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sppneumologia@mail.telepac.pt

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## 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.<sup>1</sup> 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 O<sub>2</sub> for more than 3 months. The acute response to O<sub>2</sub> was evaluated through the standardized 6-minute walk test (6MWT) and the Borg dyspnoea scale during a O<sub>2</sub> pre-intervention trial. In relation to the acute response to O<sub>2</sub> there were significant improvements in the distance walked, in resting SatO<sub>2</sub>, in minimal SatO<sub>2</sub>, 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 6MWT<sup>2</sup> 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.<sup>3</sup> The paper from Vieira et al.<sup>1</sup> 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 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 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 set oxygen flow, and a walk to evaluate response – the last one preferably taking place on a different day from the first one.<sup>4</sup> 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 a walk test because of some contraindication (e.g., a fall), the guidelines as they are written will not be followed. At present, most patients are receiving AO without the 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 therapy. 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 it is necessarily the best tool to test the benefit 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 insufficiency<sup>5</sup> is present? The study by Vieira et al.<sup>1</sup> 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 AO therapy.

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S. Diaz Lobato\*, S. Mayoralas Alises, J.L. García C  
*Servicio de Neumología, Hospital Ramón y Cajal, Madrid, Spain*

\*Corresponding author.

E-mail address: [sdiazlobato@gmail.com](mailto:sdiazlobato@gmail.com) (S. Diaz Lobato).

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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 article<sup>1</sup> 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 survey<sup>2</sup> 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 6MWT<sup>3</sup> 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,<sup>4</sup> and then the oxygen titration should be performed after three 6MWT to evaluate the effect of breathing air and two different oxygen doses.<sup>5</sup> 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.<sup>6</sup> 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 hypoxemia<sup>4</sup> 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.<sup>7</sup>

It is important to note that the BTS recommendations published in 2006<sup>8</sup> suggest that ‘‘the initial assessment

should be followed by a review after two months to assess the true value of AO can be judged by interview, diary and oxygen usage’’. In addition home follow-up within 12 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 case, if the 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. Compliance with oxygen use is urgently needed and the use of designed Oxygen Therapy Monitoring Devices can help in the management of these patients.<sup>9</sup>

As we stated (because acute improvements in physiological parameters do not help predict outdoor activities) we need better tests to identify those who really respond to oxygen. As has been suggested by Vonbank et al.<sup>10</sup> hemodynamic response to oxygen can be a better predictor. Other studies have implied that the more hyperinflated COPD patients are the ones that can benefit most<sup>11</sup> or we may even have to be more stringent in the criteria for AO prescription as suggested by Leach et al.<sup>5</sup> and only consider those with >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 with long-term oxygen therapy.

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