Cardiac Rehabilitation after Myocardial Infraction: Effect of a 4 Weeks High Contact Frequency Cardiac Rehabilitation Program on Heart Rate Recovery in Comparison to a 12 Weeks Low Contact Frequency Program

Thesis

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Islam Reda

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Abb.	Full term

AACPR ..... *American Association of Cardiovascular and Pulmonary Rehabilitation*

ACEI ..... *Angiotensinogen Converting Enzyme Inhibitors*

ACS ..... *Acute Coronary Syndrome*

ACSM ..... *American College of Sport Medicine*

ADA..... *American diabetic association*

AF ..... *Atrial Fibrillation*

BP ..... *Blood Pressure*

bpm ..... *Beats per Minute*

CAD ..... *Coronary Artery Disease*

CCS ..... *Canadian Cardiovascular Society*

CCU ..... *Coronary Care Unit*

CHF ..... *Chronic Heart Failure*

CR ..... *Cardiac Rehabilitation*

CRT ..... *Cardiac Resynchronization Therapy*

CV ..... *Cardiovascular*

CVD ..... *Cardiovascular Disease*

D ..... *Duration*

DM ..... *Diabetes Mellitus*

EAPC ..... *European Association of Preventive Cardiology*

ECG ..... *Electrocardiogram*

EF ..... *Ejection Fraction*

ESC ..... *European Society of Cardiology*

ET ..... *Exercise Testing*

EXT..... *Exercise time*

F ..... *Frequency*

List of Abbreviations (Cont...)

Abb.	Full term
HDL-C	*High Density Lipoprotein Cholesterol*
HF	*Heart Failure*
HFpEF	*HF with Preserved Ejection Fraction*
HRQOL	*Health-Related Quality of Life*
HRR	*Heart Rate Reserve*
I	*Intensity*
IHD	*Ischemic heart disease*
LDL-C	*Low Density Lipoprotein Cholesterol*
LV	*Left Ventricular*
M	*Modalities*
METs	*Metabolic Equivalents*
MI	*Myocardial Infarction*
NYHA	*New York Heart Association*
P	*Progression*
PAD	*Peripheral Arterial Disease*
RPE	*Rating of Perceived Exertion*
SCAD	*Stable Coronary Artery Disease*
SPSS	*Statistical Package for Social Science*
TC	*Total Cholesterol*
TG	*Triglycerides*
THR	*Target Heart Rate*
WHO	*World Health Organization*

ABSTRACT

Also, the lipid profile showed marked improvement in the two groups in the form of reducing LDL, Cholesterol and triglycerides.

To sum up, according to the results of this study we emphasize the positive effect on patients who shared in cardiac rehabilitation programs on decreasing morbidity and sense of disability especially after major events (myocardial infarction) as on functional capacity and on the level of clinical, analytical and echocardiographic parameters there were improvement.

In our study we proved that the 4-weeks intensive cardiac rehabilitation program was non inferior to the 3-months standard moderate intensity cardiac rehabilitation program.

Keywords: Electrocardiogram - Cardiovascular Disease - Cardiac Resynchronization Therapy

INTRODUCTION

Worldwide, ischemic heart disease (IHD) is the most frequent cause of death. Over seven million people die each year from IHD, accounting for 12.8% of all deaths ***(Karamfiloff et al., 2015).***

The IHD burden is also projected to rise in the future, especially in developing countries. IHD is a source of disability; heart failure and residual angina symptoms disable patients to carry out their work, and role in the society. Once an individual suffers a myocardial infarction (MI), he or she has a roughly 20% chance of having another heart attack or dying from coronary heart disease in the next 5 years ***(Go et al., 2013).***

For those who survive an MI, the prevention of subsequent coronary events and the maintenance of physical functioning are major challenges ***(Ades et al., 2001).***

These findings have led the American heart association and European society of cardiology propose more stringent guidelines for both primary and secondary prevention of cardiovascular diseases ***(Wood et al., 1998)***.

Cardiac rehabilitation (CR) is an essential part of the continuum of care for patients with cardiovascular disease.Basic goals of cardiac rehabilitation are to restore and improve cardiac function, reduce disability, identify and improve cardiac risk factors, and increase cardiac conditioning ***(Heran et al., 2011).***

In modern practice, there is an increase in trends towards cardiac rehabilitation programs of short duration due to financial restrictions and owing to the fact that, in active population, early return to work is a main objective ***(Jean-Marie et al., 2001)***.

Aim of the Work

Our main target is to evaluate the effect of a 4 week high contact frequency cardiac rehabilitation program on heart rate recovery as a cardiovascular fitness index in comparison to a 12 week low contact frequency program in revascularized anterior ST elevation myocardial infarction patients.

Chapter 1
CARDIAC REHABILITATION

What is Cardiac Rehabilitation?

The world health organization has defined cardiac rehabilitation as, "the sum of activities required to influence favorably the underlying the cause of the disease, as well as to provide well the best possible physical, mental and social conditions, so that the patients may, by their own efforts, preserve or resume when lost as normal a place as possible in the community." this process includes the facilitation and delivery of prevention strategies ***(World Health Organization, 1993).***

In essence, cardiac rehabilitation services are comprehensive programs involving education, exercise, risk factor modification and counselling, designed to limit the physiological and psychological effects of heart disease, reduce the risk of death or recurrence of the cardiac event, and enhance the psychosocial and vocational state of patients ***(Wenger et al., 1995).***

In most current guidelines of cardiovascular societies worldwide, Cardiac rehabilitation is a class I recommendation for those patients with recent myocardial infarction or acute coronary syndrome, chronic stable angina, or heart failure, or for those patients following coronary artery bypass or percutaneous coronary intervention, valve surgery or cardiac transplantation ***(Thomas et al., 2010; Piepoli et al 2016).***

Historical background

In 1772, four years after his magnificent description of angina pectoris, Heberden reported a case of a patient who improved by working in the woods half an hour per day. Despite some evidence of the benefits of physical activity, mobility restriction was imposed on patients with acute coronary events, often leading to serious deconditioning problems, decline in functional capacity, prolonged hospital stay and increased morbidity and mortality. This incorrect attitude was reinforced after the description of myocardial infarction by Herrick in 1912.In the 1930s, patients with acute coronary events were advised to observe 6 weeks of bed rest. Chair therapy was introduced in the 1940s ***(Levine et al., 1951).***

In the early 1950s, a very short daily walk of 3 to 5 minutes was allowed 4 weeks after the coronary events. Gradually, it was recognized that early ambulation prevented many of the complications of bed rest, and that it did not increase the risk of neither mortality nor morbidity. Early cardiac rehabilitation pioneers like Levine and Lown experienced very strong opposition for advocating early mobilization of patients. However the cumulating evidence of the benefits of early ambulation and physical activity in general helped convince the skeptics. In 1953, Morris' study showed that the bus drivers in London had a higher rate of coronary events compared to ticket sellers ***(Morris et al., 1953).***