

Walk Tests in the Prescription of Portable Oxygen Therapy

L. Puente-Maestu

Servicio de Neumología, Hospital General Universitario Gregorio Marañón, Madrid, Spain.

Long term domiciliary oxygen therapy is the only treatment that has been reliably shown to prolong the life of patients with chronic obstructive pulmonary disease (COPD) and severe hypoxemia at rest. However, our understanding of such treatment is still incomplete. Clinical decisions and health insurance coverage policies are based primarily on 2 relatively small studies carried out in the 1970s.^{1,2} Since then, however, rather little has been done to refine and broaden that information.³ It is evident that we still lack knowledge on important matters, such as mechanisms of action, optimal dosage, prognostic factors for efficacy, and ways of improving adherence. It is very significant that there are no controlled clinical studies on the effectiveness of ambulatory oxygen therapy on the survival of patients with hypoxemia at rest or while walking. The lack of study in this area is surprising since in Spain over 45 000 prescriptions are written annually for domiciliary oxygen and, among them, approximately 3000 are for portable oxygen therapy. Consequently, the study by Morante et al⁴ in this issue of ARCHIVOS DE BRONCONEUMOLOGÍA is, frankly, most welcome.

The article compares arterial oxyhemoglobin saturation levels measured during 6-minute walk tests with levels detected by equipment capable of recording and storing measures over a period of 24 hours, thereby obtaining information on saturation during activities of daily living. That study showed that the correlation between the 2 contexts was acceptable: $r=0.7$ for mean saturation values and a slightly weaker correlation for percentage of time in which saturation was less than 85%. Among the other interesting results, the most noteworthy was that saturation during activities of daily living was generally higher than that observed during the 6-minute walk test. This finding suggests that at least one of the objectives of treatment had been accomplished—correction of hypoxemia during exercise—and that the prescribed oxygen flow in the walk test is at least the flow patients will require while performing every-day tasks. The

authors include no description of how they titrated the oxygen during the walk test, that is, whether they adjusted the flow without stopping the test or if, after increasing the flow, they waited a few minutes for the patient's PaO₂ to adjust to the new fraction of inspired oxygen. The former method saves time but tends to lead to the prescription of slightly higher flows. If that was the method used, it might explain the slightly higher saturation levels found when patients used oxygen as soon as they started activities. This finding would then offer a certain level of support for use of titration during a 6-minute walk test as a way of setting flow with a margin of safety.

Another reflection on the study is that the results could indicate that patients do not reach levels of physiological stress in their daily activities that are as high as those reached during their walk tests, when they are spurred on by the encouragement and enthusiasm of health care personnel. The walk test, correctly administered, is considered a method for evaluating a patient's daily activity,⁵ but such may not be the case for patients with COPD and severe hypoxemia at rest. Finally, it seems that patients avoid desaturation during their daily activities—a natural tendency that is well justified physiologically since desaturation is associated with increased dyspnea. However, this avoidance of desaturation and dyspnea raises the question of whether portable oxygen therapy really increases capacity for activity and whether this behavior should not be taken into consideration when prescribing oxygen at least to the same extent as the patient's improved performance on the 6-minute walk test. In our experience, COPD patients who request portable oxygen usually do so either to meet the demands of a special occasion (for instance a family event that is important for them) or because they have unrealistic expectations as to what portable oxygen will enable them to do. People who have an active work or social life and would, in principle, be the ones to benefit from portable oxygen tend to reject such treatment.

Present indications for oxygen during exercise are based on studies that compared oxygen with a placebo and that showed the distance walked in 6 minutes by COPD patients increased with oxygen.^{6,7} However, such improvement can be markedly reduced, albeit still evident, depending on the weight of the portable

Correspondence: Dr. L. Puente-Maestu.
Servicio de Neumología, Hospital General Universitario Gregorio Marañón.
Dr. Ezquerdo, 46. 28007 Madrid, España.
E-mail: lpuente@separ.es

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system.⁸ It is our assumption that such qualifying information—and possibly the desire to reduce unjustified prescription of portable oxygen—led the public health authorities in Spain to require the 6-minute walk test as a prerequisite for the prescription of portable oxygen therapy in an attempt to assure an “objective” measure for justifying oxygen treatment (RCL 1999\699; Boletín Oficial del Estado of March 13, 1999).

Reality is, nevertheless, more complicated than what can be stipulated in writing, and the prerequisite is probably not rigorously obeyed in many instances because taken to its ultimate consequences it would require that all patients under consideration for portable oxygen therapy actually undergo 3 walk tests (4, counting the practice walk): a walk at baseline, a walk to titrate oxygen flow, and a walk to evaluate response—this last one preferably taking place on a different day from the first. In most cases, however, the only test likely to be performed is the walk to set flow. The 6-minute walk test is rather less simple than it may seem. Not every walk performed in a hospital in the presence of someone in a white coat is a walk test. In order for the test to be a valid instrument of measurement, it must strictly conform to official guidelines, for reasons of external validity.⁹⁻¹¹ This means having (among other things) a long, quiet corridor, some clearly visible objects to mark the ends of the distance to be covered, adequate safety measures (such as a defibrillator and medication for angina and bronchospasm), and a dedicated member of the staff (a nurse or doctor) to supervise the tests.⁹ Furthermore, if oxygen is to be prescribed for patients who are unable to take the walk test because of some contraindication (eg, angina), the guidelines as they are written will not be followed. Furthermore, it is not clear what we mean by “improvement” on a test. It could be interpreted as any increase in the distance walked, small as that may be. But returning to scientific evidence, according to studies published on the reproducibility of the 6-minute walk test, using the criterion of an intraindividual variation of 1.96 times baseline (or less than a 5% probability that the variation observed is random),

improvement could range from 12% to 15% if patients did the practice walk, and from 15% to 60% if they did not. One study asserted that for improvement to be considered clinically relevant the increase in the distance walked should exceed 70 meters.¹²

In summary, the recent study by Morante et al⁴ is of interest for those who prescribe portable oxygen therapy in their practice and it underscores the need for further study to identify the type of patient who will truly benefit from such therapy.

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