



Editorial

When to Return for Usual Activity After ACS; The Benefit of Cardiac Rehabilitation

Cholid Tri Tjahjono^{1,2*}¹ Brawijaya Cardiovascular Research Center, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.² Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

ARTICLE INFO

Keywords:

Acute Coronary Syndrome;
Physical Activity;
Cardiac Rehabilitation

ABSTRACT

Cardiac rehabilitation (CR) can be managed as global long-term care and comprehensive risk reduction of cardiac patients based on preventive care through a professional multi-disciplinary integrated process approach.¹¹ Multidisciplinary CR elements include: patient evaluations, physical activity counselling, exercise training, diet/nutritional counseling, psychosocial management, lipid management, smoking avoidance, management of weight, and regulation of blood pressure. Exercise training if begun at the post-ACS acute phase, would achieve its greatest beneficial effect on the process of LV remodeling in the dysfunctional LV and cardiopulmonary rehabilitation in patients after acute coronary syndrome. Cardiac rehabilitation (CR) can be managed as global long-term care and comprehensive risk reduction of cardiac patients based on preventive care through a professional multi-disciplinary integrated process approach

Cardiovascular diseases remain the most common cause of death worldwide. Approximately 15.5% of all deaths belongs to Coronary Disease with over 8.76 million death annually. 1 Moreover, In-hospital mortality is in the range of 3.5–14%.²

Currently, in a clinical setting, acute coronary syndrome is available to be treated with multiple modalities therapy, including thrombolytic drugs, percutaneous transluminal coronary angioplasty (PTCA), and coronary artery bypass grafting.³ Epidemiological evidence has shown that besides medications and surgeries, exercise in the form of sports, stair climbing, and even walking, is correlated with lower mortality of cardiovascular causes.⁴ Exercise training programs can improve patients' cardiorespiratory fitness, decrease symptoms and increase physiologic responses to physical effort. Ultimately, heart rate and blood pressure decrease during physical activity, decreasing myocardial oxygen demand. Moreover, workload, heart rate response, test duration, and functional capacity of patients with acute myocardial infarction can be improved by exercise training.⁵

Exercise is important in our daily life. Cardiorespiratory exercise such as walking, running, swimming, cycling, dancing is important exercise that will increase the heartbeat and breathing rate. It may improve physical fitness.⁶ Exercise training if begun at the post-ACS acute phase, would achieve its greatest beneficial effect on the process of LV remodeling in the dysfunctional LV and cardiopulmonary rehabilitation in patients after acute coronary syndrome.⁷

Research of cross-sectional study in the population sample size 65 men (60 ± 6 years) found that in veteran athletes, LV systolic function was maintained by lifelong exercise training and also minimized the detrimental effects of post-MI LV remodeling.⁸ Furthermore, after 10 weeks of exercise training, it may significantly decrease of LV end-diastolic and systolic volumes in MI patients.⁹ Thus, through improving cardiac performance, exercise training in coronary patients may effectively promote heart circulation.

Rehabilitation employing exercise has been recognized to be potentially beneficial to an individual with coronary heart disease as early as 1772. A CHD patient was "nearly cured", as Heberden noted, after sawing wood for half an hour a day for 6 months. Based on evidence, using exercise-based cardiac rehabilitation, early ambulation after myocardial infarction, and the modification of cardiovascular risk factors are widely practiced.¹⁰

Cardiac rehabilitation (CR) can be managed as global long-term care and comprehensive risk reduction of cardiac patients based on preventive care through a professional multi-disciplinary integrated process approach.¹¹ Multidisciplinary CR elements include: patient evaluations, physical activity counselling, exercise training, diet/nutritional counseling, psychosocial management, lipid management, smoking avoidance, management of weight, and regulation of blood pressure.¹² The definition of cardiac rehabilitation services is itself, as comprehensive and multi-factorial, with central components in all

*Corresponding author at: Brawijaya Cardiovascular Research Center, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia
E-mail address: cholidt@gmail.com (C.T. Tjahjono).

