I read with great interest the study by Davies et al.1 in which it was reported that the oxygen uptake efficiency slope (OUES) is a determinant of survival in patients with chronic heart failure (CHF). Indeed, the essential point is that it is not clear which parameter ought to be selected to detect the severity of CHF. Responses such as the anaerobic threshold, VE (minute ventilation volume)/VCO2 slope, oxygen uptake kinetics, rate of recovery of peak oxygen consumption (pVO2), and OUES have frequently been used to classify functional limitations and stratify risk in patients with heart disease.2 Although pVO2 is accepted as a key parameter in assessing the severity of CHF, it might be underestimated and be a less reliable parameter because of reduced patient motivation, the exercise protocol selected, and skills of the examiner.3 A more physiological approach would express pVO2 per kilogram of lean tissues, which better reflects the fact that non-lean tissue does not contribute significantly to increased oxygen uptake on exercise.4

According to previous studies, patients with VE/VCO2 above the upper limits of normal have a significantly worse prognosis.5 Commonly, patients with CHF do not arrive at the maximal level of exercise capacity, instead stopping at the submaximal level. Therefore, submaximal exercise parameters, such as the ventilatory anaerobic threshold and changes of ventilatory parameters, are introduced to evaluate the cardiopulmonary functional reserve.4

A recently proposed index of ventilator efficiency, the OUES, has been suggested as a useful measure to stratify the functional reserve of patients undergoing exercise testing.5 Baba et al.5 reported that the OUES was as effective as pVO2 for discriminating between CHF functional classifications and that it was strongly correlated to pVO2. The usefulness of OUES is that it does not require the maximal effort of the patient, it has been shown to be reproducible, and it reflects the combination of cardiovascular, musculoskeletal, and pulmonary influences that result in inefficient breathing, which are characteristic of CHF disease.5 However, excessive carbon dioxide production simulates ventilation and leads to lower values of OUES in patients with CHF. OUES should be evaluated and standardized during different exercise protocols and various therapy modalities, which affect carbon dioxide production. Additionally, Paradoens et al.6 reported that pVO2 was a stronger predictor of death or cardiovascular events than OUES or than the VE/VCO2 slope.

Shortly, it seems to me that neither pVO2-related nor VE-related parameters correctly present central and peripheral exercise capacity in cardiac patients during submaximal exercise. As a submaximal mathematical parameter, OUES may provide a more beneficial analytic approach to prognosis and progression of CHF.

References

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