Letter to Editor

The importance of cardiopulmonary exercise testing (CPET) in managing overweight and associated comorbidities

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Article Information

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Cardiopulmonary exercise testing (CPET) provides a comprehensive assessment of cardiovascular and ventilatory responses to exercise stress. By analyzing gas exchange, CPET reflects cardiac output, pulmonary blood flow and peripheral oxygen extraction, providing crucial insights into cardiovascular function and exercise capacity.[1]

The CPET procedure includes the ramp exercise on a cycling ergometer, breathing air collection and stress ECG. The patient has to maintain a higher cadence during the test, with a lower cadence during the recovery period. Real-time gas exchange kinetics, stress ECG, heart rate, dynamics, and blood pressure and blood lactate levels are closely monitored throughout the procedure.

Figure 1. Cardiopulmonary exercise fitness testing (CPET)

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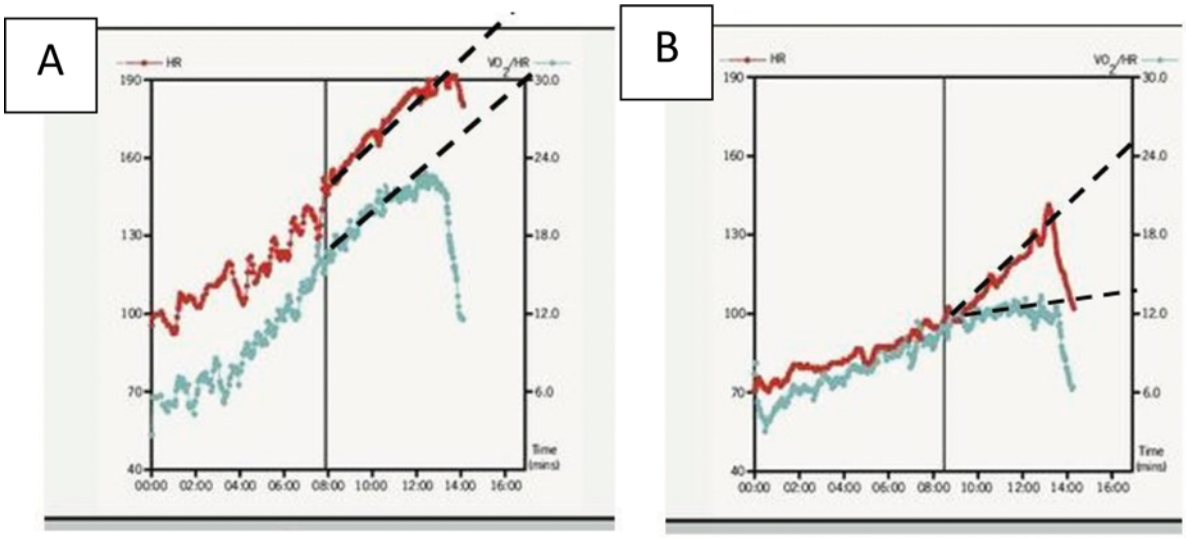

Figure 2. Graphs of O_2 pulse and VO_2 kinetics against the heart rate of the patient. A: VO_2 kinetics (red line) over O_2 pulse (blue line) of a healthy adult. The VO_2 and O_2 pulse kinetics are parallel to each other. B: VO_2 and oxygen pulse kinetics of a overweight adult. The O_2 pulse is in plateauing / flattening pattern over the VO_2 indicating impaired left ventricular systolic function.

The CPET parameters such as VO_2 peak and oxygen pulse are the main indicators of oxygen kinetics of the body during a given physical stress. VO_2 peak describes the maximum oxygen utility of the body during a peak exercise level. Oxygen pulse is the key indicator of left ventricular systolic function, reflects stroke volume. A reduced or plateauing oxygen pulse during exercise can indicate left ventricular dysfunction.[2] Anaerobic threshold, the point at which anaerobic glycolysis begins, is also readily identified with CPET. Lower, early reaching anaerobic threshold indicates suboptimal supply of oxygen to active tissues, organs especially to the skeletal muscles during a physical activity.

Overweight is a prevalent global health concern associated with numerous comorbidities, including cardiovascular diseases and generalized deconditioning. Generalized deconditioning, characterized by reduced VO_2 max, reduced oxygen pulse and dominant anaerobic metabolism (early set anaerobic threshold) are strongly linked to increased risk of cardiovascular morbidities and premature mortality.[3]

This letter highlights the importance of CPET in assessing patients with overweight and generalized deconditioning. This letter is based on a recent clinical case demonstrated the value of usage of CPET in setting a fine-tuned aerobic exercise training program for managing an overweight patient.

CPET is a valuable tool for assessing individuals with metabolic disorders. It provides crucial information for risk stratification and the development of personalized exercise interventions. By identifying potential cardiovascular risks and guiding tailored exercise programs, CPET can optimize patient care and improve health outcomes.

A key limitation to broader CPET adoption is its cost and limited patient understanding. Policy directives are needed to increase awareness and accessibility of CPET, particularly for rehabilitation programs, to improve patient outcomes and enhance healthcare quality.

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