Bronchiectasis: Treatment of Breathing Difficulties

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Introduction

Bronchiectasis is a device that contain a substance that enlarge bronchi and bronchioles, decreasing resistance in the respiratory airway and increasing air ow to the lungs to make breathing easier. Bronchiectasis may be originated naturally within the body or they may be used for the treatment of breathing di culties. ey are useful in obstructive lung disease such as asthma and in chronic obstructive pulmonary disease. e impact on healthcare systems is substantial [1]. A recent multicentre European study of patients with bronchiectasis identi ed an annual exacerbation frequency per patient per year, with a hospitalisation rate over few years follow-up. Bronchiectasis has a clear attributable mortality. In the largest cohort study reported to date, half of the patients died from respiratory causes, with around one-quarter dying from cardiovascular diseases. Loebinger provided long-term data on mortality by following up a cohort of patients rst recruited for the validation of the St. Georges Respiratory Questionnaire. ese patients were followed up for years. In a prospective cohort analysis of patients in secondary care in Belgium, Goeminne found that deaths were respiratory related and remaining were cardiovascular. erefore, it is clear, at least in secondary care bronchiectasis cohorts, that patients experience a high rate of exacerbations, hospital admissions and attributable mortality, emphasising the need for high-quality specialised care for these patients. e pathophysiology of bronchiectasis and the goals of treatment our understanding of the pathophysiology of bronchiectasis is limited, in part because of the lack of representative experimental models. Airway in ammation in bronchiectasis is dominated by neutrophils, driven by high concentrations of neutrophil chemo-attractants such as interleukin and leukotriene [2]. Airway bacterial colonisation occurs because of impaired mucociliary clearance and because of failure of neutrophil opsonophagocytic killing. Since neutrophils from bronchiectasis patients are believed to be normal prior to their arrival in the airway, it is likely that the airway in ammatory milieu itself impairs bacterial clearance. Work over several decades has implicated neutrophil elastase in this process. e e ects of elastase on airway epithelial cells includes slowing of ciliary beat frequency and promotion of mucus hypersecretion while impairment of opsonophagocytosis occurs at multiple levels, through cleavage of opsonins from the bacterial surface and cleavage of the neutrophil surface receptors FcγRIIIb and CD. Alpha defensins released from neutrophil granules also suppress phagocytic responses. Other mechanisms of immune dysfunction include failure of clearance of apoptotic cells and T cell in ltration, with recent evidence pointing to an important role of cells.

Discussion

Nevertheless, much more work is needed to unravel the complexities of the host response in bronchiectasis. Signi cant recent advances in our understanding of bronchiectasis have arisen through rRNA sequencing technologies which allow a comprehensive analysis of polymicrobial bacterial communities in the lung. Such technologies have clearly disproven the previous teaching that the healthy airway is sterile [3]. Studies in bronchiectasis reveal colonisation with familiar pathogens such as Haemophilus sp., Pseudomonas aeruginosa and

break the cycle. As with other respiratory diseases, patients with bronchiectasis should be encouraged to stop smoking. Vaccination against in uenza and pneumococcal disease is also recommended as for other chronic respiratory disorders although there are no speci c data in bronchiectasis about its impact. Bronchiectasis represents the nal common pathway of a number of diseases, many of which require speci c treatment. Host-infectious bronchiectasis is o en used as a diagnostic label for patients with a history of severe or childhood respiratory infections, a ecting patients. ere is little evidence so far that they represent a distinct phenotype from idiopathic bronchiectasis and some cases may represent recall bias [5]. Less data on aetiology is available outside the UK, but data from Italy and Belgium suggested a spectrum similar to the UK with perhaps fewer patients with allergic broncho-pulmonary aspergillosis and more with chronic obstructive pulmonary disease. Data from the USA clearly demonstrate more bronchiectasis due to non-tuberculous Mycobacteria in some centres, and a report by patients identi ed aetiology in few of cases. e BTS guidelines recommend testing for underlying causes including measurement of immunoglobulin, testing to exclude ABPA and speci c antibody responses to pneumococcal and Haemophilia vaccination. Sputum culture to exclude NTM and measurement of autoantibodies are also suggested. Testing for CF is recommended for patients with recurrent P. aeruginosa and Staphylococcus aureus isolation, or upper lobe predominant disease irrespective of age. Additional testing is recommended in speci c circumstances. COPD appears to be a very common aetiology, with bronchiectasis reported in up to patients with moderate-to-severe COPD. Bronchiectasis also appears relatively common in patients meeting the diagnostic criteria for asthma. Focal bronchiectasis may be associated with bronchial obstruction. Gastro-oesophageal re ux frequently co-exists with bronchiectasis and has been suggested as an aetiological factor in some cases. Immunoglobulin replacement, steroids and anti-fungal for ABPA, treatment for NTM and of CF all represent opportunities to speci cally treat the underlying cause and so systematic testing of all