

differences may not be so clear-cut in the clinical setting and there are significant overlaps in clinical, physiological and pathological features of the two diseases, including the mechanisms of bronchial hyperresponsiveness and atopy that drive obstructive phenotypes [7]. Although asthma may progress to chronic irreversible airflow obstruction, changes in reversibility over time are not widely reported [8, 9]. It may be that we require a new taxonomy to better define the various disorders of airway obstruction.

So in the end perhaps it all comes back to the title of our paper [1]: COPD prevalence...a matter of definition.

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STATEMENT OF INTEREST

None declared.

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DOI: 10.1183/09031936.00132207

Right ventricular dysfunction and functional limitation in idiopathic pulmonary fibrosis

To the Editors:

We read with great interest the paper by DAL CORSO *et al.* [1] in a recent issue of the *European Respiratory Journal*. The authors used a 6-min step test to estimate effort tolerance and exercise-related oxyhaemoglobin desaturation in patients with interstitial lung disease. Although desaturation with exertion is well accepted as a prognostic tool in patients with interstitial lung disease, conflicting reports exist regarding the distance covered during the test [2–5]. Moreover, evidence is lacking regarding the possible association between cardiac function, exercise capacity and exercise desaturation in patients with interstitial lung disease. In a small cohort of 22 patients (mean \pm SD age 65 \pm 9 yrs) with well-defined idiopathic pulmonary fibrosis (IPF), we used the 6-min walk test (6MWT) to assess prognosis and to investigate the association of exercise capacity with left and right ventricular echocardiographic parameters. All patients underwent a complete echocardiographic study, including two-dimensional, colour flow, spectral Doppler as well as tissue Doppler imaging for the evaluation of right and left ventricular systolic and diastolic function.

Mean time from initial diagnosis of the disease was 9 months. After a median follow-up period of 22 months, five deaths

were recorded (four were due to respiratory failure decompensation and one followed sepsis). A cut-off value of 225 m for 6MWT distance predicted survival after follow-up with 100% sensitivity and 60% specificity (area under curve (AUC) 0.77, $p=0.01$). Moreover, a cut-off value of $>5\%$ for desaturation with exercise predicted mortality with 58% sensitivity and 100% specificity (AUC 0.82, $p=0.006$). Amongst all echocardiographic parameters, 6MWT distance correlated significantly with pulmonary artery systolic pressure ($r=-0.53$, $p=0.01$; fig. 1), early diastolic peak myocardial velocity of the tricuspid annulus ($r=-0.45$, $p=0.03$; fig. 1) and late diastolic peak myocardial velocity of the tricuspid annulus ($r=-0.44$, $p=0.03$). No correlation was found between oxygen desaturation during the 6MWT and any of the echocardiographic parameters.

Although the number of patients evaluated was small, our results indicate that there is a close association between exercise capacity, indices of right ventricular diastolic function and prognosis in patients with IPF. Exercise capacity in patients with IPF has been shown to be limited mainly by gas exchange and ventilatory impairment [6]. The conflicting reports in the literature regarding the relationship between 6MWT distance and mortality in IPF patients probably reflect differences in the exercise protocols and, particularly, the time and reason of the 6MWT termination [2–5]. Nevertheless, the

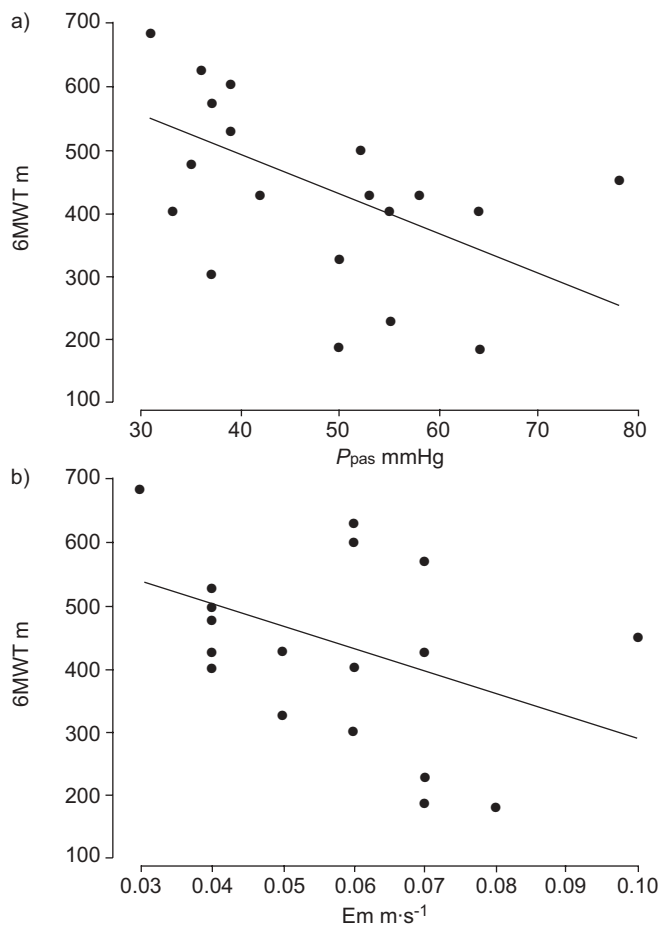


FIGURE 1. Scatter plots showing the relationship between 6-min walk test (6MWT) distance and a) pulmonary artery systolic pressure (P_{pas}) and b) early diastolic peak myocardial velocity (Em) of the tricuspid annulus.

majority of authors [2–5] agree that the degree of desaturation seems to be a strong predictor of mortality, as we also confirmed in our cohort. Importantly, exercise capacity is not only dependent on respiratory function; cardiac function and muscle function are other important factors that can come into play [7]. Moreover, poor 6MWT performance should raise suspicion of the presence of underlying pulmonary arterial hypertension.

As the prevalence of right ventricular dysfunction is high in patients with end-stage pulmonary disease [8], we believe that the echocardiographic evaluation of right ventricular function can be complementary to clinical evaluation and functional assessment in these patients.

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STATEMENT OF INTEREST

None declared.

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DOI: 10.1183/09031936.00083407

From the authors:

We thank G. Giannakoulas and co-workers for their interest in our study [1]. Unfortunately, haemodynamic measurements at rest or during exercise were not performed in our patients with interstitial lung diseases. Therefore, we were unable to evaluate the relationship between exercise tolerance and those physiological adjustments. In line with these results, however, we did find that oxygen pulse, an index of stroke volume in some circumstances [2], was positively related to the number of steps climbed in 6 min ($r=0.64$; $p<0.01$). Conversely, there was an inverse relationship between oxygen pulse and the nadir of oxyhaemoglobin desaturation at exercise cessation ($r= -0.57$; $p<0.01$).

Additional studies are needed to better characterise the haemodynamic responses to stepping and walking in these patients and their relationships with resting echocardiographic parameters and the severity of chronic hypoxaemia. We have preliminary data (data not published) suggesting that the step test also provides prognostic information in these patients and that it might constitute a more practical test paradigm than walking tests performed in clinical settings.