The Comprehensive Plan for Management and Treatment of Bronchiectasis: A Review

Chaya Garg

*Indian Journal of Physiotherapy and Occupational Therapy - An International Journal*
The Comprehensive Plan for Management and Treatment of Bronchiectasis: A Review

Akansha Sikarwar¹, Chaya Garg², Deepeish Gupta³
¹B.P.T. 4th year Student, ²Head of the Department & Assistant Professor, at B.C.I.P, ³Senior Resident Pulmonary Medicine at R.B.I.P.M.T

ABSTRACT

Bronchiectasis is a worldwide spread disorder of respiratory airways and lung tissues. It includes different types of treatment management like, medical treatment, surgical treatment and both these treatment modules concise with physiotherapy treatment.

Aim: The aim of this project is to review latest studies, articles, knowledge of treatment and effect of physiotherapy on the disease prognosis.

Methodology: A total of 6 books have been referred. Various internet databases were used to search articles on the set topic and 11 articles were short listed for review. Also 5 patients diagnosed as cases of bronchiectasis as thoroughly assessed to understand the clinical presentation of disease.

Discussion: Most of the information on long term outcome is from historical data and suggests that antibiotic therapy has had an effect. Nevertheless; this still indicates a significant reduction in life expectancy in patients with bronchiectasis. More recent data suggest a better prognosis, although it is recognised that the general health of patients with bronchiectasis can be poor and certain subsets (particularly those colonised with Pseudomonas aeruginosa) are particularly affected, with continued ill health and progressive deterioration. But early recognition and adequate treatment can help control bronchiectasis and decrease symptoms. Life-long awareness of the need for treatment may allow people with bronchiectasis to minimize complications and maximize life expectancy.

Conclusion: Early recognition and adequate treatment can help control bronchiectasis and decrease symptoms. Life-long awareness of the need for treatment may allow people with bronchiectasis to minimize complications and maximize life expectancy. The outlook depends upon the underlying reason for developing bronchiectasis. Congenital causes of bronchiectasis, like cystic fibrosis, may have a worse prognosis than acquired diseases.

Keywords: Bronchiectasis, Pathology, Signs and Symptoms, Investigations, Treatment and Management, Physiotherapy Treatment, Techniques

INTRODUCTION

The definition of Bronchiectasis is based on morbid anatomical appearances, the word being derived from Greek roots, bronchion meaning windpipe and ektasis means a stretching out. Thus bronchiectasis is present when one or more bronchi are abnormally and permanently dilated.[¹]

Bronchiectasis is a permanent dilatation of one or more proximal and medium-sized bronchi due to destruction of the elastic and muscular components of the bronchial wall. The condition, which is usually accompanied by suppurative infection, is the end result of a variety of pathologies. Bronchiectasis is not now included in the diagnosis chronic obstructive pulmonary disease.

The incidence varies widely between populations from 3.7/100 000 children in New Zealand to 52/100 000 adults in the USA. In the UK there are no recent studies, although mass chest x-ray features of bronchiectasis in the 1950s suggested a prevalence of 100/100 000. The prevalence increases with age. Some of these population studies, many of which were conducted years ago, have not included modern diagnostic techniques and specifically high resolution CT scanning (HRCT). The importance of this issue is that the true incidence remains unknown in most populations.[²]
PATHOLOGY

Bronchiectasis is primarily a disease of the bronchi and bronchioles involving a vicious circle of transmural infection and inflammation with mediator release. Illness is related to retained inflammatory secretions and microbes that cause obstruction and damage of the airway and recurrent infection. Although there are no studies of patients in the very early stages of bronchiectasis, findings in patients with proven bronchiectasis give credence to the importance of enhanced cellular and mediator responses: bronchial mucosal biopsies reveal infiltration by neutrophils and T lymphocytes; expectorated sputum has increased concentrations of elastase and the chemoattractants interleukin-8, tumor necrosis factor a (TNFa), and prostanoids.[3]

In bronchiectasis bronchial obstruction will cause absorption of the air from the lung tissue distal to the obstruction and this area will therefore shrink and collapse. This cause a traction force to be exerted upon the more proximal airways which will distort and dilate them.[4]

