Novel Exercise Modality in Cardiac Rehabilitation: Acute Responses and Safety of Moderate Hybrid Interval Training on Hemodynamic, Autonomic, and Muscle Oxygenation Parameters in Acute Myocardial Infarction: A Randomized Cross-over Design

Mohamed Ali Hbaieb*[1,2,3], Omar Hammouda*[3], Salma Charfeddine*[4], Tarak Driss[5], Ahmed Makni[4], Leila Abid[4], Benoit Dugué[6], and Laurent Bosquet[7]

[1]University of Poitiers, Laboratory Mobilité, Vieillissement, Exercise (MOVE) (UR20296), Faculty of Sport Sciences, 86000 Poitiers, France – University of Poitiers, France – France

[2]High Institute of Sport and Physical Education of Sfax, University of Sfax, 3000 Sfax, Tunisia – Tunisie

[3]Interdisciplinary Laboratory in Neurosciences, Physiology and Psychology: Physical Activity, Health and Learning (LINP2), UFR STAPS, Paris Nanterre University, 92000 Nanterre, France – Université Paris Nanterre, Nanterre – France

[4]Unit of Cardiology in Hospital of Hedi Chaker, Faculty of Medicine, University of Sfax, 3029 Sfax, Tunisia – Tunisie

[5]4 Interdisciplinary Laboratory in Neurosciences, Physiology and Psychology: Physical Activity, Health and Learning (LINP2), UFR STAPS, Paris Nanterre University, 92000 Nanterre, France – Université Paris Nanterre, Nanterre – France

[6]University of Poitiers, Laboratory Mobilité, Vieillissement, Exercise (MOVE) (UR20296), Faculty of Sport Sciences, 86000 Poitiers, France – University of Poitiers, France – France

[7]University of Poitiers, Laboratory Mobilité, Vieillissement, Exercise (MOVE) (UR20296), Faculty of Sport Sciences, 86000 Poitiers, France – University of Poitiers, France – France

Résumé

Background and Aim

The combination of aerobic and resistance training remains the cornerstone intervention of exercise-based cardiac rehabilitation (CR). Moderate hybrid interval Training (MHIT) is a novel exercise modality, that alternates aerobic and resistance sets at moderate intensity within one exercise. The main objective of this study was to compare the acute effects of MHIT to moderate intensity continuous training (MICT) on blood pressure, cardiac autonomic function, and muscle oxygenation. The secondary aim was to explore the safety of MHIT and MICT in post-AMI patients.

Methods

Twenty-four patients with AMI (mean age of 54.8±7.7 years) were referred to an exercise-based CR program and completed a cross-over trial. They were randomized to a single bout

*Intervenant

of MICT or MHIT with one week of washout period between sessions. The MICT and MHIT sessions were performed at moderate intensity for 48 minutes. Blood pressure, muscle oxygenation (Near Infrared Spectroscopy), and heart rate variability were measured before and after each session.

Results

Diastolic and systolic blood pressure were decreased only following the MHIT ($p< 0.001$). The root mean square of successive differences between normal heartbeats was increased only following the MICT ($p=0.043$). The muscle saturation index and oxygenated hemoglobin increased only following MHIT ($p< 0.001$). No adverse cardiac events were recorded during MICT and MHIT sessions.

Conclusion

Compared to the MICT, MHIT provided greater post-exercise hypotension and muscle oxygenation. However, vagal reactivation was greater following the MICT. Furthermore, MICT and MHIT were safe for sedentary patients with low cardiorespiratory fitness.