DIABETES MELLITUS: THE MOST IMPORTANT CARDIAC RISK FACTOR OF PREMATURE MYOCARDIAL INFARCTION IN WOMEN

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Abstract

INTRODUCTION: Myocardial infarction (MI) is the leading cause of mortality and morbidity both in men and women. Risk factor profiles vary in different ethnic groups, in male and female and in different age groups. This study aimed to evaluate the cardiovascular risk factors in young women with AMI, and to compare it with other age and sex groups, in Birjand, south Khorasan.

METHODS: This descriptive analytic study evaluated the prevalence of classic CHD risk factors in female patients with acute Myocardial Infarction (AMI) aged ≤ 56 and compared it with female AMI patients aging more than 56 and also with the male patients with AMI. The study group included 311 consecutive female patients (48 patients ≤ 56 and 263 > 56 years old) out of 1112 patients who were hospitalized with acute myocardial infarction in Vali Asr hospital, the referral hospital in the capital of south Khorasan province in eastern Iran, from 2002 to 2006.

RESULTS: Diabetes was detected to be the most frequent coronary risk factor in younger women (35.4%). The overall prevalence of diabetes was 22.6% in women with AMI. Women with premature coronary artery disease were found to have a higher prevalence of diabetes compared to older women (35.4% versus 20.1% respectively, P < 0.01). Furthermore, the number of diabetics was significantly higher in women than men (29.2% versus 13.9% respectively, P < 0.001). In addition, number of diabetics was significantly higher in younger women than younger men (age =< 56) (35.4% versus 13.3% respectively, P = 0.03). Hypertension was second most common modifiable risk factor in younger female group and the most common risk factor in older female group. Cigarette smoking was found to be the least common risk factor in the younger female group but the most common, in the younger male. The mean age of female MI patients was only 5.6 years more than male MI patients, which is less than the 10 years delay of MI in females reported in the literature.

CONCLUSION: Our findings show a significantly higher prevalence of diabetes in young females compared with both older females and younger males with premature MI. The higher prevalence of DM in young females may be associated with the decreasing difference of mean age between female and male patients with MI. This data may be useful in directing primary and secondary preventive measures.

Introduction

Myocardial infarction (MI) is the leading cause of mortality and morbidity in both developed[1] and developing countries.[2,3] Recognition of risk factors in different groups of people may significantly affect prevention strategies and can be especially very useful in the younger ages. Risk factor profiles vary in different ethnic groups[4,5] and with age and sex of the patients. Although the onset of the disease is delayed about ten years in the female[4] epidemiologic studies have shown an increasing trend both in young men and women. Acute myocardial infarction (AMI) has a

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peculiar risk profile in the young population with specific prognostic characteristics that differentiate these patients from the elderly. In addition to age factor, sex also may influence the clinical presentation of acute myocardial infarction.[5-7] Morbidity and mortality of the disease in a younger age and in the years of greater productivity may cause even more psychosocial and economic problems.[8] In several studies on female patients with AMI, systemic arterial hypertension (Htn) have been reported to be the most prevalent risk factor.[9,10] Considering the differences in risk factor profile of MI in old versus young and female versus male, and different results reported from different countries in the world,[9,11,12] we aimed to study the classic risk factors of cardiovascular disease in Vali-Asr hospital of Birjand, the main hospital and the referral center for heart disease in south Khorasan. We compared the risk factors between different groups of MI patients.

Materials and Methods

The study group included 311 consecutive female patients out of 1112 cases with acute myocardial infarction (48 patients =< 56 and 263 patients > 56 years old) who were hospitalized in Vali Asr Hospital of Birjand Medical University, which is the referral hospital in the capital of south Khorasan province, from April 2002 to march 2006. The questionnaires including patients' demographic data were completed by trained medical students under supervision of cardiologists. All patients were evaluated for classic major coronary risk factors. A group of 801 male patients with acute myocardial infarction were the controls. Prevalence of risk factors was compared between four age and sex groups, including females aged =< 56, females aged > 56, males aged =< 56 and males aged > 56. Patients' age was ranging from 19 to 90 (mean age: 62 ± 12.7). Acute myocardial infarction was diagnosed on the basis of typical chest pain, diagnostic electrocardiographic findings and cardiac enzyme evolutionary patterns including CK-MB and Tn-I. Blood samples were collected at the beginning of hospital admission, the next morning and every 24 hours thereafter. DM was diagnosed if the patient had a definite history of DM, was using anti-diabetic drugs or had a fasting blood sugar ≥126 on three separate occasions. Hypertention (Htn) was diagnosed when there was a known history of Htn, or the patient was already on anti-hypertensive drugs or had a blood pressure ≥ 140/90 on 3 occasions in two different days. SPSS 13 for windows was used for statistical analysis. Chi square test was used to compare proportion of qualitative variables and independent-sample T test was used for mean value comparison of quantitative variables.

Results

The majority of female patients were older than 56 (84.2% versus 15.8%). The overall prevalence of diabetes was 22.6% in women with AMI. Women with premature coronary artery disease were found to have a significantly higher prevalence of diabetes than older women (35.4% versus 20.1% respectively, P < 0.01) (table 1). Furthermore, the number of diabetics was significantly higher in women compared to men (22.6% versus 13.9% respectively, P < 0.001). In addition, diabetes was detected to be the most frequent coronary risk factor in our younger women group (35.4%). Besides, number of diabetics was significantly higher in younger females when compared with younger men (age =< 56) (35.4% versus 13.3% respectively, P < 0.001) (table2). The similarity of mean age between these two younger groups (46.2 ± 6.8 years in women versus 47.4 ± 7.6 years in men) made the comparison possible. Prevalence of hypertension was highest in older women (57.9%), then it was 28.3% in younger women (table 1), and 16.9% in younger men (Table 2) and the difference was statistically significant. Cigarette smoking was found to be the dominant risk factor in men with premature coronary artery disease (42.9%) (Table 2).

