Reduced Quality of Life after Myocardial Infarction in Women Compared with Men

STEFAN AGEWALL, M.D., PH.D., FESC, MARGARETA BERGLUND, R.N., LOGHMAN HENAREH, M.D.

Department of Cardiology, Huddinge University Hospital, Karolinska Institute, Stockholm, Sweden

Summary

Background: Psychosocial factors have been suggested as risk factors for atherosclerotic disease.

Hypothesis: The purpose of the present study was to examine whether there is a gender difference in quality of life after a myocardial infarction with modern treatment of acute ischemic heart disease.

Methods: In all, 123 men and women aged between 31 and 80 years, and with a hospital-diagnosed myocardial infarction occurring 1–12 months prior to inclusion, were studied. Minor symptoms evaluation profile (MSEP) was used to estimate quality of life at entry.

Results: Age, hemodynamic data, smoking habits, as well as laboratory data, concomitant cardiovascular disease, and revascularization rate did not differ between men and women. Women had significantly more negative feelings regarding all the estimated dimensions of quality of life (Contentment, Vitality, and Sleep) than did men.

Conclusion: Self-assessed quality of life after a myocardial infarction was significantly lower among women than among men despite similar age, treatment, and hemodynamic and laboratory data. The causal relationship is however, not known. Further studies are needed to evaluate the underlying mechanism of this observation. This may lead to the development of novel treatment strategies in female patients after a myocardial infarction.

Introduction

Psychosocial factors have been suggested as risk factors for atherosclerotic disease. Experimental studies of several animal species have shown that coronary pathology can result when animals are exposed to conditions that disrupt the social environment.[1] A low socioeconomic status has been found to be associated with an increased incidence of coronary heart disease,[2] and social support, which refers to emotional and informational aid obtained from an individual's social ties or community resources, might have a protective effect against coronary heart disease.[3, 4] High workload, low status control, competitiveness, depression, feelings of anger, and a low level of social activity are examples of other factors that have been shown to be associated with atherosclerotic diseases.[1, 5–6] We have previously reported that feelings of discontent in treated hypertensive men at high cardiovascular risk were significantly and independently associated with an increase in maximum intima-media thickness in the common carotid artery after 3 years of follow-up[7] and with clinical cardiovascular events after 6 years of follow-up.[8]

Male and female patients with myocardial infarction (MI) differ with respect to several clinical aspects. Women are more likely to present with angina pectoris rather than MI as the first symptom of ischemic heart disease;[9] they have a later onset of clinical coronary disease and have been shown to report more depression symptoms after MI.[10] Most of the previous studies concerning quality of life after MI were performed in another time era. Pharmacologic treatment has changed radically and interventional revascularization now is a routine procedure in this group of patients.

The aim of this study was to examine whether there is a gender difference in quality of life after MI with modern treatment of acute ischemic heart disease.

Methods

Subjects

In all, 123 men and women aged between 31 and 80 years and with a previous acute MI were included. The inclusion criterion was hospital-diagnosed MI occurring 1–12 months prior to inclusion; exclusion criterion was known diabetes mellitus (the study group was examined with an oral glucose tolerance test). The patients were recruited from the Department of Cardiology at Huddinge University Hospital, Sweden. All subjects gave informed consent after written and oral information. The study was approved by the regional ethics committee of the Karolinska Institute.

Acute MI was defined by the criteria of the European Society of Cardiology and the American College of Cardiology.[11] Thus, patients were diagnosed with acute MI if they had two values of serum troponin T > 0.05 g/l or creatine kinase (CK)-MB > 5 mg/l, together with either typical symptoms (chest pain > 15 min, pulmonary edema in the absence of valvular heart disease, cardiogenic shock, arrhythmia such as ventricular fibrillation or ventricular tachycardia) or new Q waves in at least 2 of the 12 standard electrocardiographic (ECG) leads, or ECG changes indicating acute ischemia (ST elevation, ST depression, or T-wave inversion).

