4th National Conference and the frist International Conference on Humanities and Islamic Studies
January 17, 2019

Effect of anxiety and hostility on depression after cardiac rehabilitation and exercise training

Alireza Mohammadzadeh[1], Sajjad Ghaffari[2]

1 Department of Cardiothoracic, Imam Khomeini Hospital, Ardabil University of Medical Sciences, Ardabil
[2] Islamic Azad University, Ardabil branch ,Ardabil ,Iran

Abstract

Depression is associated with increased mortality in stable coronary heart disease. Cardiac rehabilitation and exercise training has been shown to decrease depression, psychological stress, and mortality after a coronary heart disease event. The presence of depression at completion of cardiac rehabilitation and exercise training is associated with increased mortality. However, it is unknown if depression with comorbid psychological risk factors such as anxiety or hostility confers an additional mortality disadvantage. We evaluated the mortality effect of anxiety and hostility on depression after cardiac rehabilitation and exercise training. We studied 1150 patients with coronary heart disease following major coronary heart disease events who had completed formal cardiac rehabilitation and exercise training. Using Kellner questionnaires, stress levels were measured in 1 of 3 domains: anxiety, hostility, and depression (with an aggregated overall psychological stress score) and divided into 3 groups: nondepressed (n = 1072), depression alone (n = 18), and depression with anxiety or hostility (n = 60). Subjects were analyzed for all cause mortality over 161 months of follow-up (mean 6.4 years) by National Death Index. Depression after cardiac rehabilitation was not common (6.8%; mortality 20.8%) but when present, frequently associated with either anxiety or hostility (77% of depressed patients; mortality 22.0%). After adjustment for age, sex, ejection fraction, and baseline peak oxygen consumption, depression alone (hazard ratio [HR] 1.73, P = .04), as well as depression with comorbid psychological stress, was associated with higher mortality (HR 1.98, P = .03). Furthermore, our data showed an increased mortality when both anxiety and hostility were present in addition to depression after cardiac rehabilitation (HR 2.41, P = .04). After cardiac rehabilitation, depression, when present, is usually associated with other forms of psychological stress, which confers additional mortality. More measures are needed to address psychological stress after cardiac rehabilitation.

Keywords: Cardiac rehabilitation; Depression; Mortality; Psychological stress

Introduction

There is a large body of literature demonstrating the association among psychological risk factors, including depression, anxiety, hostility, and cardiovascular disease(Menezes,2011). In fact, psychological stress is a known independent risk factor for mortality in patients with coronary heart disease (Haines and Lazzarino,2013). [redacted] large multinational study, involving 29,972 individuals from 52 countries, which sought to evaluate the strength of association between various cardiovascular disease risk factors and first myocardial infarction. Psychosocial risk factors, which included depression and psychological stress, accounted for 33% of the population-[redacted]ardial infarction by threefold (Yusuf,2004). Regular exercise training has been associated with sig[redacted] reductions in cardiovascular disease events, cardiovascular disease mortality, and all-cause mortality(Lavie ,2013).There is also substantial evidence to suggest that cardiac rehabilitation exercise training programs result in notable reductions in depressive symptoms, anxiety, hostility, and overall psychologi- cal stress and improves the mortality risk associated with adverse psychological risk (Lavie , 2007). [redacted] cardiac rehabilitation and exercise training programs, it has been

demonstrated that those patients who remained depressed following cardiac rehabilitation had a four-fold increase in mortality when compared with those individuals who were not depressed following cardiac rehabilitation (Milani ,2007). Furthermore, patients who did not show improvement in their exercise capacity after cardiac rehabilitation (assessed by peak oxygen consumption) also had a high prevalence of depression and higher mortality risk. However, either mild (<10%) or marked (>10%) [redacted]-cantly reduced prevalence of depression, as well as mortality risk. We have previously shown that following cardiac rehabilitation, the presence of anxiety, hostility, or both, in addition to rehabilitation. Two-dimensional echocardiography was performed prior to enrollment in cardiac rehabilitation.

