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EDITORIAL

Dyspnea in bronchiectasis: a complex symptom of a complex disease

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Dyspnea, as a symptom, and bronchiectasis, as a syndrome, are both complex, heterogeneous entities.[1,2] The pathophysiological mechanisms that explain the presence and evolution of dyspnea in patients with bronchiectasis are quite diverse in origin. They can act synchronously (multifactorial dyspnea), are dynamic (changing over time), and can have different effects in different patients. In addition, dyspnea is difficult to quantify because it is, by definition, a subjective symptom. However, in most studies of bronchiectasis, dyspnea is mentioned as one of the factors most often associated with greater severity and poorer prognosis of the disease (determined by multidimensional scoring systems), as well as with worse quality of life scores.[3]

One common feature of various airway diseases, including bronchiectasis, is that the determination of dyspnea severity provides information that expands and complements findings regarding the nature and impact of the disease on the basis of clinical, radiological, and pulmonary function variables. That might be explained by the unexpectedly weak correlation that the severity of dyspnea shows with deterioration in lung function and the radiological extent of bronchiectasis.[4] In addition, each of the variables most commonly used for the overall evaluation of pulmonary function is usually associated, in varying degrees, with the severity of dyspnea. Each of those pulmonary function variables are therefore probably related, to a greater or lesser extent, to one of the various mechanisms that cause dyspnea in bronchiectasis, such as bronchial obstruction, mucus plugging, pulmonary hyperinflation, parenchymal destruction, and even dyspnea associated with individual comorbidities.[5]

In the present issue of the *Jornal Brasileiro de Pneumologia*, the article authored by Nucci et al.[6] clearly illustrates the complexity of dyspnea in bronchiectasis. The authors analyzed the relationship that dyspnea has not only with various markers of bronchiectasis severity and prognosis but also with several pulmonary function parameters. The analysis involved the rigorous selection of 114 patients with bronchiectasis in whom other diseases that cause dyspnea had been ruled out. Corroborating previous studies, the authors concluded that the severity of dyspnea correlates only weakly with pulmonary function variables and with the radiological extent of bronchiectasis.[4] In other words, none of the functional and radiological variables analyzed achieved, on their own, any significant diagnostic capacity to distinguish patients with fewer symptoms from those with more symptoms (stratified on the basis of a modified Medical Research Council scale score > 1); that is, none of the variables studied had an area under the ROC curve > 0.8 (i.e., excellent diagnostic value), even if we consider the upper limits of their confidence intervals. This finding supports the notion that a single variable (objectively measured) is incapable of evaluating the (subjective) impact of symptoms (dyspnea) in a particular patient.

Another interesting feature of the study conducted by Nucci et al.[6] is the thorough study of respiratory function in all of the patients, which included spirometry, plethysmography, and DLCO measurement. That allowed the authors to determine not only the severity of airway obstruction but also the presence of any restrictive pattern, air trapping, hyperinflation, and even parenchymal impairment or the presence of small airway disease. It is notable that all of these functional variables, when analyzed separately, are capable of distinguishing patients with more symptoms from those with fewer symptoms, although the diagnostic power was modest (area under the ROC curve between 0.62 and 0.68). However, the correlation between individual functional variables was not very high either, confirming once again that each of the functional variables measured provides additional, independent information about the severity of dyspnea in individual patients because those variables are probably associated with one of the pathophysiological mechanisms involved.[5] This finding is interesting because it could clarify some therapeutic aspects of dyspnea. This reminds us of various studies of COPD suggesting that improvements in dyspnea due to the use of bronchodilators are primarily associated with a reduction in air trapping and in pulmonary hyperinflation, which are often found in patients with COPD,[7] as well as in various patients with bronchiectasis.[6] Despite the widespread use of bronchodilators in patients with bronchiectasis, we are continually startled, even after two decades studying this disease, by the paucity of scientific literature on the clinical effects of this type of treatment for bronchiectasis. That is even more notable when compared with the abundance of studies on bronchodilators in other chronic inflammatory airway diseases, such as COPD and asthma—diseases that are closely related to bronchiectasis. Finally, Nucci et al.[6] also found a negligible association between the severity of dyspnea and structural changes on CT scans, probably because the radiological scales generally used in bronchiectasis do not include parameters such as the presence of emphysema, bullae, mucus plugs,

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atelectasis, or other structural lesions that can increase the severity of dyspnea.

It would be interesting to evaluate, perhaps via a further analysis of the data provided by Nucci et al.,[6] the best combination of (simultaneous or sequential) measurements of the different functional variables that would make it possible to predict or assess more accurately the severity of dyspnea in patients with bronchiectasis. This would also involve, however, an evaluation of the costs and availability of those pulmonary function tests at different centers. Finally, the addition of other variables, such as those that measure functional exercise capacity (particularly the six-minute walk distance and incremental shuttle walk distance), could provide valuable complementary information to studies regarding dyspnea in bronchiectasis.[8]

Once again, we are facing an extremely complex disease: bronchiectasis. The severity of the disease needs to be determined as objectively as possible, although other dimensions also need to be taken into account, including its biological activity (biomarker levels) and how well patients live with the disease (quality of life).[1] Such variables will provide further complementary information and contribute to a more realistic evaluation of the overall impact that bronchiectasis has on a given patient. New studies on the subject are likely to be necessary in the future.

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