<https://doi.org/10.21776/ub.hsj.2020.001.04.01>

Received 9 November 2020; Received in revised form 30 November 2020; Accepted 15 December 2020

Available online 25 December 2020

rehabilitation and preventive interventions which are physical activity counseling and exercise training. Exercise training programs can mediate for many risk factor improvements occurring in CR.¹² In a cohort study of 37 MI patients (mean age, 66 years), a 5-week CR program improved Quality of life, exercise capacity, and autonomic modulation in MI patients.¹³

Based on data, physical activity in acute MI patients, even at a low intensity, has an important role in the improvement of Quality of life.¹⁴ At least one controlled trial showed a significant result in the decrease recurrence of myocardial infarction (MI) following cardiac rehabilitation.¹⁵ Physical activity play a important role for reducing the mortality of cardiovascular disease among post-MI patients.

Moderate-intensity continuous training (MICT) is the most preferred choice for exercise rehabilitation in the early phases after acute coronary syndrome.¹⁶ The research data from single-blinded randomized controlled trial of 21 ACS patients was reported, the 3 months cardiac rehabilitation program comprises of three separate sessions a week of one hour with a main menu comprised of ten sets of 15 s of 15 s of active recovery at eighty to ninety percent of their maximum heart rate or 40 min at seventy percent to eighty five percent of their maximum heart rate in high-intensity interval exercise (HIIT) and MICT groups, respectively. The outcome of agility and mental elements of quality of life related to health (p-value < 0.05) increased after all cardiac rehabilitation programs were introduced. A marked increase in the flexibility of superior and inferior extremities (p-value < 0.05) were also demonstrated in HIIT protocol. In addition, in the handgrip intensity, substantial group x time correlation was observed (p-value = 0.035) in favour of the HIIT group. No major impact on heart rate variability or cardiorespiratory fitness was found. In conclusion, no adverse events have been reported, so HIIT seems to be a safe and feasible way to treat patients with acute coronary syndrome.^{17,18}

A meta-analysis of 35 RCTs showed positive results of lower (95% CI, -0.17 to -0.96) and upper [1.43(0.73-2.13)] body weights of isolated progressive resistance exercise. In terms of both strength and fitness, progressive resistance training plus aerobic training is more beneficial compared to aerobic training alone.¹⁷ Through the improvement of Psychological reactions to exertion and functional capacity enhancement, even in the short-term, early exercise programs were beneficial to patients with MI.¹⁸ Ventricular remodeling, balance of autonomic nerves, and exercise tolerance in post-MI patients were improved by early exercise training.^{19,18}

The key component in a cardiac rehabilitation program to recover from ACS event is Physical activity.²¹ Physical exercise has been found to delay atherosclerosis development, leading to acute coronary syndrome. Increased physical activity contributes by improving many risk factors for ACS, including obesity, hypertension, psychological health, dyslipidemia, and insulin resistance. Early exercise training is a feasible and safe way of gaining protective effect in post-myocardial infarction patients. Moderate-intensity exercise level for 150 minutes per week or more is the most recommended choice to improve the outcomes for the coronary heart disease patients in the early stages of myocardial infarction and throughout life. The primary aim of cardiac rehabilitation is to motivate patients to attain the recommended levels of physical activity.^{21,22}

