



ORIGINAL RESEARCH PAPER

Pulmonary Medicine

STUDY OF BRONCHIECTASIS AT A TERTIARY CARE CENTRE

KEY WORDS: Bronchiectasis, HRCT Thorax, Spirometry

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ABSTRACT

Bronchiectasis is defined as an irreversible dilation and destruction of one or more bronchi, with a reduction in clearance of secretions and in the expiratory airflow. The present study was undertaken by analyzing data to study the clinical, microbiological, radiological & spirometric profile of patients with Bronchiectasis. In this study of total 100 Bronchiectasis patients, 61 (61%) were males and 39(39%) were female. The minimum age was 18 years, the maximum age 83 and the mean age 48.5 years. Productive cough was the commonest symptom. An underlying etiology was identified in 87% of the patients. Most commonly, bronchiectasis was post-infectious due to tuberculosis and pneumonia. ABPA was found in 2%. The most commonly isolated bacterium was Haemophilus influenzae. On HRCT Thorax bronchiectasis was limited to one lung in 64% of the cases & bilateral in 36% cases. The predominant pattern of bronchiectasis on HRCT-thorax was cylindrical in 61%, cystic in 36% and varicose in 3% of the cases. On spirometry most common pattern was obstructive ventilator defect. Any patient with significant history and clinical findings suggestive of Bronchiectasis should be evaluated with various hematological, microbiological, Radiological investigations and spirometry to make confirmative diagnosis and similarly to rule out any other co-morbid conditions, on which the management and treatment to be ascertained and given accordingly. All options of treatment including surgical intervention to be taken into consideration for good quality life and healthy survival.

INTRODUCTION

Bronchiectasis is defined as an irreversible dilation and destruction of one or more bronchi, with a reduction in clearance of secretions and in the expiratory airflow. The definition of bronchiectasis is based on morbid anatomical appearances, the word being derived from Greek roots, bronchion meaning windpipe and ektasis as stretching out. This disease can lead to recurrent lower respiratory tract infections, worsening pulmonary functions, respiratory failure and pulmonary hypertension, resulting in deterioration in quality of life, with increased morbidity and premature mortality.

Rene Laennec, who invented the stethoscope, used his invention to first discover bronchiectasis in 1819. The disease was researched in greater detail by Sir William Osler in the late 1800s. The incidence and prevalence of bronchiectasis are generally not well known and are underestimated in developing countries. Although the prevalence once declined over the past years in societies with high socioeconomic status, probably due to the development of preventive medicine, especially childhood immunizations, and improvement of the living conditions and widespread use of antibiotics, now a days bronchiectasis has been recognized more, mainly due to the frequent use of high resolution computerized tomography (HRCT). Bronchography was the classic modality used and, until the advent of HRCT scanning, was the only imaging method to demonstrate bronchiectasis. HRCT scanning is non-invasive and has a sensitivity of 96% and specificity of 93%.

The etiology of bronchiectasis varies between different populations. Immune deficiency syndrome, metabolic and ultrastructural defects are the predominant etiological factors in developed countries, while bacterial and viral infections continue to be major causes of the disease in developing countries. On the other hand, despite using advanced immunological and genetic diagnostic techniques, up to 40% of patients' etiology remains undetermined. Main anatomic types of bronchiectasis are as follows: Cylindrical, varicoid and saccular.

In this study, we will review the underlying etiological, and the clinical, radiological, microbiological and spirometric findings in patients with bronchiectasis.

MATERIALS AND METHODS

The study was conducted in the department of Pulmonary Medicine at a tertiary care hospital. The plan of the study and proforma were submitted to the Institutional Ethics committee for Research on patients and approval was obtained. Patients attending our department were screened by clinical history, physical examination, blood investigations, sputum microscopy and culture, chest radiograph, HRCT-Thorax and other indicated investigations to diagnose and evaluate cases of bronchiectasis.

INCLUSION CRITERIA

1. Diagnosed cases of Bronchiectasis
2. Patients aged 18 years and above
3. Patients of either gender

EXCLUSION CRITERIA

1. Patients with Ischemic heart disease/ unstable angina/ uncontrolled hypertension
2. Patients with recent history of Myocardial infarction /cerebrovascular accident
3. Patients not willing to take part in the study 100 patients, diagnosed with bronchiectasis, were enrolled and subjected to further study

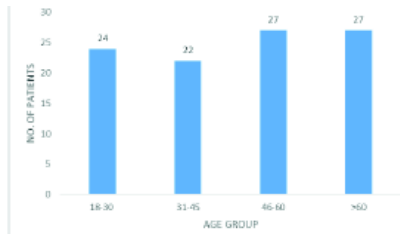
RESULTS

1. Gender wise distribution



61 patients(61 %) were males and 39 patients(39%) were females

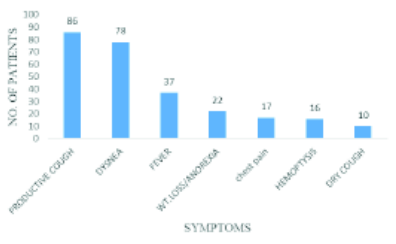
2.Distribution as per age-group



The Minimum age was 18 years, the maximum age was 83 years with mean age of 45.81 years.

