ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Etiological Spectrum Of Bronchiectasis In Indian Patients.

Tushar Sahasrabudhe*, and Nirmala MA.

Dr.D.Y.Patil Medical college, Hospital and Research Institute , Dr. D.Y. Patil University, Pimpri, Pune, Maharashtra, India.

ABSTRACT

Bronchiectasis is known for its prolonged morbidity and mortality. Unfortunately, little is known about the common causes of bronchiectasis in India as most cases are not evaluated for the same. With this knowledge, it is possible to prevent future cases by aggressively treating the underlying diseases that may lead to bronchiectasis if neglected. We therefore undertook to do complete etiological evaluation of Indian patients suffering from bronchiectasis. The study included 100 patients of bronchiectasis. The commonest cause was found to be Tuberculosis (66%) with bronchiectasis as a squeale. 12% had ABPA, a condition thought to be uncommon in India. In 10% cases, bronchiectasis was the result of bronchial obstructions like foreign body or tumours that were undiagnosed. 5% patients developed bronchiectasis secondary to lung infection and 3% cases had connective tissue disorders. India being a high burden country for TB, follow up care after cure needs to be emphasized to prevent bronchiectasis.

Keywords: Bronchiectasis, TB, ABPA

https://doi.org/10.33887/rjpbcs/2020.11.1.14

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Bronchiectasis is anatomically defined as irreversibly dilated and thick walled bronchi. These permanently dilated airways are inflamed, tortuous and sometimes partially or totally obstructed with secretions. It is the result of damage to the walls of the bronchial tubes with loss of smooth muscle and loss of elasticity of segments of the bronchi. This prevents secretions from being adequately cleared from the lung. Secretions tend to pool in the distorted airways rather than be expelled, and these stagnant secretions are a breeding ground for bacterial growth. These bacteria, in turn cause further inflammation, airway damage and hence more secretions, initiating a vicious cycle of damage. The disease starts with airway damage, usually due to infection, either de novo or secondary to poor clearance of airways due to varied conditions such as bronchial obstruction, fibrosis, ciliary dysfunction and thick secretions .[1]

A detailed diagnostic evaluation is still not a standard protocol in India due to non availability & cost of diagnostic tests and also lack of awareness, especially in the rural areas. In most patients, the bronchiectasis once diagnosed is treated with antibiotics and supportive care. Making an etiological diagnosis is important for following reasons: Firstly, if the original cause such as sick cilia syndrome remains undiagnosed and unaddressed, the disease will progress and will involve other organ systems of the body as well.[2] Secondly, a localized bronchiectatic lung can be cured by surgical resection if the underlying cause has been treated[3,4]. Thirdly, bronchiectasis is a complication in cases of localized bronchial obstruction such as slow growing tumours, bronchial stenosis or intra bronchial foreign body. Unless evaluated, the underlying disease may go completely undetected. Fourthly, many uncommon diseases such as sick cilia syndrome, ABPA[5], Cystic fibrosis[6,7,8] are never suspected and hence never diagnosed. Actually, we may be surprised to find that these diseases may not be rare in our country if routine evaluation protocol is followed.

We therefore designed a study to evaluate the complete etiological spectrum of bronchiectasis and find out the common causes prevalent in Indian patients.

MATERIALS AND METHODS

It was a prospective study done at the department of respiratory Medicine, Dr. D.Y. Patil Medical college hospital over a period of 2 years. Institute Ethics committee clearance was obtained before the start of the study.

All cases (above the age of 15 years) of HRCT (High Resolution CT scan) proven bronchiectasis who presented to the department during this period were considered eligible for the study.

A detailed consent was obtained from the participants before thorough evaluation that was done free of cost for these patients. Those with contraindications to bronchoscopy and those with severe sepsis were excluded from the study. Patients were included only when they had no active exacerbation in past 4 weeks. This was done to ensure that they are fit for evaluation and also to differentiate between colonizing bacteria and active infection.