Tables and Figures

Subgroup Characteristics After Cardiac Rehabilitation After cardiac rehabilitation, the study population was sub- divided into 3 groups: no psychological stress, depression alone, and comorbid depression (depression with anxiety or hostility) (Table 1**).** While depression after cardiac rehabilitation was relatively rare, it was frequently associated with other symptoms of psychological stress. With the exception of overall lower ejection fraction, and higher fasting blood glucose among the [redacted]- differences in other baseline variables (Table 1).

Table 1 Patient Characteristics After Cardiac Rehabilitation Among the Psychological Stress Subgroups

	No Psychosocial Stress n ¼ 1072	Isolated Depression n ¼ 18	Comorbid Depression n ¼ 60	*P*-Value
BMI, kg/m2	28.7 5.2	28.3 7.9	29.8 6.7	NS
Body fat, %	26.8 7.8	26.7 7.6	26.3 7.5	NS
Lean mass index,	20.8 3.1	20.5 5.0	21.6 3.4	NS
Age, y	72.1 10.4	72.7 7.8	69.2 11.9	NS
Total cholesterol,	153.7 35.5	141.7 28.1	153.3 40.5	NS
HDL, mg/dL	43.7 11.9	42.9 8.5	41.6 14.3	NS
LDL, mg/dL	86.1 30.4	75.5 16.1	87.2 31.6	NS
Triglycerides, mg/dL	122.1 84.6	115.4 65.7	126.6 59.1	NS
C-reactive protein,	3.4 5.9	5.3 7.8	3.2 2.8	NS
Fasting blood sugar,	111.3 32.3	101.5 13.6	122.9 46.4	.01
Ejection fraction, %	54.6 11.6	56.6 8.9	49.7 15.7	.01
Peak Flow O2,	17.9 5.5	15.9 5.8	17.5 5.7	NS
Anxiety (points)	2.0 2.7	4.7 2.2	12.6 4.2	<.001
Depression (points)	1.3 1.8	9.0 1.1	12.4 3.5	<.001
Hostility (points)	1.3 2.2	2.7 2.1	9.2 5.3	<.001
Psychosocial stress	4.6 5.7	16.4 3.5	34.2 9.3	<.001
Anxiety (%)	6	0	90	<.001
Depression (%)	0	100	100	<.001
Hostility (%)	2	0	58	<.001
% Male	73	61	78	NS
% Hypertensives	84	78	75	NS
% Diabetics	35	44	38	NS
% Smoking	16	42	20	NS
% Married	72	60	85	NS
% Mortality	14	17	22	NS

References

Menezes AR, Lavie CJ, Milani RV, et al.(2011). Psychological risk factors and cardiovascular disease: is it all in your head? *Postgrad Med*.123(5):165-176.

Haines A, Cooper J, Meade TW.(2001). Psychological characteristics and fatal ischaemic heart

disease. *Heart*. 85(4):385-389.
Lazzarino AI, Hamer M, Stamatakis E, et al.(2003). The combined association of psychological distress and socioeconomic status with all-cause mortality: a national cohort study. JAMA Intern Med.173(1): 22-27.
Yusuf S, Hawken S, Ounpuu S, et al.(2004). Effect of potentially modi- able risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 364:937-952.

Lavie CJ, Milani RV, Marks P, de Gruiter H.(2003). Exercise and the heart: Risks, benefits, and recommendations for providing exercise pre- scriptions. *Ochsner J.* .3(4):207-213.

Milani RV, Lavie CJ, Cassidy MM. (1996).Effects of cardiac rehabilitation and exercise training programs on depression in patients following major coronary events. Am Heart J.132:726-732.

Lavie CJ, Milani RV.(2004). High prevalence of anxiety in coronary patients with improvements following cardiac rehabilitation and exercise training. *Am J Cardiol*.93:336-339.