In this study majority of patients(54%) are in the age group of 46 to 60 years and >60 years

3.Symptom wise distribution



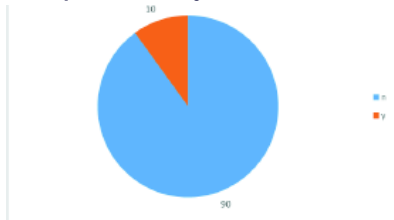
Out of 100 patients, 96 patients had cough ;amongst them 86 patients (86%) had productive cough which was the most common symptom followed by dyspnea(78%), fever(37%), weightloss/anorexia(22%),chestpain(17%)and hemoptysis(16%)

4.Smoking history

Out of 100 patients ,15% were current or ex-smokers and 85% patients were nonsmokers.



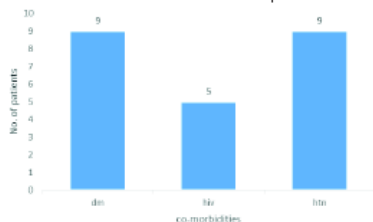
5.Biomass exposure history



Out of 100 patients,10% of the patients had history of biomass exposure

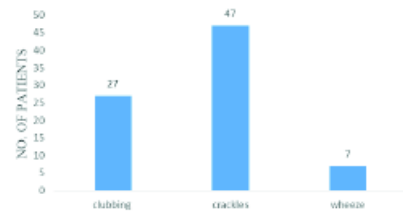
6.Co-morbidities

Out of 100 patients,diabetes mellitus was present in 9%, hypertension in 9% and HIV in 5% of the patients.



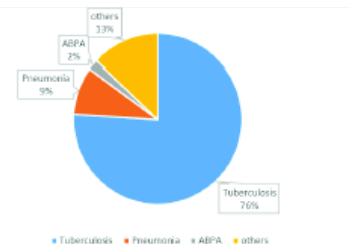
7.Signs in patients with Bronchiectasis

Most common sign on clinical examination was crackles(47%) followed by clubbing(27%) and wheeze (7%)

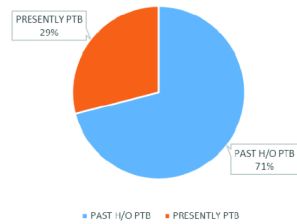


8.Etiology:

Out of 100 patients,an underlying etiology was identified in 87% & 13% patients were of unknown etiology as they did not follow up and labelled as others . Most commonly,bronchiectasis was post-infectious due to tuberculosis(76%) and pneumonia(9%). ABPA patients were 2% of the total patients.

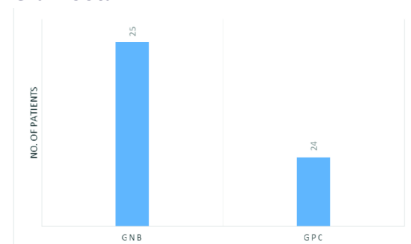


Among the 76 patients(76%) associated with tuberculosis, 54 patients(71%) had past history of pulmonary tuberculosis while 22 patients (29%) were diagnosed as having active pulmonary tuberculosis



9. Microbiological profile:

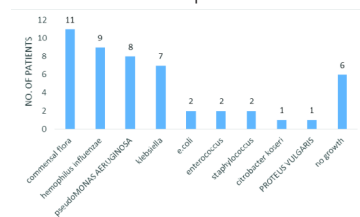
Sputum Gram's stain:



Out of 100 patients, sputum samples appropriate for microbiological examination were obtained in 49 patients. On sputum gram's stain gram negative bacilli were present in 25 samples and gram positive cocci were present in 24 samples

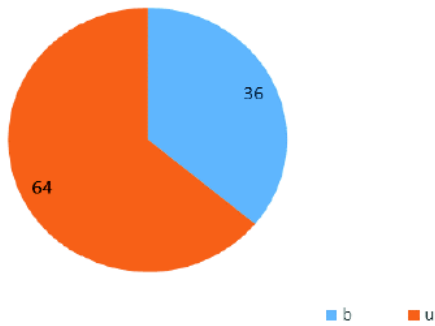
Sputum culture for bacteria

The most commonly isolated bacterium was Haemophilus influenzae which was found in 9 patients



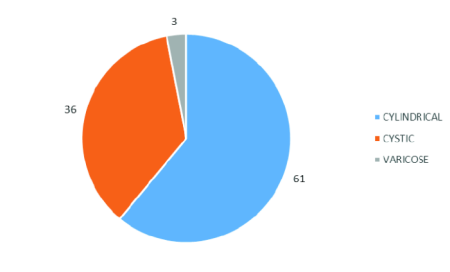
10. Radiological feature

Out of 100 patients, radiological distribution of bronchiectasis was limited to one lung in 64% of the cases while in rest 36% of the patients it was bilateral.