In addition to demographic data, history was obtained about all past and current illnesses and the duration of their suffering. All past records including X-rays and CT scans were reviewed. The specific evaluation included in addition to HRCT thorax, bronchoscopy with BAL (Bronchoalveolar Lavage) examination, total and aspergillus specific IgE, evaluation for MTB (Mycobacterium Tuberculosis) and NTM (Non-Tubercular Mycobactria) by genetic methods and culture, bacterial and fungal cultures, evaluation for cystic fibrosis, evaluation for ciliary dysfunction and workup for collagen disorders and esophageal dysfunction.

A total of 100 fully evaluated cases were analyzed.

RESULTS

Out of the total 100 cases, 30 were in 15-35 years age group, 31 were in 36-55 years age group, 33 were in 56-75 years age group and 6 were in above 75 years age group. (Figure 1)

It is noteworthy that 42% of patients were suffering from bronchiectasis for more than 15 years.

ISSN: 0975-8585

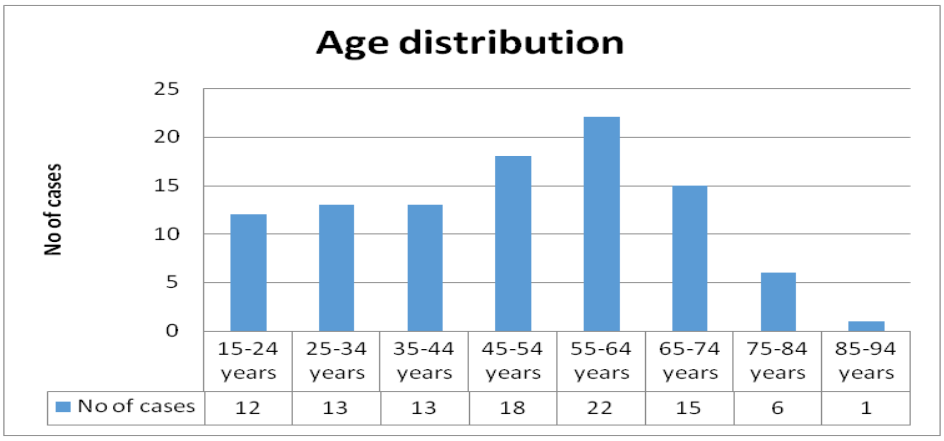

Figure 1: Comparison of cases according to age groups

Most patients were from low socioeconomic group, probably the very reason why they were not completely evaluated in past and also had their underlying illness poorly managed. (Figure 2)