These infections, if occurs repeatedly, with the bronchial walls they become weaker and weaker. Inflammation of the bronchial walls with destruction of the elastic and muscular tissue and mucous lining is replaced by granulation tissue with loss of cilia. Bronchial walls will eventually dilate owing to negative intra-pleural pressure.[4]

The arterial vessels within the bronchial walls anastomose with the pulmonary capillaries and this results in common feature of hemoptysis. The condition most commonly affects the lower lobes, the lingula and the middle lobes.[4]

PREDISPOSING FACTORS

Infections: infection plays a fundamental role in both the initiation of the morbid anatomical defect and the perpetuation of the symptoms of bronchiectasis.[1]

- Originate from lower respiratory tract insult in early childhood


Mucoiliary clearance abnormalities[1]: Factors that effect cilia are smoking and chronic infections (i.e. Chronic Bronchitis or Bronchiectasis). Cigarette smoke slows down the action of cilia; chronic infections decrease the number of the ciliated cells and increase the number of goblet cells. Both of these factors decrease the ability of the lungs to clear foreign particles and bacteria, and the increased mucus production give bacteria a perfect place to grow, thus increasing the chances of infection. Also many congenital diseases leads to bronchiectasis as in case or disorders named as- Kartegner’s syndrome, Young’s syndrome (idiopathic obstructive azoospermia), Cystic fibrosis.

Note: Abnormal activity of chloride channel known as cystic fibrosis transmembrane regulator is reduced.[1]

Immunodeficiency syndrome

- Reduces the capacity to deal with pyogenic infection
- Humoral Immunodeficiency include:
  (a) Congenital x linked (Brouton) agammaglobulinemia
  (b) Acquired form of C.V.I.D. (Common varried immunodeficiency).

Bronchiectasis is usually associated with IgG deficiency.

Also, associated with natural killer dysfunction, lack H.L.A. class I, so, called bare lymphocyte syndrome.

Other causes

Alpha 1-antitrypsin deficiency, Inhalational injury[7], Pulmonary agenesis: Congenital bronchiectasis peripheral part of the lung i.e. alveoli does not develop. Ipsilateral bronchiectasis : due to pulmonary artery agenesis, Tracheobronchomegaly (Mounier kuhn syndrome), Williams-Campbell syndrome (bronchomalacia), Post T.B. bronchiectasis, Aspiration of foreign body, Allergic Bronchopulmonary Aspergillosis (ABPA), Asthma, Yellow nail syndrome. Etc.

Clinical Picture[3]

Virtually all patients with bronchiectasis have cough and chronic sputum production. The sputum is variously described as mucoid, mucopurulent, thick,
tenacious, or viscous (viscid). Blood-streaked sputum or copious hemoptysis may also result from erosive airway damage caused by an acute infection. Dyspnea and wheezing occur in 75 percent of patients. Pleuritic chest pain occurs in 50 percent of patients and reflects the presence of distended peripheral airways or distal pneumonitis adjacent to a visceral pleural surface. Adventitious breath sounds on physical examination of the chest, including crackles (in 70 percent of patients), wheezing (in 34 percent), and rhonchi (in 44 percent), are clues to the diagnosis. In the past, digital clubbing was a frequent feature, but a more recent series describes a prevalence of only 3 percent. The major confounding disease is chronic obstructive pulmonary disease (COPD). Diagnosis for bronchiectasis is made by assessing clinical picture presented by patient and confirmation by investigations like:

- Blood testing- for hemogram, immunoglobulin, skin prick testing for ABPA.
- Immunological testing
- Gastrointestinal investigations
- Investigations to exclude Cystic Fibrosis
- Bronchoscopy
- Radiological investigations- chest X-ray, HRCT
- Sputum microbiology
- Pulmonary function test

**TREATMENT AND MANAGEMENT**

Medical and Surgical treatment- It aims to relieve and control the symptoms. The main aim of medical treatment is the control of lower respiratory tract infection/inflammation with appropriate antibiotics and other drugs, and prevent complications.