Pattern on HRCT- Thorax: cystic/cylindrical/varicose

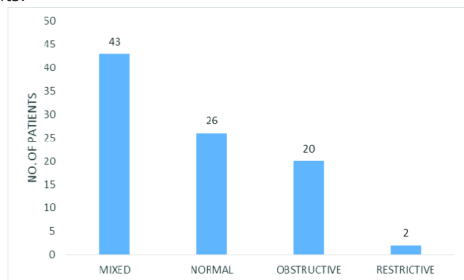
Cylindrical in 61% of the cases with cystic in 36% of the cases and varicose in 3% of the cases.



11. Pulmonary Functions:

Out of 100 patients, spirometric measurements of 91 patients were analyzed.

The test was normal in 26 patients (28.57%), obstructive in 20 (21.98%), restrictive in 2 (2.20%), and mixed in 43 (47.25%) patients.



DISCUSSION

Bronchiectasis is defined as an irreversible dilation and destruction of one or more bronchi, with a reduction in clearance of secretions and in the expiratory airflow. This disease can lead to recurrent lower respiratory tract infections, worsening pulmonary functions, respiratory failure and pulmonary hypertension, resulting in deterioration in quality of life, with increased morbidity and premature mortality.

This study was done to find clinical profile of patients with bronchiectasis, to identify most common symptoms and signs, to study the microbiological profile, to study spectrum of radiological findings and to assess the pulmonary functions. The study was conducted on patients attending Pulmonary Medicine Department in a tertiary care hospital. Those patients fulfilling the inclusion and exclusion criteria were evaluated for the presence of bronchiectasis. 100 patients, diagnosed with bronchiectasis, were enrolled and subjected to further study.

The patients underwent detailed clinical examination, lab investigations, sputum gm's stain and culture, sputum Genexpert, AFB & mycobacterial culture, radiological investigations, pulmonary function tests and other indicated investigations.

Out of 100 patients, 61 patients were male and 39 patients were female. Minimum age in study was 18 years, maximum age was 83 years and mean age was 45.81 years. Maximum patients (54%) were in the age group of 46 to 60 years and >60 years. In a similar study by P.T. King et al the mean age of the group was 56 years and the majority of patients were female (63%).

In a similar study by D. Gothi et al 2 bronchiectasis was seen in a younger age group, age range 13 to 54 years with a mean age of 31 years with a male:female ratio of 3:2.

Out of 100 patients of bronchiectasis taken, 96 patients had cough; amongst them 86 patients (86%) had productive cough which was the most common symptom followed by dyspnea (78%), fever (37%), weight loss/ anorexia (22%), chest pain (17%) and hemoptysis (16%). Similar study conducted by P.T. King et al 1 showed that productive cough was the most common symptom and was present in 96% of the patients followed by dyspnea (60%) with hemoptysis in 26% and chest pain in 19% of the patients.

Out of 78 patients having dyspnea, patients were classified as per MMRC grades of dyspnea. Maximum patients exhibited grade I dyspnea which was present in 31 patients which was followed by grade II dyspnea present in 29 patients, grade III dyspnea present in 16 patients and grade IV dyspnea was present in 2 patients. Study conducted by P.T. King et al 1 showed that mean dyspnea score was 2.1 ± 1.2.

Out of 100 patients, most common sign on clinical examination was crackles (47%) followed by clubbing (27%) and wheeze (7%) as shown in graph no. 8.

Similar study conducted by P.T. King et al 1 showed that crackles were present in 73% of patients, wheeze in 21% of patients and clubbing in 2% of patients.

Out of 100 patients, an underlying etiology was identified in 87% of the patients [graph no. 9]. Most commonly, bronchiectasis was post-infectious due to tuberculosis (76%) and pneumonia (9%). There were two patients with allergic bronchopulmonary aspergillosis (2%).

Study conducted by D. Gothi et al 2 showed that etiologies for bronchiectasis were post-infections (80%), dyskinetic cilia syndrome (13%), tracheobronchomegaly - 1 patient (7%).

Study conducted by Habesoglu, et al (3) showed that most commonly, bronchiectasis was post-infectious (49.7%) due to childhood infections (22.7%), tuberculosis (15.5%) and severe pneumonia (11.5%), 5 (1.6%) patients with immotile cilia syndrome, two patients (0.6%) with immunoglobulin deficiency and two single cases (0.3%) with allergic bronchopulmonary aspergillosis and congenital bronchoesophageal fistula.

