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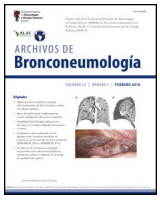

Editorial

[Translated article] Exercise Tolerance in Pulmonary Hypertension

Tolerancia al esfuerzo en la hipertensión pulmonar

Exercise intolerance is common in patients with chronic respiratory diseases and impacts on quality of life and activities of daily living.[1] This limitation is caused by the dysfunction of certain physiological systems involved in exercise and is associated with a greater intensity of symptoms such as dyspnea.[2] From the physiological point of view, the mechanisms involved in exercise intolerance include impaired ventilation and gas exchange, systemic and/or pulmonary hemodynamic limitations, and skeletal muscle abnormalities.[1]

Pulmonary hypertension (PH) is a hemodynamic disorder characterized by an abnormal increase in mean pulmonary arterial pressure greater than 20 mmHg and pulmonary vascular resistance greater than 3 Wood units at rest.[3] Exercise capacity assessment can provide valuable information for the diagnosis, treatment, and prognosis of PH.[4] Although PH has different causes, they all share a cardiovascular component, so tests that evaluate aerobic capacity are an important factor in both diagnosis and follow-up.

Exercise limitation is a common characteristic of PH, and is therefore a crucial component in the clinical evaluation of the disease.[5] The most common way to assess exercise capacity in PH is with the 6-minute walk test (6MWT), a submaximal test that is easy to perform, inexpensive, and widely used in clinical practice. This test can be used to evaluate the effect of an intervention and provides prognostic information,[6] but it does not explain the origin of the aerobic limitation. In the past, the 6MWT was used to evaluate the efficacy of PH treatments,[7] and it is now used as one of the essential elements in the multi-parameter assessment of the mortality risk.[8,9]

Another way to assess maximum exercise capacity is with cardiopulmonary exercise testing (CPET), which provides information on cardiovascular response to maximum exercise.[10] This test provides diagnostic and prognostic information complementary to that provided by the 6MWT. Some CPET parameters, such as peak oxygen consumption, oxygen pulse, and the ventilatory equivalent for CO_2 at the anaerobic threshold (VE/VCO_2) have been shown to be predictors of survival in pulmonary arterial hypertension.[11]

In patients with chronic lung diseases, such as chronic obstructive pulmonary disease or diffuse interstitial lung disease, CPET helps clarify the nature of exercise limitation. Various studies have shown that in these chronic lung diseases, the presence of PH significantly reduces peak oxygen consumption by more than 4 ml/min/kg and the oxygen pulse by about 2 ml/beat,[12] confirming that the ventilatory limitation typical of the underlying respiratory disease is compounded by a significant cardiovascular limitation.[13]

In operable chronic thromboembolic PH, the 6MWT is routinely performed before and after pulmonary endarterectomy as a means of assessing disease severity, functional capacity, and prognosis.[14] Distance walked on the 6MWT and the VO_2 obtained on CPET have been associated with residual post-operative PH.[15,16]

Conscious of this situation, the European Society of Cardiology (ESC) and the European Respiratory Society (ERS) now include in their risk assessment distance walked on 6MWT, peak oxygen consumption on CPET, and the New York Heart Association (NYHA) functional class, which also contributes to assessing the functional status of patients with PH.[4]

Exercise tolerance testing is not only used in the evaluation of patients with PH. Because clinical guidelines recommend its use, studies of therapeutic interventions have also adopted exercise tolerance as one of the most important parameters for assessing the effectiveness of their treatments. Thus, exercise tolerance appears regularly in studies evaluating not only the effectiveness and safety of new drugs, but also surgical procedures and pulmonary rehabilitation.[16–18]

In short, the assessment of exercise tolerance should be included the evaluation of patients with PH, irrespective of the cause. There is little question that its utility in diagnosis and prognosis will offer a greater understanding of ventilatory and circulatory changes, substantially improving the management of this disease.

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Conflict of interests

The authors state that they have no conflict of interests.

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