- Antibiotics (oral/inhaled), long term antibiotics
- Corticosteroids (oral/inhaled)
- Mucolytic
- Bronchodilators
  
  Surgical treatment plays only a small role in the present day management of bronchiectasis.
- Pneumonectomy
- Lobectomy/segmental resection etc

Physiotherapy management- The most important component of treatment is regular physiotherapy to clear secretions from the lungs. There are numbers of different methods to do this and an individual program will have to be developed by the respiratory physiotherapist. These clearance techniques should be undertaken regularly at home and more frequently when there is an acute infection. All patients with bronchiectasis should also maintain a regular exercise program. The management includes:

- Postural drainage
- Manual techniques (chest percussions, vibrations, shaking etc)
- Forced expiratory techniques (huffing/coughing)
- Breathing techniques (pursed lips breathing, diaphragmatic breathing)
- Head down and bending forward position
- Thoracic and spinal mobility exercises
- Posture correction and education
- Maintenance of good general health and confidence
- Exercise tolerance, participating in all activities
- Different devices and equipments can be use for assistance (mechanical vibrator, electric chest percussor, In-exsufflator, flutter device, incentive spirometer, etc)

General measures- should be take into lifestyle like: Stop smoking, Avoid second-hand smoke, Have adequate nutritional intake with supplementation, if necessary, Immunizations for influenza and pneumococcal pneumonia are recommended, Immunizations for measles, rubella, and pertusis should be confirmed.

**PROGNOSIS**

Early recognition and adequate treatment can help control bronchiectasis and decrease symptoms. Lifelong awareness of the need for treatment may allow people with bronchiectasis to minimize complications and maximize life expectancy.
REFERENCE

1. Crofton and Douglas’s Respiratory Disease (Fifth Edition), Vol. 1
5. Chest-1995
11. casaburi/petty principles and practice of pulmonary rehabilitation (copyright 1993 by W.B. saunders company), (chapter-controlled breathing techniques and chest physical therapy)
15. Lee et al. BMC Pulmonary Medicine 2010, 10:5, (http://www.biomedcentral.com/1471-2466/10/5)
For the treatment of MAC in the setting of bronchiectasis, the American Thoracic Society recommends a 3- to 4-drug treatment regimen with clarithromycin, rifampin, ethambutol, and possibly streptomycin that is continued until the patient’s culture results are negative for 1 year. The typical duration of therapy may be 18-24 months. A review of mucus clearance therapies: percussion and postural drainage, autogenic drainage, positive expiratory pressure, flutter valve, intrapulmonary percussive ventilation, and high-frequency chest compression with the ThAIRapy Vest. J Cardiopulm Rehabil. 1998 Jul-Aug. Despite this, bronchiectasis has been a poorly studied disease that until recently had no national guidelines for management and the evidence base for many of its treatments relied on consensus expert opinions. Population studies in bronchiectasis are limited. Although it is widely believed that there has been an overall decline in incidence (due to more effective treatment of childhood respiratory conditions, successful vaccination programmes and strategies for the control of pulmonary tuberculosis), it remains an important problem. A review of. Diagnosis and evidence-based management. The treatment of uncomplicated, acute bronchitis in adults. JAMA. To assess whether antibiotic treatment for acute cough is effective and to measure the side effects of such treatment. Quantitative systematic review of randomised placebo controlled trials. Nine trials (8 published, 1 unpublished) retrieved from a systematic search (electronic databases, contact with authors, contact with drug manufacturers, reference lists); no restriction on language. Proportion of subjects with productive cough at follow up (7-11 days after consultation with general practitioner); proportion of subjects who had not improved clinically at follow up; proportion of subjects with productive cough at follow up. Find out about the different treatment options available. A personalised self-management plan to help you control your symptoms. Airway clearance techniques (breathing exercises) to clear your sputum. Doing these regularly will reduce the number of infections you get and keep you well. Treatment with antibiotics for flare-ups or chest infections. Annual flu vaccinations. Treatment for other conditions causing your bronchiectasis for example problems with your immune system. Bronchiectasis treatment involves getting to know your body and what’s right for you. Make sure you agree a written self-management plan with your health care professional.