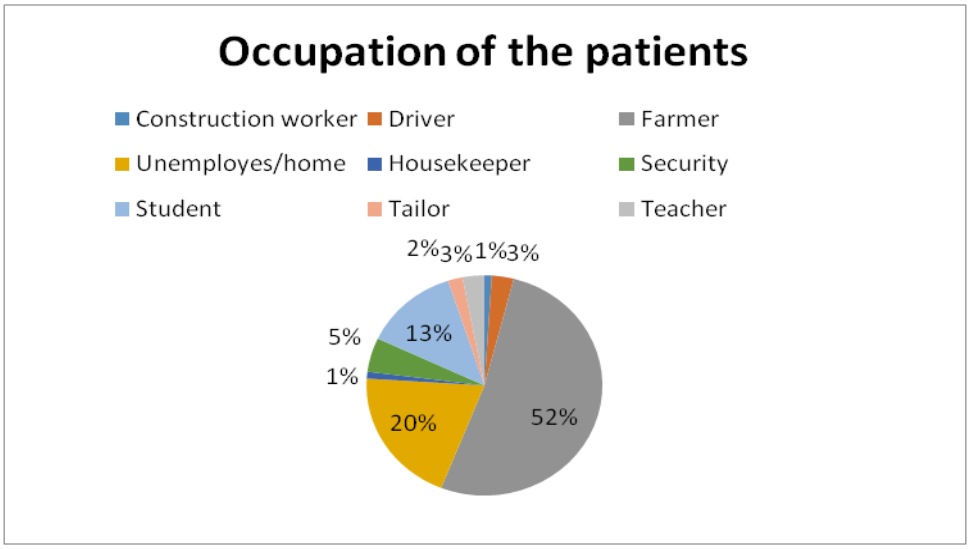

Figure 2: Pie chart showing occupations of the study population

Bronchoscopy was done in all patients and BAL was subjected to detailed microbiological investigations as bacteria, TB and fungi all play a role not only in etiology but also tend to colonize the bronchiectatic airways. The colonizers bacteria could however be detected in only 12% of the patients (Table 1).

Table 1: Bacterial culture

Bacterial culture with DST	No of cases	Percentage
Klebsiella pneumoniae	**5**	**5%**
Pseudomonas	**7**	**7%**
No growth	**88**	**88%**

The etiology could be established in 96% of cases (Figure 3). Bronchiectasis as a result of sequalae of Tuberculosis was the commonest cause found (66% cases), Allergic Bronchopulmonary Aspergillosis (ABPA) was found to be another common cause, most patients being managed as bronchial asthma alone[9,10].

ISSN: 0975-8585

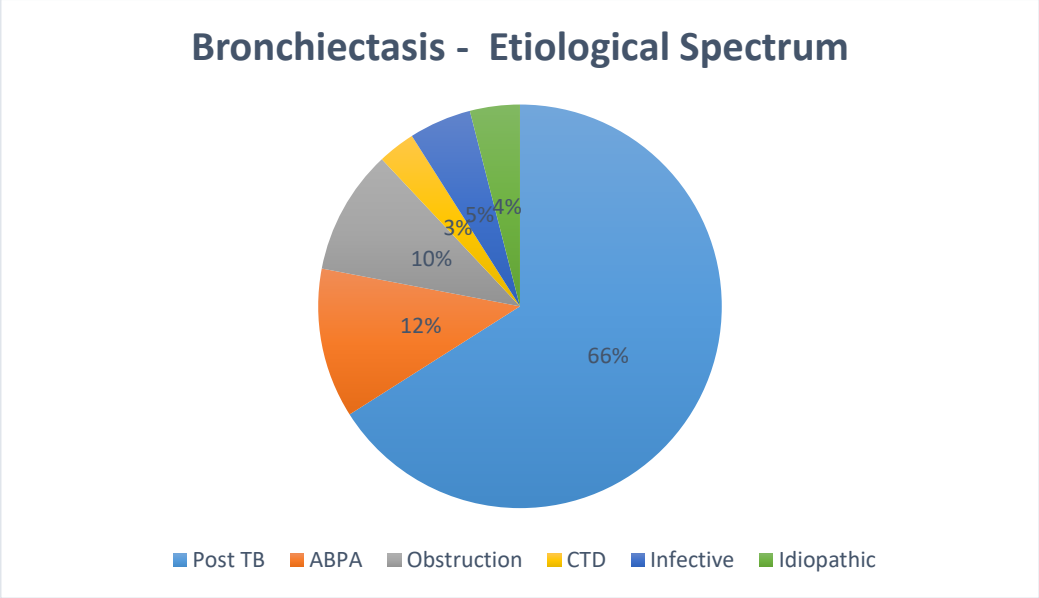

Figure 3: Pie chart showing the etiological spectrum of bronchiectasis

Chronic foreign body and bronchial adenoma were few unsuspected causes of bronchiectasis that were potentially reversible and treatable.

Etiology could not be established in 4% cases. Causes such as ciliary dysfunction and cystic fibrosis were not found in these 100 serial cases.

DISCUSSION

This study aimed at finding the etiological spectrum of bronchiectasis. Bronchiectasis is under diagnosed and/or misdiagnosed in many parts of India, especially in rural areas. In the remote areas of our country, awareness about this disease is lacking which results in inappropriate treatment and increased morbidity among patients.

