



LETTERS TO THE EDITOR

Ambulatory oxygen: Is the six-minute walk test the best option?

Oxigenoterapia de deambulação: será o teste de 6 minutos de marcha a melhor opção?

Dear Editor,

We have read with great interest the paper recently published by Vieira et al. in the *Portuguese Journal of Pulmonology* about the efficacy and patterns of ambulatory oxygen usage in a university hospital.¹ To determine patterns of ambulatory oxygen (AO) use among patients with COPD and interstitial lung diseases, the authors have studied 37 consecutive adult patients on AO by liquid O₂ for more than 3 months. The acute response to O₂ was evaluated through the standardized 6-minute walk test (6MWT) and the Borg dyspnoea scale during a O₂ pre-intervention trial. In relation to the acute response to O₂ there were significant improvements in the distance walked, in resting SatO₂, in minimal SatO₂, and in percentage of desaturation, independently of the diagnosis. However, acute improvement in 6MWT parameters was not predictive of enhancement of outdoor activities with AO. AO was used for a mean of 4.1 h/day and surprisingly, patients spent fewer hours per day away from home after AO treatment. Moreover, 16% of the patients were not compliant to the prescription, and 54% mentioned side effects.

The ATS Guideline for the 6MWT² have established that the strongest indication for the 6MWT is for measuring the response to medical interventions in patients with moderate to severe heart or lung disease, as a one-time measure of functional status of patients, and as a predictor of morbidity and mortality. The number of meters walked has been accepted as the main variable to be recorded in these situations.³ The paper from Vieira et al.¹ highlights a number of important problems related to 6MWT that we would like to consider.

First of all, it is necessary to say that in this Guideline there is no reference to the role of the 6MWT in the AO prescription. Second, it is very important to take into account that the 6MWT is not as simple as 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 should strictly conform to official guidelines, for reasons of external validity. This

means having a long, quiet corridor, some clearly visible objects to mark the ends of the distance to be covered, adequate safety measures, and a dedicated member of staff (a nurse or doctor) to supervise the tests. It would also require all patients under consideration for portable oxygen therapy to 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 one.⁴ In most cases, however, the only test likely to be performed is the walk to set flow. Third, if oxygen is to be prescribed for patients who are unable to take the walk test because of some contraindication (e.g., angina), the guidelines as they are written will not be followed.⁵ At present, most patients are receiving AO without a prior 6MWT being performed. On the contrary, the public health authorities have established the 6MWT as a prerequisite for the prescription of portable oxygen therapy in an attempt to reduce the cost of domiciliary respiratory therapies. Finally, as the authors have shown, acute improvement in 6MWT parameters was not predictive of enhancement of outdoor activities with AO. So, what can we do?

We daily see many patients who live more comfortably and with less dyspnoea on AO. We do not think probably that the 6MWT is the best tool to test the benefits of AO in our patients. Would a simple walk be enough? A 2-min walk test? Should we guarantee the use of as much oxygen as the patient can take if a chronic respiratory insufficiency⁶ is present? The study by Vieira et al. is of interest for those who prescribe AO in their practice and it underscores the need for further study to identify the type of patient who will truly benefit from such therapy.

References

1. Vieira T, Belchior I, Almeida J, Hespanhol V, Winck JC. Efficacy and patterns of ambulatory oxygen usage - experience of a university hospital. *Rev Port Pneumol*. 2011; doi:10.1016/j.rppneu.2011.03.012.
2. ATS. Statement: six minute walk test. *Am J Respir Crit Care Med*. 2002;166:111–7.
3. Van der Plas MN, Surie S, Reesink HJ, Van Steenwijk RP, Kloek JJ, Bresser P. Longitudinal follow-up of six-minute walk distance after pulmonary endarterectomy. *Ann Thorac Surg*. 2011;91:1094–9.

4. Dolmage TE, Hill K, Evans RA, Goldstein RS. Has my patient responded? Interpreting clinical measurements such as the six minute walk test. *Am J Respir Crit Care Med*. 2011 [Epub ahead of print].
5. Puente-Maestu L. Walk tests in the prescription of portable oxygen therapy. *Arch Bronconeumol*. 2005;41:591–2.
6. Ram FS, Wedzicha JA. Ambulatory oxygen for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2002:CD000238.