Measurements

At entry, patient history of cardiovascular disease was carefully documented. Smoking history was assessed by questionnaire and the patient's current medication regimen was recorded. Blood pressure was measured with a mercury sphygmomanometer using a cuff of appropriate size; diastolic blood pressure was determined as Korotkoff phase V. The patient rested in the recumbent position for 5 min and the mean of two recordings was used. Body mass index (BMI) was calculated as weight in kg/(height in m^2). Using established methods, venous blood was drawn after an overnight fast and after 5 min of supine rest for determination of serum levels of glucose, cholesterol, and triglycerides. Body mass index was measured according to recommended principles. Left ventricular ejection fraction was estimated by echocardiography using Simpson's method.

Subjective experiences of the patients were evaluated using a standardized questionnaire[12–14] at entry into the study. The Minor Symptoms Evaluation-Profile (MSEP) is a self-administered questionnaire with 24 questions based on a visual analogue scale (VAS), which has been shown to be valid, reproducible, and sensitive to the effects of pharmacologic treatment.[12] The internal consistency (Cronbach's alpha coefficient) of the dimensions has previously been shown to be 0.81 for Contentment, 0.81 for Vitality, and 0.77 for Sleep.[13] Low values on the visual analogue scale indicate positive and high values indicate negative feelings. The MSEP has been shown to discriminate between symptoms induced by different classes of drugs, as well as differences in the subjective well-being of normotensives, borderline hypertensives, and

hypertensives.[13, 14] Thus, the present study used the MSEP as a measure of quality of life. Instead of using the answers to the individual questions as effect variables, the questions with similar factor loading in a principal component analysis were combined. Three dimensions are thus created from 15 of the 24 questions in the MSE profile and are assumed to reflect the patient's condition regarding Contentment, Vitality, and Sleep:

Contentment (7 items: happiness, tranquillity, self-control, decisiveness, self-confidence, mental fatigue, and general well-being).

Vitality (5 items: enthusiasm, initiative, endurance, concentration, and responsiveness).

Sleep (3 items: nocturnal sleep, quality of sleep, and insomnia).

By using the three dimensions instead of answers from each of the 24 questions as primary variables, the variability is reduced and the multisignificance problem is avoided.

Statistical Analysis

Results are presented as means ± standard deviation. Continuous and categorical variables were compared with unpaired t-tests and Fisher's exact test, respectively. Pearson's correlation coefficient was calculated. A two-sided $p < 0.05$ was considered to be statistically significant.

Results

The study included 94 men and 29 women. Clinical characteristics are presented in Table I. Age, hemodynamic data, smoking habits, and laboratory data did not differ between men and women. Table II shows treatment and concomitant

TABLE I   Patient characteristics at entry

Gender	Men (n = 94)	Women (n = 29)
Age (years)	61 ± 11	61 ± 10
Body mass index (kg/m²)	26.5 ± 3.4	26.6 ± 4.0
Blood pressure (mmHg)		
Systolic	138 ± 20	135 ± 22
Diastolic	80 ± 9	76 ± 8
Heart rate (beats/min)	58 ± 10	59 ± 9
Total serum cholesterol (mmol/l)	4.7 ± 0.9	4.8 ± 0.9
Serum triglycerides (mmol/l)	1.7 ± 1.1	1.3 ± 0.9
Plasma glucose (mmol/l)	5.5 ± 1.4	5.0 ± 1.7
Ejection fraction (%)	52 ± 9	55 ± 6
Smoking habits		
Previous smoker, n (%)	54 (57)	17 (59)
Current smoker, n (%)	17 (18)	3 (10)
Never smoked, n (%)	20 (21)	8 (28)
Snuff user, n (%)	3 (3)	1 (3)

Data are means ±standard deviation unless stated otherwise.