35% patients were not even aware of the diagnosis and 68% were not aware of postural drainage, which is the mainstay of management. 23% never underwent detailed etiological evaluation. Lack of proper diagnosis and postural drainage resulted in high rate of exacerbations and prolonged morbidity in most.

The etiology of bronchiectasis is a large spectrum ranging from infection to obstruction. [13] However certain causes are potentially preventable and treatable thereby reducing the burden of the disease. The potentially preventable causes evident from our study were ABPA and obstruction causing bronchiectasis. In patients with ABPA, bronchiectasis could have been prevented by early diagnosis and treatment with appropriate antifungals and steroids. Similarly, obstruction in the bronchus could have been diagnosed earlier by doing a CT thorax and bronchoscopy. These patients could have been subjected to surgical removal of the obstructive mass or foreign body at an early stage, thereby reducing the chances of developing bronchiectasis.

A most important early detectable and potentially aggressively treatable cause found in this study was post tubercular bronchiectasis. Our Revised National TB Control Programme (RNTCP) focuses on the early diagnosis of tuberculosis and giving appropriate treatment. However the follow up of the patients who completed tuberculosis treatment is not a part of the programme. The emphasis of the programme is on sputum conversion and reducing infectiousness. Follow up X-ray assessment is not a part of RNTCP strategy, thereby missing the assessment of lung damage and fibrosis that leads to bronchiectasis later. Earlier recognition of such damage and prompt institution of postural drainage techniques/ surgical intervention would prevent these potential bronchiectasis patients who would otherwise suffer lifelong even after their TB is cured**.** A better approach should be following up TB patients with repeat chest X-rays in addition to sputum assessments. [14, 15, 16]

This study also reconfirmed the fact that chest X-ray is not the only diagnostic modality of bronchiectasis and a confirmatory imaging with CT scan is mandatory. In this study, 33% of the patients whose chest X ray was normal had bronchiectasis on HRCT [17]. CT scan thorax also helps us to identify any impending obstruction and the extent of bronchiectasis. In our study, endobronchial tumour was diagnosed in 8 of the patients with bronchoscopy and endobronchial biopsy. These showed up as an endobronchial mass on CT thorax. Two unsuspected foreign bodies were also picked up on bronchoscopy. Thus CT evaluation helped in appropriate treatment in these patients.

Similar results were obtained in a study conducted in china [18], which reviewed the etiologies of bronchiectasis and concluded that majority were post infective. Amongst the post infective causes, TB was the most common cause. This study signifies that since the prevalence of tuberculosis is higher in the Asian countries compared to European and American countries, TB has always been the common cause of bronchiectasis in Asian countries.

Early etiological evaluation of bronchiectasis should be carried out as appropriate treatment would reduce the morbidity and disease progression.

It is clear from our study that extensively studied causes of bronchiectasis such as cystic fibrosis and alpha 1 antitrypsin deficiency are rare in our country where the burden of tuberculosis is high.

The sample size had to be limited to 100 as the complete diagnostic work up is expensive. Due to the small sample size, the rare causes of bronchiectasis like cystic fibrosis and alpha 1 antitrypsin deficiency were not found in out cohort.

CONCLUSION

There are a wide range of disorders that can lead to bronchiectasis. The commonest causes found in our study were Tuberculosis and ABPA. 35% patients were not aware of the diagnosis and 68% were not aware of postural drainage, which is the mainstay of management. 23% never had a diagnostic work up done before. The study thus highlights that bronchiectasis in our country is often under diagnosed and under evaluated by the treating physicians. Awareness about bronchiectasis needs to be disseminated to the practicing clinicians, especially at the peripheral level. More campaigns and awareness regarding bronchiectasis should be encouraged in rural areas.

It was observed that more than half of the patients enrolled in our study had post tubercular bronchiectasis, which implies the high tuberculosis burden in our country and the need for follow up of the tuberculosis patient even after treatment completion.

REFERENCES

[1] Pasteur MC,BiltonD, HillAT.Britishthoracicsocietyguidelinefor non-CF bronchiectasis. Thorax 2010; 65(Suppl. 1): i1–58.