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Response to the letter “Ambulatory oxygen: Is the 6 minute walk test the best option?”

Resposta à carta “Oxigenoterapia de deambulação: será o teste de 6 minutos de marcha a melhor opção?”

We would like to thank the authors for their comment on our article¹ about the study on the prescription of ambulatory oxygen (AO) and for raising very pertinent and important issues.

Our findings of relatively low adherence to prescribed AO are consistent with other studies, for example, a recent Italian survey² which confirmed that only 41% of the patients reported used liquid oxygen when outside the house.

In our study we clearly defined the criteria for use of AO; these consisted of exercise hypoxemia which is documented by a standardized 6-min walk test (6MWT) on air, evidence of significant desaturation (to 88% or less), the patient being responsive to oxygen, and significant daily activity. According to our data, positive response during the 6MWT did not help to predict greater use of the portable oxygen systems (POS). This led us to the conclusion, highlighted in the article, that non-adherence to AO may be closely related to the social stigma or the physical characteristics (like weight) of the POS.

The authors correctly discuss the role of the 6MWT in prescribing AO. In fact, although the ATS statement on the 6MWT³ is not very clear in relation to prescribing AO, some authors have suggested the need for up to five 6MWT. To minimize the learning effect, the first two are training sessions, one of which may be performed with the patient carrying the weight of the oxygen source,⁴ and then the oxygen titration should be performed after three 6MWT to evaluate the effect of breathing air and two different oxygen doses.⁵ However, there is no standard titration method. According to the COPD ATS Guidelines it is recommended that the resting flow rate be increased by 1L/min during exercise.⁶ We opted to perform the walk test with the highest flow possible (6 L/min) because in some studies doubling the resting dose was not sufficient to prevent hypoxemia⁴ and we wanted to make sure of providing adequate oxygenation during all activities. Moreover, we do not believe that in the real world the repetition of so many 6MWT is actually feasible and, in fact, 26% of respirologists around the world do not perform the oxygen titration test during exercise on every patient.⁷

It is important to note that the BTS recommendations published in 2006⁸ suggest that “the initial assessment

should be followed by a review after two months when the true value of AO can be judged by interview, diary card and oxygen usage”. In addition home follow-up within 4 weeks is strongly recommended. Without this monitoring patients might use systems or settings that do not maintain adequate oxygenation and as a consequence their physical activity is restricted and the health benefits lost. In our centre this strict protocol is not followed and so long-term compliance with AO can be affected.

We believe, therefore, that the acute assessment should be only one component of an AO evaluation. Objective compliance of oxygen use is urgently needed and newly designed Oxygen Therapy Monitoring Devices can improve the management of these patients.⁹

As we stated (because acute improvements in 6MWT parameters do not help predict outdoor activities) we need better tests to identify those who really respond to AO. As has been suggested by Vonbank et al.¹⁰ hemodynamic response to oxygen can be a better predictor. Others have implied that the more hyperinflated COPD patients are the ones that can benefit most¹¹ or we may even have to be more stringent in the criteria for AO prescription as suggested by Leach et al.⁵ and only consider those who show 50% improvement in exercise ability!

One thing is certain, although we have to increase the consensus around AO prescription, repeated educational sessions are definitely needed to improve compliance to long-term oxygen therapy.

References

1. Vieira T, Belchior I, Almeida J, Hespanhol V, Winck JC. Efficacy and patterns of ambulatory oxygen usage – experience of a university hospital. *Rev Port Pneumol*. 2011;17:159–67.
2. Neri M, Melani AS, Miorelli AM, Zanchetta D, Bertocco E, Cinti C, et al. Educational Study Group of the Italian Association of Hospital Pulmonologists (AIPO) Long-term oxygen therapy in chronic respiratory failure: a Multicenter Italian Study on Oxygen Therapy Adherence (MISOTA). *Respir Med*. 2006 May;100:795–806.
3. ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories. ATS statement: guidelines for the six-minute walk test. *Am J Respir Crit Care Med* 2002;166(Jul 1 (1)):111–7.
4. Nasilowski J, Przybyłowski T, Zielinski J, Chazan R. Comparing supplementary oxygen benefits from a portable oxygen concentrator and a liquid oxygen portable device during a walk test in COPD patients on long-term oxygen therapy. *Respir Med*. 2008;102 July:1021–5 [Epub 21 Mar 2008].