



Editorial

Exercise-induced Oxygen Desaturation in Chronic Obstructive Pulmonary Disease Patients[☆]



Desaturación de oxígeno inducido por el ejercicio en pacientes con enfermedad pulmonar obstructiva crónica

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Interest in the causes and characteristics of chronic obstructive pulmonary disease (COPD) and its clinical manifestations has grown in the last 10 years. The range of clinical symptoms and other specific characteristics of COPD patients has led it be considered more as a syndrome than a disease, and many investigators have been motivated to define new phenotypes that reflect the particular features or responses of these patients. GesEPOC¹ guidelines classify phenotypes as non-exacerbator and exacerbator, predominant emphysema or chronic bronchitis, while the GOLD classification² includes moderate, severe and symptomatic or at-risk. It is clear that we are about to see a surge in COPD classifications, as it seems likely that guidelines will emerge in the near future that try to account for any particular characteristics that modify the clinical course or prognosis of the disease.

One characteristic that has been well defined but little understood is exercise-induced oxygen desaturation. About one third of COPD patients are thought to suffer desaturation during exercise, so this phenomenon is encountered relatively often in these patients. Nevertheless, consensus has not yet been reached on the definition of desaturation: some authors define it as a drop in blood oxygen saturation of 4% or more, while for others, it is a drop in blood oxygen saturation of 4% along with a reduction in minimum saturation to below 90% oxygen saturation in hemoglobin. This phenomenon has been mostly observed in patients with more severe disease in terms of FEV₁, and in patients with predominant emphysema phenotype. Although oxygen saturation may be detected during maximal effort on a cycle ergometer or during shorter exercise tests, it is mostly observed during submaximal effort on the 6-min walk test. This test is widely used and can be implemented in any center. In addition to determining the number of meters walked, it can be used to determine how the patient walked or how oxygen saturation changed during the test. Thus, the qualitative compo-

nent of the walk test, an aspect that has received little attention to date, can also be analyzed. The correlation between desaturation during the 6-minute walk test and desaturation observed during activities of daily living have already been analyzed: patients experiencing saturation within 1 min of starting the walk test, known as early desaturators, have a high probability of desaturation during activities of daily living, i.e., during a normal day with regular activity.³ Thus, patients who are early desaturators during a submaximal exercise tolerance walk test performed in a hospital, also have desaturations outside the hospital, during low-level exercise or while performing regular activities. These patients, in principle, should be more closely monitored than those who do not experience desaturation or who do so at a later stage (after 5.30 min). Thus, desaturation does appear to be an important characteristic of COPD patients, and one that impacts on the exercise tolerance and the quality of life of many. Moreover, in another study in which arterial PaO₂ levels were analyzed in early and late desaturators, after 5 years of follow-up, the early desaturators were seen to develop respiratory failure before the late desaturators.⁴ Desaturation during exercise, then, is a rather common occurrence, more so in patients with severe disease. Early or more rapid desaturation, moreover, is predictive of future respiratory failure. Indeed, it seems that while the number of meters walked in the 6-minute test provides useful data with prognostic value,⁵ the manner of walking and the moment in which COPD patients present desaturation are equally relevant.⁶ Nevertheless, factors predicting desaturation during exercise remain unclear. For some authors, FEV₁ is important, while for others carbon monoxide diffusion (DLCO) or PaO₂^{7,8} are of more interest. Furthermore, not only are the extent and time of desaturation important, recovery after exercise is probably significant too. Time to recovery of baseline pre-test values may be of clinical interest and prognostic value.⁹

Another consideration is that some patients, generally those with severe obstruction, desaturate more deeply, to levels as low as 20% below baseline. Indeed, it is not uncommon to see patients who desaturate more than 10%, with a minimum saturation of less than 90% and FEV₁ below 50% predicted value and severely diminished DLCO. This phenomenon has also been seen in other milder

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desaturators, but the clinical impact in these patients has still to be defined.

The next question to be addressed is whether COPD patients with exercise-induced desaturation are candidates for oxygen therapy during exercise. Current guidelines are unclear in this regard, and ambulatory oxygen therapy is recommended if it improves dyspnea or exercise tolerance.¹⁰ Oxygen therapy may be really effective in patients with large or early desaturations. More studies are needed to provide new data on the clinical consequences of severe exercise-induced desaturations during exercise in COPD patients and the possible benefits of oxygen therapy.

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