[2] A human syndrome caused by immotile cilia. Afzelius BA. Science. 1976;193:317–319.

[3] Bilton D. Update on non-cystic fibrosis bronchiectasis. Curr Opin PulmMed. 2008;14:595–599.

[4] Dhillon SS, Watanakunakorn C. Lady Windermere syndrome: middle lobe bronchiectasis and Mycobacterium avium complex infection due to voluntary cough suppression. Clin Infect Dis. 2000;30:572–575.

[5] Burden of Allergic Bronchopulmonary Aspergillosis (ABPA) in the India bronchiectasis registry.European Respiratory Journal 2019 54: PA705; DOI: 10.1183/13993003.congress-2019.PA705

[6] Khan, TZ, et al. Early pulmonary inflammation in infants with cystic fibrosis. *Am J Respir Crit Care Med* 1995. **151**:1075-1082.

[7] Vignola, AM, et al. Increased levels of elastase and alpha1-anti-trypsin in sputum of asthmatic patients. *Am J Respir Crit Care Med* 1998. **157**:505-511

[8] McShane PJ, Naureckas ET, Tino G, Strek ME. Non-cystic fibrosis bronchiectasis. Am. J. Respir. Crit. Care Med. 2013; 188: 647–56.

[9] Pasteur MC, Bilton D, Hill AT. British thoracic society guideline for non-CF bronchiectasis. Thorax 2010; 65(Suppl. 1): i1–58

[10] McShane PJ, Naureckas ET, Strek ME. Bronchiectasis in a diverse us population: effects of ethnicity on etiology and sputum culture. Chest 2012; 142: 159–67.

[11] Quigley KJ, Reynolds CJ, Goudet A, Raynsford EJ, Sergeant R, Quigley A, Worgall S, Bilton D, Wilson R, Loebinger MR et al. Chronic infection by mucoid pseudomonas aeruginosa associated with dysregulation in T-cell immunity to outer membrane porin F. Am. J. Respir. Crit. Care Med. 2015; 191: 1250–64.

[12] Polverino E, Cilloniz C, Menendez R, Gabarrus A, Rosales-Mayor E, Alcaraz V, Terraneo S, Puig de la Bella Casa J, Mensa J, Ferrer M et al. Microbiology and outcomes of community acquired pneumonia in non cystic-fibrosis bronchiectasis patients. J. Infect. 2015; 71: 28–36.

[13] 3Tian X, Wu X, Xu KF, Li X, Li G, Xiao Y, Zhu Y. Analysis of etiology and clinical manifestations of patients with bronchiectasis in Chinese adult from Peking Union Medical College Hospital. Am. J. Respir. Crit. Care Med. 2014; 189: A6253.

[14] Martínez-García MA, De Gracia J, Relat MV, Girón RM, Carro LM, De La Rosa CD, Olveira C. Multidimensional approach to noncystic fibrosis bronchiectasis: The faced score. Eur. Respir. J. 2014; 43: 1357–67

[15] Rogers GB, Zain NMM, Bruce KD, Burr LD, Chen AC, Rivett DW, McGuckin MA, Serisier DJ. A novel microbiota stratification system predicts future exacerbations in bronchiectasis. Ann. Am. Thorac. Soc. 2014; 11: 496–503.

[16] Borekci S, Demir D, Zuhur C, Musellim B. The evaluation of epidemiological data and etiological reasons of bronchiectasis patients. Eur. Respir. J. 2013; 42: P2207.

[17] Monteiro R, Ladeira I, Ribeiro C, Pascoal I, Taveira N. Bronchiectasis: retrospective study and risk factors for hospitalization. Am. J. Respir. Crit. Care Med. 2012; 185: A6094.

[18] Qi Q, Wang W, Li T, Zhang Y, Li Y. Aetiology and clinical characteristics of patients with bronchiectasis in a Chinese Han population: a prospective study. Respirology 2015; 20: 917–24.