Out of 100 patients, 15% were current or ex-smokers and 85% patients were lifetime non-smokers as shown in graph no. 5.

In a similar study by P.T. King et al 1 showed that 23% patients had a history of smoking.

Out of 100 patients, 10% of the patients had history of biomass exposure; all of these patients were female as shown in graph no. 6.

Out of 100 patients, associated co-morbidities were present in 24% patients with diabetes mellitus in 9%, hypertension in 9% and HIV in 5% of the patients as shown in graph no. 7.

Out of 100 patients, sputum samples appropriate for microbiological examination were obtained in 49 patients. On sputum gm's stain gram negative bacilli were present in 25 samples and gram positive cocci were present in 24 samples as shown in graph no. 13.

As shown in graph no.14 the most common isolated bacterium was Haemophilus influenzae which was found in 9 patients. Other common bacteria were Pseudomonas aeruginosa (8 patients), and Klebsiella pneumoniae (7 patients). Other bacteria were Staphylococcus aureus (2 patients), E. coli (2 patients), Enterococcus (2 patients), Citrobacter koseri (1 patient) and proteus vulgaris (1 patient). 11 patients had commensal flora grown on the culture and one patient had no pathogenic bacteria isolated.

In a similar study conducted by Paul T. King, S.R. Holdsworth et al the most common bacterium isolated was H. influenzae, present in 42 (47%) of the cohort of 89 patients. The next most common bacteria were P. aeruginosa isolated in 11 patients (12%), Moxarella catarrhalis in 7 patients (8%) and S. pneumoniae isolated in 6 (7%). Only 3 patients had Staphylococcus aureus isolated. A large number of patients (21%) had no potential pathogenic microorganisms.

In a similar study conducted by Angrill, Agusti, de Celis, et al, the most common bacteria isolated among potential pathogenic microorganisms were H. influenzae (52%), Streptococcus pneumoniae (14%), Pseudomonas aeruginosa (9%), Moxarella catarrhalis (5%), E. coli (2%), Proteus spp (2%).

Out of 100 patients, sputum AFB smear/culture for mycobacteria was positive in 12% of the patients as shown in graph no. 12

Out of 100 patients, radiological distribution of bronchiectasis was limited to one lung in 64% of the cases while in rest 36% of the patients it was bilateral. Among the 100 patients, unilobar involvement was seen in 43% of the patients while 57% of the patients had multilobar involvement as shown in graph no. 16.

All the six lobes were involved in 3% of the patients.

Most common lobe involved was right upper lobe (58%) followed by left upper lobe (46%), left lower lobe (34%), right middle lobe (29%), right lower lobe (26%) as shown in graph no. 17.

In a similar study conducted by Habesoglu et al, disease was bilateral in 62.5% of the cases with multilobar involvement in 75.3% of the cases with a median of two lobes (interquartile range 2-3) was involved. As in single lobe was affected in 24.7% cases, as with all six lobes in 2.6% cases. The most common lobe involved was left lower lobe (64.8%) and right lower lobe (52.3%).

In a similar study by P. T. King et al, 1 showed that 80% patients had multilobar involvement with right lower lobe (69%) and left lower lobe (64%) involved most commonly.

Out of 100 patients, as per radiologic examination with HRCT, the predominant type of bronchiectasis was cylindrical in 61% of the cases with cystic in 36% of the cases and varicose in 3% of the cases as shown in graph no. 18.

In a similar study conducted by Angrill, Agusti, de Celis et al, 5, Most of the patients (73%) presented with cylindrical bronchiectasis according to the HRCT scan and cystic-varicose in 27% of the patients.

In a similar study conducted by Habesoglu et al (3) the predominant type of bronchiectasis was cystic in 47% cases and non-cystic in 53% cases.

Out of 100 patients, spirometric measurements of 91 patients were analyzed.

The test was normal in 26 patients (28.57%), obstructive in 21 (21.98%), restrictive in 2 (2.20%), and mixed in 43 (47.25%) patients as depicted in graph no. 19 and graph no. 20. Mixed type spirometric abnormality was detected in most of the patients. Mild obstruction was present in 21 patients, moderate in 34 patients and severe obstruction in 8 patients as shown in graph no. 21.

In a similar study conducted by Habesoglu et al, 3, spirometric measure

ments of 274 patients were normal in 59 patients (21.5%), obstructive in 128 (46.7%), restrictive in 22 (8%), and mixed in 65 (23.7%) patients. Spirometry of the group was characterized by mild airway obstruction. In a study conducted by D. Gothi et al, 2, mild obstruction was present in 20% of patients, moderate in 47% and severe obstruction in 33% of the patients.

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