

The Influence of Gender on Outcome in Patients with First Acute Myocardial Infarction

S. H. Hakim MD, J. Samadikhah MD, A. Alizadeh Asl MD and R. Azarfarin MD

Abstract

Background -The aim of this study was to determine whether characteristics, presentation and outcome differences based on the patient's gender occur after acute myocardial infarction (AMI).

Methods- By this prospective multivariate study; we assessed 500 consecutive first infarct survivors (353 men and 147 women), who were admitted to our heart center over a period of 2 years.

Results- On average, women were 6.2 years older than men ($P=0.030$). According to multivariate analysis women were less likely than men to be smokers ($p=0.0001$) and more likely to have underlying hypertension ($P=0.02$), diabetes ($P=0.041$), previous angina ($P=0.041$), non-Q-wave infarctions ($P=0.019$) and left ventricular ejection fraction $< 40\%$ ($P=0.038$). Men had significantly more 3-vessel coronary artery disease [relative risk (RR) = 1.8, 95% CI, (1.21-2.38), $P=0.02$]. In-hospital mortality rate was 19% for women and 12% for men [RR = 1.51, 95% CI (0.95-1.82), $P=0.044$]; in addition, the mortality rate at 1-year follow-up was 27% for women and 15% for men [RR=1.61, 95% CI (1.04-2.51), $P=0.039$]. However, after an age-matched analysis, we found no significant differences between men and women for in-hospital mortality. Also, our 1-year follow-up showed that the mortality rate in women was remarkably similar to the age-matched groups in men, but men had more CABG procedures in hospitalization and 1-year follow-up period [RR= 2.34, 95% CI (1.35-3.0), $P=0.033$].

Conclusion- The age-matched mortality rate in this study was the same for men and women, excluding the greater frequency of 3-vessel involvement, advanced left main coronary disease and greater frequency of CABG operations in men (*Iranian Heart Journal 2007; 8 (1): 30-32*).

Key words: acute myocardial infarction ■ gender ■ outcome

Coronary heart disease and especially acute myocardial infarction (AMI) are the most common causes of death among both men and women throughout the world.

In recent years, much interest has been generated regarding gender differences in diagnosis, treatment and outcome of ischemic heart disease.¹

The age of presentation and prevalence of risk factors differ between males and females. Studies from western countries have shown that on the whole, women with AMI are older than men and have a poorer prognosis.^{1,2} The aim of this study was to determine whether characteristics, presentation and outcome differences based on the patients' gender occur after first AMI.

Received Apr. 22, 2005; Accepted for publication Aug. 22, 2006.

From the Cardiovascular Research Center, Tabriz University of Medical Sciences and Health Services, Tabriz, Iran

Address correspondence and reprint requests to: Dr. J.Samadikhah, Associate Professor in Cardiology, Shaheed Madani Heart Hospital, Tabriz, Iran

Tel. +98 (411) 3361175

Fax. +98 (411) 3344021

Email: kkavehs@hotmail.com

Methods

We assessed 500 consecutive first infarct survivors: 353 men and 147 women over a period of 2 years, who were admitted to our heart center. The diagnosis of MI was based on the presence of at least two of the three following criteria: a typical history of chest discomfort lasting >15 minutes, an increase in cardiac enzyme levels to more than two times the upper limit of normal and the appearance of Q waves or characteristic ST segment elevation on serial electrocardiograms (ECGs).

All the patients (Pts.) underwent electrocardiography and echocardiography. Coronary angiography was performed on 211 patients. We followed the survivors for in-hospital mortality and up to 1 year after discharge from hospital by telephone.

Continuous variables are expressed as mean ± SD. Collected data were analyzed by student's t-test and Chi-square test (and Fisher's exact test when appropriate). Differences were considered statistically significant at P<0.05.

The relative likelihood for some parameters was calculated as relative risk with 95% confidence intervals.

Results

According to our results, women were older than men; and women were less likely than men to be smokers but more likely to have other underlying risk factors (Table I).

Table I. Clinical characteristic of pts. with first acute myocardial infarction.

Clinical features	Women (%)	Men (%)	P value
Number of pts	147 (29)	353 (71)	
Mean age (yr)	67.2±11	61±10	0.039
Smoking	14%	83%	0.0001
Hypertension	79%	61%	0.02
Diabetes	46%	39%	0.041
Hyperlipidemia	47%	45%	0.613
Family HX CAD*	48%	43%	0.218
Previous angina	45%	37%	0.038

* HX CAD: History of coronary artery disease

Rates of anterior infarcts, non Q-wave MI, CHF and cardiogenic shock were higher in women than men (Tables II, III). Men were more likely than women to undergo thrombolytic therapy, coronary angiography and CABG (Tables II, III).