TABLE II   Treatment and concomitant cardiovascular disease

Gender	Men (n = 94)	Women (n = 29)
Previous stroke, n (%)	2 (2)	0
Hypertension, n (%)	36 (38)	11 (38)
Angina pectoris, n (%)	37 (34)	14 (48)
Previous PCI, n (%)	43 (46)	16 (55)
Previous CABG, n (%)	28 (30)	3 (10) [a]
Previous revascularization (PCI or CABG), n (%)	63 (67)	17 (59)
Drug treatment		
Aspirin, n (%)	94 (100)	28 (97)
Clodpidogrel, n (%)	5 (5)	4 (14)
Beta blocker, n (%)	84 (89)	26 (90)
ACE inhibitor, n (%)	25 (27)	6 (21)
Statin, n (%)	85 (90)	26 (90)

[a] $p < 0.05$.
Abbreviations: PCI = percutaneous coronary intervention, CABG = coronary artery bypass graft, ACE = angiotensin-converting enzyme.

cardiovascular disease. The only significant difference between men and women was a higher prevalence of previous coronary artery bypass graft (CABG) among men (30 and 10%, respectively, p = 0.049). This difference was partly counterbalanced by an insignificantly higher prevalence of previous percutaneous coronary intervention (PCI) treatment in the female group (55 and 46%, respectively, NS). Taken together, the proportion of patients revascularized with either PCI or with CABG did not differ between genders (67 and 59%, respectively, NS), nor did their pharmacologic treatment.

Women had significantly higher values of Contentment, Vitality, and Sleep, indicating more negative feelings, than did men (Table III). When subjects with previous CABG were excluded, the difference between the genders in quality of life remained significant (data not shown). There was no significant difference regarding quality of life between patients who did and those who did not undergo a revascularization procedure.

Discussion

The major finding of this study was that self-assessed quality of life was significantly lower among women than among men after an MI, despite similar age, treatment, and hemodynamic and laboratory data.

TABLE III   Quality of life data

Gender	Men (n = 94)	Women (n = 29)
Sleep	90 ± 64	150 ± 81 [b]
Contentment	197 ± 100	277 ± 110 [b]
Vitality	131 ± 71	170 ± 81 [a]

[a] $p < 0.05$.
[b] $p < 0.001$.

It is difficult to estimate quality of life and there is no standard of reference for its measurement. The method used in the present study, the MSEP, is based on a questionnaire for self-assessment using a visual analogue scale. This instrument has been evaluated by assessing the effects of different drugs on well-known symptom profiles.[12] In addition, construct validity has been established by calculating the correlation coefficients between dimensions of MSEP and those of other questionnaires, for example, the Nottingham Health Profile.[13] Compared with equivalent dimensions of other questionnaires for measurement of health-related quality of life, the dimensions of the MSEP were found to be relevant. Furthermore, a fundamental requirement is that the used instrument produces the same results in repeated use. This matter has previously been evaluated by the test/re-test reliability and has been shown to be acceptable.[12] Hence, all these observations taken together indicate that the MSEP is a valuable tool for estimating aspects of quality of life that are of clinical importance.

All three dimensions of the MSEP indicated a lower quality of life in women than in men; thus, the observations were consistent. Age, blood pressure, lipids, smoking habit, and pharmacologic treatment did not differ between genders, nor did the proportion of subjects, who had undergone interventional revascularization. Men were more likely to be revascularized by CABG compared with women, whereas there was an opposite trend for PCI, which was more common among women than men. Thus, the only identified confounding factor was CABG prevalence. However, even after excluding subjects who had undergone CABG, a significantly lower quality of life was observed among women.

Is this observation dangerous for women? A prospective study by Colantonio *et al.*[15] reported that symptoms of depression predicted stroke in elderly noninstitutionalized subjects. We have previously observed that low self-assessed quality of life, using the same method as in the present study, predicted an increase in maximum intima-media thickness in the common carotid artery[7] and cardiovascular events[8] in hypertensive

male subjects. Several groups have reported that psychological stress increases the progression of the intima-media thickness of the common carotid artery.[8, 16] There are also several reports regarding a relationship between psychosocial factors and coronary heart disease.[1–6] However, it is important to keep in mind that several previous studies have failed to find such an association,[17] and there certainly is a publication bias; a positive finding is more likely to be published than a negative observation. The relationship between psychosocial factors and coronary heart disease has not been completely established.

It is easy to understand that a life-threatening event such as an MI can affect quality of life, but the underlying reason for the gender difference is unclear. Our observation is in line with several previous reports,[10, 18] whereas others have failed to demonstrate a gender difference in quality of life after an MI.[19] However, most data, including those of our own study, indicate that more should done to support women following MI. Possibly women would benefit from a more pronounced psychological approach in the cardiac rehabilitation program.

