Bronchiectasis

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Bronchiectasis: Chronic, irreversible dilatation of one or moe bronchi due to the destruction of the elastic and muscular components of the bronchial wall.

Causes:

- Cystic fibrosis - most common cause
- Immune deficiency
- Post-infective (whooping cough, TB, measles)
- Obstruction (foreign body, tumor)

Pathophysiology (in cystic fibrosis):

- Mucus with high viscosity → impairs function of cilia and viscous mucus accumulates
- Stagnant mucus is a medium for bacteria to multiply → recurrent airway infections & chronic inflammation
- Chronic inflammation → cytokines degrade cilia and bronchial elastin fibers → airway dilatation
- Pathological deposition of collagen to repair damaged airways → lungs become less elastic → hypoxia → hypoxic pulmonary vasoconstriction → increased pulmonary vascular resistance → right ventricular hypertrophy
- Common pathogens in exacerbations: Haemophilus influenza, Pseudomonas aeroguinosa & Non-tuberculous mycobacteria

Presentation

- Cough associated with copious amounts of purulent sputum and occasionally haemoptysis - cough worsened by lying flat or one one side
- Crackles, high-pitched inspiratory squeaks & rhonchi
- Dyspnoea
- Recurrent episodes of fever
- Rhinosinusitis - runny nose and sinus pain
- Pleuritic chest pain
- Finger nail clubbing

Diagnosis

- Presence of risk factors - immunodeficiency, primary ciliary dyskinesia, alpha-1 antritrypsin deficiency, connective tissue disease, IBD
- Chest x-ray: evidence of lung volume loss and tram lines
- High-resolution chest CT: dilation of bronchi (signet ring) +/- airway thickening
- Sputum culture: assess for the presence of a pathogenic organism
- Spirometry: Reduced FEV1 & reduced FEV1/FVC ratio
- Elevated CRP: indicates active infection

Management

- Pulmonary rehabilitation - Duration of six to eight weeks, with two sessions of two hours each week, and includes an individualised exercise and education programme including aerobic exercise and resistance training with lifestyle support
- Ensure the patient is adequately hydrated to reduce sputum viscosity
- Airway clearance technique (with nebulised agents) - including postural drainage, percussion & oscillatory positive expiratory pressure devices
- Use of nebulised hyperosmolar agents such as hypertonic saline - promotes sputum clearance by inducing coughing
- Teach Active Cycle of Breathing Technique - breathing control may alleviate episodes of dyspnoea - thoracic expansion exercises enhance the recruitment of alveoli - inspiratory breath-hold improves collateral ventilation of collapsed alveoli - forced expiration technique/huff used to move secretions, mobilised by thoracic expansion exercises, downstream towards the mouth
- Medical management: beta-2-agonist inhaler, inhaled corticosteroid, antibiotics according to sputum cultures/sensitivities for acute exacerbations, flu vaccine, strep pneunomoniae vaccine

Want to learn more?

With AcePhysio the learning journey doesn't stop here! Take a look at our further reading recommendations below to become an expert in Bronchiectasis:

1. Smith, Maeve P. "Diagnosis and management of bronchiectasis." CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne vol. 189,24 (2017): E828-E835.
2. Murray MP, Pentland JL, Hill AT. A randomised crossover trial of chest physiotherapy in non-cystic fibrosis bronchiectasis. Eur Respir J. 2009 Nov;34(5):1086-92.
3. Hill AT, Sullivan AL, Chalmers JD, et al. British Thoracic Society guideline for bronchiectasis in adults. Thorax. 2019 Jan;74(suppl 1):1-69.