with less frequent exacerbations initially. Later on frequency of exacerbations was increased with increased Sputum production. Similar incidence was found in other studies² this incidence was lower than reported by Amorimet at. (30.3%).¹³ Post infectious causes of BE is reduced in developed countries due to vaccination programme, proper use of antibiotics and by maintaining social hygienic condition.³⁸

COPD (20%) is the second most common cause of BE identified in this study, is in consistent with other studies^{11,23} all of them had irreversible air flow obstruction in spirometry and more chest symptoms with recurrent exacerbations, most of them were ex-smokers and had given past history of less physical activity. Lower incidence reported by Dhar et al. (5%) 1, Alivera et al. (7.8%). Higher incidence of BE was reported by Tan et al, 14.1%

with mild COPD and moderate COPD 22.2% and 34% in Service COPD. Development of BE among COPD patients is directly related to severity of the disease.³⁹ It has been recently recognized that BE, frequently occur in patient with COPD may be up to 50-54%.^{40–42} Higher incidence of BE COPD can be attributed to smoking habits in them.

Similar incidence was reported in both US and European regions.^{11,40} ABPA (10%) is not uncommon cause of BE, in our study and was in accordance with other studies.^{2,22,29} ABPA is an important cause of BE to identify, because it has a specific treatment, that can improve the symptoms and prevent lung function decline and recurrent exacerbations there by preventing the development of severe BE.^{43,44} Most of them had central Bronchiectasis and all of them had obstructive pattern with moderate to good response to Broncho-dilator reversibility test. 5% case had Asthma with BE, all of them were younger and had mild to moderate air flow obstructions showed good Bronchodilator reversibility test. Sputum production was less among these patients. Almost similar incidence was seen in other studies.^{22,31} Higher incidence reported by Aksamit et al. (29%).¹¹ All had cylindrical type of BE.

BE secondary to CTD (3%) and immuno-deficiency (2%) was less common in our study and all of them were young and had restrictive pattern of lung function in spirometry. Sputum production was less among these patients.

Radiological analysis showed that majority of the patients had Bilateral BE with Predominant involvement of lower lobes. 1/5th of the patients had middle/upper/multilobar involvement and 10% had central BE and majority of the patients had cystic BE and one third of the patients had cylindrical BE. Multilobar involvement was common similar finding was seen in other studies.¹³ None of the patients had varicose type of BE.

Majority of BE patients had obstructive pattern of lung function most of them had irreversible in bronchodilator reversibility test and 1/4th of the patients of reversible airflow obstruction. 1/5th had restrictive impairment of lung function and 1/3rd showed mixed pattern in spirometry. In patients with diffuse bilateral involvement of BE had poorer lung function and localized BE showed better lung function.

5. Conclusions

Demographic and base line characteristics of study population were predominantly consisted of men, most of BE occurring in between the age of 50-74 years. Majority were non-smokers although medical history indicates BE but definitive Diagnosis was made based on CT chest. The typical clinical profile of BE was long standing cough with sputum production followed by dyspnoea and Rhino sinusitis and fatigue, digital clubbing and crackles was the common examination findings. BE secondary to Post infection was the dominated aetiology. COPD was the

second common cause of BE. ABPA is also not uncommon followed by miscellaneous causes. Cystic type of BE was predominant CT finding. Majority cases had poorer lung function.

BE is caused by many disease establishing its etiology is important for clinical and prognostic reasons. Main aim of management is to reduce symptoms, reduce exacerbation frequency and severity and preserve lung functions and improve patient's related quality of life.

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8. Conflict of Interest

The authors declare they have no conflict of interest.

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