CHAPTER 69

BRONCHIECTASIS

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INTRODUCTION

Bronchiectasis is a disorder of persistent lung inflammation and recurrent infection, defined by a common pathological end point: irreversible bronchial dilatation arrived at through diverse etiologies. Bronchiectasis is defined as irreversible widening of medium to small-sized airways (bronchi) in the lung. It is characterised by inflammation, destruction of bronchial walls, and frequent colonisation with bacteria. Its incidence has been decreasing overall in industrialized countries, but it persists as a problem in lower and middle-income countries.

PATHOPHYSIOLOGY AND PATHOGENESIS

The relationships between the variables that define the disease, its natural course, and responsiveness to treatment are probably determined by the interaction between each patient's genome and the environment.

Unfortunately, our current knowledge of the cellular, molecular, and genomic basis of bronchiectasis is still very limited. The condition may be limited to a single lung segment, or it may affect one or both lungs more diffusely.

Future investigation may also include diagnostic imaging of the bronchiectasis (it is estimated that currently we take advantage of only 1% of the entire information that a high-resolution computed tomography scan provides), development of the "omics" (including genomics, proteomics, metabolomics, and microbiomics) that can better characterize the multiple endotypes (pathogenetic mechanisms), identification and validation of biomarkers associated with the clinical syndrome of bronchiectasis, and the expansion of bioinformatics(computational capacity and artificial intelligence) that can handle huge amounts of data ("big data") [1].

Previous respiratory infection, cystic fibrosis, immune deficiency, and ciliary disorders are the most common identified causes; however, most cases are idiopathic. This suggests interplay between immunogenetic susceptibility, immune dysregulation, bacterial infection, and lung damage. The damaged epithelium impairs mucus removal and facilitates bacterial infection with increased cough, sputum production, and airflow obstruction.

It is most prevalent in women and those older than 60 years, and prevalence is increasing. Patients have daily excessive sputum and associated symptoms, recurrent chest infections and impaired health-related quality of life [2].

The ensuing host response, immune effector cells (predominantly neutrophils), reactive oxygen intermediates (eg, hydrogen peroxide [H2O2]), neutrophilic proteases (elastase), and

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ral adhesions due to recurrent infections may require conversion to thoracotomy [19].

Hemoptysis due to bronchiectasis is frequently associated with acute infective episodes and is produced by injury to superficial mucosal neovascular bronchial arterioles. Bronchoscopy and chest CT are initial diagnostic tools to localize the bleeding to a lobe or segment for the patients with hemoptysis. Furthermore, balloon tamponade, topical application of a vasoconstrictive or coagulant agent, laser therapy, electrocautery, argon plasma coagulation, and cryotherapy may be able to stop the bleeding. If bronchoscopic techniques to control bleeding are unsuccessful or are not available, arteriographic embolization of bleeding sites (typically from a bronchial artery) may be performed. Bronchial artery embolization successfully stops pulmonary hemorrhage in more than 85% of attempted embolizations and preserves lung tissue and often eliminates the need for surgery [18]. However, if embolization is unsuccessful and bleeding persists, surgical resection may be necessary.Urgent surgery is occasionally required for the life-threatening hemoptysis which cannot be controlled with less invasive procedures.

For patients with tracheobronchomegaly (eg, Mounier-Kuhn syndrome), tracheal stabilizing procedures, such as proximal stents or tracheobronchoplasty, may be required to improve pulmonary function and clearance of airway secretions.

Patients with advanced bronchiectasis have a poor quality of life and an increasing mortality risk as lung function progressively falls. Worsening pulmonary function with hypercapnia, resting hypoxemia, and/or pulmonary hypertension are indications for initiating a lung transplant evaluation. Patients with suppurative lung disease were initially considered poor candidates for lung transplantation due to the potential persistence of infection that might worsen during prolonged immunosuppression. However, with bilateral lung transplantation, the survival advantage of transplantation is now thought to be comparable to that in other diagnostic groups [18]. Bronchiectasis severity index is a useful clinical predictive tool that identifies the risk of mortality, hospitalization, and exacerbations for patients with bronchiectasis. Score results of 9 or greater are associated with a predicted mortality rate up to 10.5% within the following year and a29.2% predicted mortality rate within the next 4 years. and various studies reported the improvement in survival after lung transplantation as 1 year survival 81-83 % and 5 year survival 73-76% [20].

Bronchiectasis should be well controlled and treated otherwise it reduces the quality of life, progresses due to frequent infections, and is a life-threatening illness because of severe respiratory distress or hemoptysis in the advanced stages.

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