Discussion

Different ages has been reported as the cutoff point for premature MI in men and women in the literature.[13-15] In this study, patients up to 56 years of age were selected as premature MI group. The mean ages of the young female and young male group (46 ± 6.8 versus 47.4 ± 7.6 years, respectively) were similar and this allowed an adequate

Table 1. Comparing frequency distribution of risk factors between women aged =< 56 and >56 years and definite myocardial infarction

Risk factor	Age =< 56	Age > 56	P value
Diabetes	17(35.4%)	48(20.1%)	0.01
Hypertension	13(28.3%)	140(57.9%)	0.000
Dyslipidemia	14(29.8%)	67(28.6%)	0.50
smoking	2(5.1%)	21(10.6%)	0.23
Family history	13(34.2%)	27(16.7%)	0.017

Total number: (women =<56 years old) = 48, women > 56 year old = 263

Table 2. Comparing frequency distribution of risk factors in women   aged =< 56 and > 56 years and definite myocardial infarction.

Risk factor	Women =< 56	Men =< 56	P value
Diabetes	17(35.4%)	35(13.3%)	< 0.001
Hypertension	13(28.3%)	45(16.9%)	0.05
Dyslipidemia	14(29.8%)	79(30.4%)	0.54
Smoking	2(5.1%)	134(56.5%)	< 0.001
Family history	13(34.2%)	70(37.4%)	0.42

Total number: (women =< 56 years of age) = 48, (men =< 56) = 295

comparison between these two groups. In our case series, diabetes was significantly more prevalent in young female group when compared with both young male and old female group (Tables 1 and 2). In a study on 290 patients with acute coronary syndrome in Asian Indians of South Africa, DM was reported in 41% of women with age less than 45 (versus 25% in our study) and 52% of women with age between 45 and 65 (versus 37.5% in our study), which is higher than our findings but the same trend is noted.[16] Although there are many reports from Iran and other countries about risk factors of patients with MI, most of them have compared the risk factors only in two groups either divided by sex[17-21] or by age.[22,14] In a study on MI patients in the city of Yazd, DM and Htn has been the two most common risk factors in females irrespective of their age.[21] Simillar to our study, a study from Brasilia[4] and another from Guilan, Iran (Htn 41.9% and DM 20.9%)[20] have reported Htn and then DM to be the two most common risk factors in MI female patients, irrespective of the age. In our study, prevalence of Htn was 53.1% and prevalence of DM was 22.6% in women irrespective of their age. In an Indian study DM and Htn were reported to be the two dominant risk factors in MI patients aged over 55, irrespective of their sex. Our findings are in agreement with the study on 209 MI patients in Tehran, which reported a significantly lower age in female diabetics.[23] Our finding is also in agreement with the current concept that "the protective role of female sex disappears in patients with DM", so DM puts additional risk on young female patients.[24,25] It is worth noting that similar results have also been reported in metabolic syndrome which shares insulin resistance and hyperglycemia with DM.[26,12]

Hypertension was the dominant risk factor in older women and one of important risk factors in younger women (table 1). Prevalence of Htn was higher in younger women than in younger men. In our study, the mean age of female patients was about 6 years older than the male ones (66 ± 11.2 versus 60.4 ± 12.8, P < 0.000, respectively), while it was 5 years older in Guilan and 6.5 years fin Tehran.[23] The difference of mean age between male and female patients in these studies is less than the 10 years delay of coronary heart disease (CHD) in women reported in the literature.[4,24,25] The significantly higher prevalence of DM in young female patients may mean that the female protective effect is vanishing and the age difference between genders are declining. It is reported that women are less aware of their risk factors[27] and physicians educate women less than men about their cardiovascular risk factors.[28,29] Since patients with DM and also Htn (the other important risk factor in women with early MI) may remain clinically asymptomatic for several years, this is a serious medical problem and

educating patients about modifiable risk factors and primary preventive measures for DM and Htn, such as appropriate diet, controlling blood pressure, regular exercise and adequate statin use, can reduce these problems in young females.[25,30] who are otherwise a low risk group for CHD. Cigarette smoking was found to be the dominant risk factor in men with premature coronary artery disease in our study, so that 56% of the men in younger group were smokers. Considering the increasing trend of smoking in young men it is necessary to pay special attention to preventive measures for this important risk. The prevalence of smoking in younger female group in our study was only 5% (tables 1 and 2) which is much less than findings of studies in other countries.[31] However, significant risk increase has been reported in female smokers and it is also reported that women may be more sensitive than men to some of the harmful effects of smoking.[7,31]

Conclusion

This study showed a higher prevalence of diabetes in young females compared with both older females and young males with premature MI. This finding may be useful in directing primary and secondary preventive measures. Although all cardiac risk factors may play a role in the incidence and course of myocardial infarction, the prevalence of different risk factors in different group of patients can favorably effect direction of primary and secondary preventive measures.

Special attention is needed to preventive measures for DM and Htn in females and smoking in males.

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