Conclusion

Self-assessed quality of life was significantly lower among women than among men after MI, despite similar age, treatment, and hemodynamic and laboratory data. The causal relationship is, however, not known. Further studies are needed to evaluate the underlying mechanism of this observation. This might lead to the development of novel treatment strategies in female patients after MI.

References

1. Manuck SB, Kaplan JR, Matthews KA: Behavioral antecedents of coronary heart disease and atherosclerosis. *Arteriosclerosis* 1986;6:1–14
2. Marmot MG: Stress, social and cultural variations in heart disease. *J Psychosom Res* 1983;27:377–384
3. Reed D, McGee D, Yano Y, Feinleib M: Social networks and coronary heart disease among Japanese men in Hawaii. *Am J Epidemiol* 1983;117:384–396
4. Berkman LF, Syme SL: Social networks, host resistance, and mortality: A nine-year follow-up study of Alameda County residents. *Am J Epidemiol* 1979;109:186–204
5. Matsumoto Y, Uyama O, Shimizu S, Michishita H, Mori R, Owada T, Sugita M: Do anger and aggression affect carotid atherosclerosis ? *Stroke* 1993;24:983–986
6. Welin L, Tibblin G, Svärdsudd K, Tibblin B, Ander-Peciva S, Larsson B, Wilhelmsen L: Prospective study of social influences on mortality. The study of men born in 1913 and 1923. *Lancet* 1985;i:915–918
7. Agewall S, Wikstrand J, Dahlöf C, Fagerberg B: Negative feelings (discontent) predict progress of intima-media thickness of the common carotid artery in treated hypertensive men at high cardiovascular risk. *Am J Hypertens* 1996;9:545–550
8. Agewall S, Wikstrand J, Fagerberg B: Stroke was predicted by dimensions of quality of life in treated hypertensive men. *Stroke* 1998;29:2329–2333
9. Cerqueira M: Diagnostic testing strategies for coronary heart disease: Special issues related to gender. *Am J Cardiol* 1995;75:52D–60D
10. Wiklund I, Herlitz J, Johansson S, Bengtsson A, Karlsson BW, Persson NG: Subjective symptoms and well-being differ in men and women after myocardial infarction. *Eur Heart J* 1993;14:1315–1319
11. Myocardial infarction redefined: A consensus document of the Joint European Society of Cardiology/American College of Cardiology Committee for the redefinition of myocardial infarction. *Eur Heart J* 2000;21:1502–1513
12. Dahlöf C, Dimenäs E, Olofsson B: Documentation of an instrument for assessment of subjective CNS-related symptoms during cardiovascular pharmacotherapy. *Cardiovasc Drug Ther* 1989;3:919–927
13. Dahlöf C: Minor symptoms evaluation (MSE) profile—a questionnaire for assessment of subjective CNS-related symptoms. *Scand J Prim Health Care* 1990;(suppl 1):19–25
14. Dimenäs E, Wiklund I, Dahlöf C, Lindvall KG, Olofsson B, de Faire U: Differences in the subjective well-being and symptoms of normotensives, borderline hypertensives and hypertensives. *J Hypertens* 1989;7:885–890
15. Colantonio A, Kasi SV, Ostfeld AM: Depressive symptoms and other factors as predictors of stroke in the elderly. *Am J Epidemiol* 1992;136:884–895
16. Everson SA, Lynch JW, Chesney MA: Interaction of workplace demands and cardiovascular reactivity in progression of carotid atherosclerosis: Population-based study. *Br Med J* 1997;314:553–558
17. Lane D, Carroll D, Ring C, Beevers DG, Lip GY: Mortality and quality of life 12 months after myocardial infarction: Effects of depression and anxiety. *Psychosom Med* 2001;63:221–230
18. Westin L, Carlsson R, Erhardt L, Cantor-Graee E, McNeil T: Difference in quality of life in men and women with ischemic heart disease. *Scand Cardiovasc J* 1999;33:160–165
19. Maeland JG, Havik OE: Self-assessment of health before and after a myocardial infarction. *Soc Sci Med* 1988;26:597–605