Table II. Infarct characteristics for women and men with AMI.

Feature	Women (%)	Men (%)	P value
Chest pain	83%	87%	0.731
Anterior infarcts	51.5%	46%	0.355
Non Q-wave infarcts	40%	29%	0.019
Re-infarction (in-hospital)	9%	5%	0.036
Thrombolytic therapy	34%	49%	0.029

Table III. Univariate comparison of complications of AMI for women vs. men.

Complication	Women (%)	Men (%)	P value	Relative Risk (95% CI)
CHF	53%	37%	0.011	1.32(1.18-1.47)
K3 and K4	25%	11%	0.018	2.13(1.61-2.55)
3-vessel coronary disease	19%	32%	0.023	0.66(0.54-0.83)
Left main CAD	4%	7%	0.041	0.58(0.49-0.75)
Arrhythmias	47%	44%	0.871	1.02(0.62-1.82)
CABG in hospitalization and 1 year follow-up	4%	9%	0.033	0.46(0.33-0.77)
In-hospital mortality	19%	12%	0.044	1.51(0.95-1.82)
1-year follow-up mortality	27%	15%	0.039	1.61(1.04-2.51)

Table IV. Age-adjusted comparison for women vs. men in mortality rates

Variable	P value	Relative Risk (95% CI)
In-hospital mortality	0.780	1.03(0.62-1.72)
1-year follow-up mortality	0.569	1.14(0.81-1.5)

According to Table III, in-hospital mortality rate for women was 19% and 12% for men [RR=1.51; 95% CI (0.95-1.82), P=0.044]; also, the 1-year follow-up mortality rate for women was 27% and 15% for men [RR=1.61, 95%CI (1.04-2.51); P=0.039]. Nevertheless, according to Table IV the differences between men and women for age-matched mortality rates were non-significant.

Discussion

Kam, Vaccarion and Greenland revealed that in patients who experienced MI, women were 6.2 years older on average than men.^{1,2,3} Also, these authors and Marrugat and Hendricks reported that women were less likely than men to be smokers and more likely to have hypertension, diabetes mellitus, CHF and cardiogenic shock after MI and higher rates of mortality.¹⁻⁵ Moreover, we found that the rates of non-Q wave MI and in-hospital re-MI were higher in women than men. Taylor, Mendelson and Lincoff reported that women were less likely than men to undergo thrombolytic therapy and coronary angiography and had lower rates of 3-vessel coronary disease and left main coronary disease and CABG operations,⁶⁻⁸ (similar to our study). Most studies report results similar to our study for the above variables. Also, our results revealed higher morbidity and mortality in women after the first AMI, which is related to their higher prevalence of risk factors. For example, after adjusting women and men for age, they had no significant difference in in-hospital and 1-year follow-up mortality rate.

Conclusion

It was concluded that despite the differences in clinical features and complications, the increased mortality after AMI observed in women was due to their older age.

References

1. Kam R, Vutter J, Chew SK, Tan A, Emmanuel S, Mak KH et al. Gender differences in outcome after an acute myocardial infarction in Singapore. *Singapore Med J* 2002; 43 (5): 243-248.
2. Vaccarion V, Krumholz HM, Berkman LF, Horwitz RI. Sex differences in mortality after myocardial infarction: is there evidence for an increased risk for women? *Circulation* 1995; 91: 1861-1871.
3. Greenland P, Reicher Reiss H, Goldboust U, Behar S. In-hospital and 1-year mortality in 1524 women after myocardial infarction: comparison with 4315 men. *Circulation* 1991; 83: 484-491.
4. Marrugat J, Sala J, Masia R. Mortality differences between men and women following first myocardial infarction. *JAMA* 1998; 280: 28: 1405-1409.
5. Hendricks AS, Goodman B, Stein JH, Carnes M. Gender differences in acute myocardial infarction: The University of Wisconsin experience. *Wisconsin Medical Journal* 1999; 30-34.
6. Taylor A, Mueller S. Coronary artery disease in women. *Cardiovascular Medicine*. New York: Churchill-Livingstone 1995; 18: 1715-1725.
7. Mendelson M, Hendel R. Myocardial infarction in women. *Cardiology* 1995; 86: 272-285.
8. Lincoff A, Califf R, Ellis S. Thrombolytic therapy for women with AMI: Is there a gender gap? *Journal of the American College of Cardiology* 1993; 22: 1780-1786.