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Title: Estimation of the exercise ventilatory compensation point by the analysis of the relationship between minute ventilation and heart rate in patients with pulmonary hypertension

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Body: Background: Incremental cardio-pulmonary exercise test with gas exchange measurement is the gold standard for the identification of the ventilatory compensation point (VCP). It has previously been demonstrated that the change in the slope of increment of minute ventilation over heart rate (ΔV'E/ΔHR) can be utilized alternatively to the ventilatory equivalent for CO2 (V'E /V'CO2) method for detection of VCP in healthy subjects. The reliability of this parameter in patients affected by cardiac and pulmonary diseases is still not well elucidated. Aim: To evaluate the efficacy and reliability of the ΔV'E/ΔHR in patients with pulmonary hypertension. Methods: Twenty subjects (11F – 9M; mean age 44±15.8 SD) with a diagnosis of pulmonary hypertension underwent an incremental maximal exercise test on a cycle-ergometer. V'O2, V'CO2, V'E were measured breath-by-breath. Heart rate was also registered. Results are expressed as mean±SD. Results: All patients reached the VCP showing a mean VO2 max % predicted of 55±15%. As in healthy subjects it was possible to identify two different slopes (S1 – S2) of increment in the ΔV'E/ΔHR in 14 out of the 20 patients tested (0.78±0.2 vs 1.83±1.0 p=0.002). The remaining 6 patients in whom was not detected a significant difference between the two slopes interestingly showed an altered cardiac function, as shown by the O2 pulse in the final phase of exercise. Conclusions: ΔV'E/ΔHR as a predictor of the VCP, appears to be a useful and reliable method to identify more severe IP patients with an altered cardiac function.