3. Conflict of Interest

There is no conflict interest

References

1. Heron MP. Deaths: leading causes for 2015. 2017.
2. Widimsky P, Wijns W, Fajadet J, et al. Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries. 2010;31:943-57.
3. Sørensen JT, Mæng MJCad. Regional systems-of-care for primary percutaneous coronary intervention in ST-elevation myocardial infarction. 2015;26:713-22.
4. Paffenbarger Jr RS, Hyde R, Wing AL, Hsieh C-cJNEjom. Physical activity, all-cause mortality, and longevity of college alumni. 1986;314:605-13.
5. Andjic M, Spiroski D, Ilic Stojanovic O, et al. Effect of short-term exercise training in patients following acute myocardial infarction treated with primary percutaneous coronary intervention. 2016;52:364-9.
6. Ostman C, Jewiss D, Smart NAJC. The effect of exercise training intensity on quality of life in heart failure patients: a systematic review and meta-analysis. 2017;136:79-89.
7. Zhang Y-M, Lu Y, Tang Y, et al. The effects of different initiation time of exercise training on left ventricular remodeling and cardio-pulmonary rehabilitation in patients with left ventricular dysfunction after myocardial infarction. 2016;38:268-76.
8. Maessen MF, Eijssvogels TM, Stevens G, van Dijk AP, Hopman MTJEJoPC. Benefits of lifelong exercise training on left ventricular function after myocardial infarction. 2017;24:1856-66.
9. McGregor G, Gaze D, Oxborough D, O'Driscoll J, Shave RJEJoP, Medicine R. Reverse left ventricular remodelling-effect of cardiac rehabilitation exercise training in myocardial infarction patients with preserved ejection fraction. 2015;52:370-8.
10. O'Connor GT, Buring JE, Yusuf S, et al. An overview of randomized trials of rehabilitation with exercise after myocardial infarction. 1989;80:234-44.
11. Korzeniowska-Kubacka I, Bilińska M, Dobraszkievicz-Wasilewska B, Piotrowicz RJCJ. Hybrid model of cardiac rehabilitation in men and women after myocardial infarction. 2015;22:212-8.
12. Guidelines ECfS, Corrà U, Piepoli MF, et al. Secondary prevention through cardiac rehabilitation: physical activity counselling and exercise training: key components of the position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation. 2010;31:1967-74.
13. Fallavollita L, Marsili B, Castelli S, et al. Short-term results of a 5-week comprehensive cardiac rehabilitation program after first-time myocardial infarction. 2015;56:311-8.
14. Løvlien M, Mundal L, Hall-Lord MLJJocn. Health-related quality of life, sense of coherence and leisure-time physical activity in women after an acute myocardial infarction. 2017;26:975-82.
15. Hedbäck B, Perk J, Wodlin PJEhj. Long-term reduction of cardiac mortality after myocardial infarction: 10-year results of a comprehensive rehabilitation programme. 1993;14:831-5.
16. Cai M, Liu Z, Jia D, Feng R, Tian ZJLs. Effects of different types of

- exercise on skeletal muscle atrophy, antioxidant capacity and growth factors expression following myocardial infarction. 2018;213:40-9.
17. Greif H, Kreitler S, Kaplinsky E, Behar S, Scheinowitz MJBM. The effects of short-term exercise on the cognitive orientation for health and adjustment in myocardial infarction patients. 1995;21:75-85.
 18. Villafaina S, Giménez-Guervós Pérez MJ, Fuentes-García JPJS. Comparative Effects of High-Intensity Interval Training vs Moderate-Intensity Continuous Training in Phase III of a Tennis-Based Cardiac Rehabilitation Program: A Pilot Randomized Controlled Trial. 2020;12:4134.
 19. Bellmann B, Lin T, Greissinger K, et al. The Beneficial Effects of Cardiac Rehabilitation. 2020:1-10.
 20. Paiva SA, Zornoff LAJJoC. Delayed rather than early exercise training attenuates ventricular remodeling after myocardial infarction . 2013;170:e3-e4.
 21. Woodruffe S, Neubeck L, Clark RA, et al. Australian Cardiovascular Health and Rehabilitation Association (ACRA) core components of cardiovascular disease secondary prevention and cardiac rehabilitation 2014. 2015;24:430-41.
 22. Piepoli MF, Corra U, Benzer W, et al. Secondary prevention through cardiac rehabilitation: from knowledge to implementation. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation. 2010;17:1-17.