Incremental Shuttle Walking Test To Estimate Maximal Exercise Capacity In Patients With Pulmonary Arterial Hypertension

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Rationale: Maximal exercise capacity, as estimated by oxygen uptake ($V'O_2$) at the end of a symptom-limited incremental cardiopulmonary exercise testing (peak), is a clinically-useful index of disability and prognosis in patients with pulmonary arterial hypertension (PAH). Although a "field" test (incremental shuttle walking (ISWT)) has been used for this purpose in patients with chronic obstructive pulmonary disease and heart failure, no previous study has looked at its clinical validity in PAH. **Methods**: 24 patients with established PAH (NYHA class II-III) performed, on different days, a rapidly-incremental treadmill test (ITT) and two ISWT with cardiopulmonary variables being recorded on a portable system (Oxycon Mobile™, Jaeger, Germany). **Results**: Exercise time and distance walked in the ISWT were highly reproducible (r= 0.87 and 0.93, respectively; p<0.01). Peak $V'O_2$ was approximately 14% lower in the ISWT compared to ITT (15.1 ± 3.3 ml/min/kg vs. 17.3 ± 4.3 ml/min/kg). There was a weak correlation between peak $V'O_{2ITT}$ with both distance walked and exercise time in the ISWT (r= 0.46 and r= 0.42, respectively; p= 0.02). However, while peak $V'O_{2ITT}$ varied widely in patients with poorer ISWT performance, all but 2 patients who walked more than 300 m (N= 10) had a peak $V'O_{2ITT}$ > 15 ml/min/kg. There was a close inter-test method agreement between presence ($\Delta Sp0_2$ > 4%) and severity of exercise-related oxihemoglobin desaturation (p<0.01).

Conclusions: ISWT had a limited value as a field test to estimate maximal aerobic capacity in patients with PAH. The test showed to be more useful to indicate patients with less severe aerobic impairment and to measure exercise-related hypoxemia.

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