

## Cardiac Rehabilitation

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### Abstract

Cardiac rehabilitation is a class 1 indication by ACC guidelines. It involves different aspects of a patient's life who may be at risk of coronary artery disease. It extends to the management of patients with heart failure and those with post revascularization. We discuss briefly the different aspects of cardiac rehabilitation.

**Keywords:** Cardiac rehabilitation; Risk factors; Exercise

### Cardiac Rehabilitation

There are only a few interventions in cardiology that have shown significant effect on mortality. Cardiac rehabilitation (CR) data showed 20% decrease in all causes of death and 26% in cardiovascular death [1]. Both regular exercise and physical fitness are associated with a reduced risk of coronary events and coronary death. CR includes the provision of comprehensive long-term services involving: medical evaluation, prescribed exercise and coronary risk factor reduction/secondary prevention [2].

The goal of CR has many targets including education, counseling, and behavioral interventions that are designed to:

Optimize cardiovascular risk reduction,

Limit the adverse physiologic and psychological effects of coronary illness and adherence to preventive medications,

Reduce the risk of sudden death or reinfarction,

Control coronary symptoms,

Stabilize or reverse the progression of atherosclerosis,

Reduce cardiovascular disability, and

Enhance the patient's psychosocial and vocational status.

Exercise training after MI also may improve LV function and attenuate remodelling.

The patient assessment extends to nutritional assessment and weight management.

Modifiable factors associated with the improvement in exercise capacity included decreased waist circumference and improved physical function. The rehabilitation plan is designed to meet patient's needs. It is usually six weeks to six months or longer to learn how to manage the medical condition and develop healthier habits.

These benefits were demonstrated in the Exercise in Left Ventricular Dysfunction (ELVD) trial in which the efficacy of exercise was evaluated in patients with a first Q wave MI and EF < 40 percent.

Patients who had coronary artery disease who had undergone percutaneous coronary intervention showed similar benefit. One

observational study of >600,000 older medicare patients with coronary artery disease, had three separate statistical analyses of those who had undergone PCI showing significantly lower 1 -5 year mortality rates (30%) in users compared to non-users. In a retrospective analysis of data from an Olmsted county registry of 2,400 patients who underwent PCI, the majority of who had recent ACS, there was a 50% reduction in five-year all-cause mortality of those who underwent CR.

Improvement in functional capacity as manifested by increase in the activity threshold before the onset of ischemia, and decrease in symptoms can enable return to work as well as to leisure and recreational activities [3,4,5].

The benefits of CR has no age or sex border: one study of post acute, inpatient CR showed equal benefit for patients <65 years of age, those 65 to 74, and >75 years of age. Another study compared improvements in physiologic outcomes in women completing a 12-week gender-specific versus a traditional CR program. Exercise capacity improved significantly among women in both programs [6,7].

Accordingly, every recent major evidence-based guideline from the AHA and ACC Foundation regarding the management and prevention of coronary heart disease provides a class 1 level recommendation [7]. Mechanisms of benefit include improvement in the lipid profile, decrease in blood pressure, treatment and prevention of type 2 diabetes. Other positive effects include decrease in inflammation, as manifested by a decrease in serum C-reactive protein - independent of weight loss and possibly ischemic preconditioning. Exercise is also associated with improved endothelial function and a more favorable fibrinolytic balance. Psychosocial interventions also contribute by reducing emotional distress and depression.

Such benefits of CR obviously occur only if the patient attends and completes an appropriate program. A propensity matched analysis; the survival was lower in completers.

There is a dose-dependent improvement:

After 4 years of follow-up, patients who attended 36 sessions had a 14% lower risk of death and a 12% lower risk of MI than those who attended 24 sessions;

A 22% lower risk of death and a 23% lower risk of MI than those who attended 12 sessions;

And a 47% lower risk of death and a 31% lower risk of MI than those who attended 1 session.

However, only 18% of the patients completed the maximum 36 sessions.

The benefits of participation in CR as described above may decline with time.

Ongoing intervention either by exercise sessions, telephone follow up, counselling sessions, internet-based portals, electronic mail, or social media outlets and reports to the participants' family physicians is required.

CR is extremely safe: in a more contemporary study of 25,000 patients enrolled in 65 CR centers in 2003, there was one cardiac event for every 8,484 exercise tests performed, one cardiac event for every 50,000 patient hours of exercise training and 1.3 cardiac arrests for every million patient hours of exercise [1].

Different exercise protocols have been recommended, starting within the hospital to an outpatient supervised environment to end at a community based level. CR may be delivered in alternative modes of delivery e.g. trans-telephonic and other means of monitoring and surveillance can extend CR services beyond the settings of supervised, structured, and group-based rehabilitation. Electronic media programs can provide alternative methods for home-based comprehensive risk modification, education, and instruction, as well as providing a structured exercise regimen.

Both short-term comprehensive interventions as in the EUROACTION trial or long-term comprehensive intervention as in the GOSPEL trial have demonstrated similar benefits [8,9].

Despite this overwhelming data and ease of delivering CR, only 14% to 35% of heart attack survivors and 31% of patients post coronary artery bypass surgery participate in CR programs. Female, ethnic minorities who are elderly, and have low socioeconomic status have lower participation rates. Such low utilization may be influenced by proximity and accessibility of services. Incorporating home-based exercise programs together with facility-based supervised training sessions can help improve participation.

It is unfortunate that despite continued efforts, the demand is higher as in EUROASPIRE 1-3: with the exception of raised total cholesterol, the proportion of patients with the other risk factors remained the same or increased over the three time periods [10,11].

## Summary

CR improves outcomes after myocardial infarction with a significant reduction in all-cause mortality and an almost significant reduction in recurrent MI. It is safe and feasible.

## References

1. Mampuya WM (2012) Cardiac rehabilitation past, present and future: an overview. *Cardio vasc Diagn Ther* 2: 2223-3652.
2. DeFina LF, Haskell WL, Willis BL, Barlow CE, Finley CE, et al. (2015) Physical activity versus cardiorespiratory fitness: two (partly) distinct components of cardiovascular health? *Prog Cardiovasc Dis* 57: 324-329.
3. Thomas RJ, King M, Lui K, Oldridge N, Piña IL, et al. (2007) ACC/AHA Task Force Members. AACVPR/ACC/AHA 2007 performance measures on cardiac rehabilitation for referral to and delivery of cardiac rehabilitation/secondary prevention services. *J Cardiopulm Rehabil Prev* 27: 260-290.
4. Giannuzzi P, Temporelli PL, Corrà U, Gattone M, Giordano A, et al. (1997) Attenuation of unfavorable remodeling by exercise training in postinfarction patients with left ventricular dysfunction: results of the Exercise in Left Ventricular Dysfunction (ELVD) trial. *Circulation* 96: 1790-1797.
5. Goel K, Lennon RJ, Tilbury RT, Squires RW, Thomas RJ, et al. (2011) Impact of cardiac rehabilitation on mortality and cardiovascular events after percutaneous coronary intervention in the community. *Circulation* 123: 2344-2352.
6. Smith SC Jr, Benjamin EJ, Bonow RO, Braun LT, Creager MA, et al. (2011) AHA/ACCF secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 update: a guideline from the American Heart Association and American College of Cardiology Foundation endorsed by the World Heart Federation and the Preventive Cardiovascular Nurses Association. *J Am Coll Cardiol* 58: 2432-2446.
7. Thomas RJ, King M, Lui K, Oldridge N, Piña IL, et al. (2010) ACCFAHA Task Force on Performance Measures. AACVPR/ACCF/AHA 2010 Update: Performance measures on cardiac rehabilitation for referral to cardiac rehabilitation/secondary prevention services: A report of the American Association of Cardiovascular and Pulmonary Rehabilitation and the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Clinical Performance Measures for Cardiac Rehabilitation). *J Cardiopulm Rehabil Prev* 30: 279-288.
8. Wood DA, Kotseva K, Connolly S, Jennings C, Mead A, et al. (2008) EUROACTION Study Group. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster-randomised controlled trial. *Lancet* 371: 1999-2012.
9. Volterrani M, Agostoni P (2009) The GOSPEL study. *G Ital Cardiol* 10: 419-421.
10. De Smedt D, Clays E, Annemans L, Doyle F, Kotseva K, et al. (2013) Health related quality of life in coronary patients and its association with their cardiovascular risk profile: results from the EUROASPIRE III survey. *Int J Cardiol* 168: 898-903.
11. Hsia J, Rodabough RJ, Manson JE, Liu S, Freiberg MS, et al. (2010) Women's health initiative research group. Evaluation of the American Heart Association cardiovascular disease prevention guideline for women. *Circ Cardiovasc Qual Outcomes* 3: 128-134.