The Five-Year Trend of Coronary Artery Diseases Based on Angiography Results in Central Part of IRAN

Masumeh Sadeghi[1], Nizal Sarrafzadegan[2*], Javad Shahabi[3], Mina Naghnaiian[3], Pegah Hedayat[4]

Abstract

Introduction: Coronary artery disease (CASD) is the most common cause of mortality and morbidity in the world. Given the increasing prevalence of CAD in Iran, it is essential to determine its trend.

Method: In this retrospective study, angiography reports of all patients admitted for coronary angiography due to stable angina or acute coronary syndromes in Noor and Sina Hospitals from 2005 to 2009 were included in this study. All of the results were evaluated by 3 expert cardiologists, and recorded in one format. Data on age, sex, angiography, and coronary artery involvement were collected and analyzed using the ANOVA model.

Results: We evaluated 33388 angiography reports. The mean age of the patients was 59.48 ± 10.49 years in 2005, 59.94 ± 10.66 years in 2006, 60.17 ± 10.49 years in 2007, 60.37 ± 10.64 years in 2998, and 61.25 ± 10.58 years in 2009, respectively. Significant involvement of coronary arteries was found in 21.7% of the males and 33.5% of the females with a mean age of 63.45 vs. $\pm$ 59.17 years, respectively (p value$\leq$0.001). The mean age of CAD increased from 2005 to 2009 significantly (p value =0.002).

Conclusion: Given the increased prevalence rate of CAD, we need broad primary and secondary CAD prevention programs. Furthermore, the early occurrence of CAD in women requires more extensive preventive plans to control their risk factors. *(Iranian Heart Journal 2012; 13(2):12-19).*

Keywords: Age■ Coronary artery disease■ Sex■ Angiography

Introduction

Cardiovascular diseases are still one of the most important causes of mortality and hospitalization of patients all over the world; thus, they impose high economic pressure on the society (1). Studies carried out in India and other places suggest that Asians in general and Indians in particular are at increased risk of myocardial infarction (MI) at a younger age (<40 years), irrespective of whether they have migrated to other countries or are resident Asians (2). In the US, one person experiences cardiac infraction per 20 seconds (3,4). Based on the published statistics, 3.6 million people were hospitalized with ischemic heart disease in Iran in 2007 only in the hospitals affiliated with the Ministry of Health (5).

Several studies in developed countries have indicated the enormous reduction in the prevalence of cardiovascular diseases and their resultant hospitalization during the two past decades, which can be attributed to the identification of risk factors like cholesterol and blood pressure and prevention of these cases as well as medical and invasive treatments (6-8). On the contrary, a study conducted in Iran from 2000 to 2004 showed the increase of hospitalization for cardiovascular cases, while no significant difference was observed in ischemic cases among the population under 45 years of age (9). In the study of Saiedi et al. (2005), there was no significant difference in the emergence of acute MI from 1991 to 2001 (10). Moreover, previous studies have demonstrated a 10-year age difference in the incidence of cardiovascular diseases between women and men.

A combination of environmental and genetic factors was presented as the reason for the occurrence of ischemic cases among women at older ages (11,12). In a prospective cohort study entitled Isfahan Cohort Study in Najafabad, Isfahan and Arak and their rural districts in central Iran demonstrated that the age of cardiovascular disease occurrence was similar in men and women, and in rural and urban areas (13). Nevertheless, all previous studies have focused their full attention on acute coronary syndrome, while millions of patients suffering from obstructive atherosclerotic coronary artery lesions have no history of ischemic events and only show catastrophic results like congestive heart failure or for sudden cardiac death with no clear reason.

Due to the fact that the main element in preventing and controlling each disease is to have proper and sufficient information on that disease and to see whether the occurrence age of CAD has been decreasing in Iran in recent years, the present study was conducted to determine age trend of CAD according to angiographic data for each sex in an Iranian sample.

Materials and Methods

All the reports of coronary artery angiography of patients with stable angina or acute coronary syndrome who visited Noor Governmental and Sina Private Hospitals between March 2005 and March 2009 were included in this retrospective study. The present study was approved by the Ethics Committee of the Cardiovascular Research Center (a WHO collaborating center).

13

Exclusion criteria included incomplete reports as well as reports related to the patients who underwent angiography for evaluating congenital, valvular, and peripheral vascular diseases.

In these two centers, angiography was done by a cardiologist, whose report was further reviewed by three other cardiologists, who prepared the final report. All the data were thereafter converted into an identical format before they were entered into Excel 2007. The data obtained included age, sex, date of angiography, and the diseased coronary artery. Major coronary artery vessels were defined as vessels with a diameter > 2 mm including the left anterior descending (LAD), left circumflex (LCX), right coronary artery (RCA) and their major branches. Abnormal involvement of coronary arteries was defined as stenosis >75% of each vessel or >50% of the internal diameter of the left main.

The collected data were analyzed in SPSS$_{15}$ software using the one-way Analysis of Variance.

Results

In this study, 33388 coronary artery angiography reports were reviewed from both Hospitals between 2005 and 2009. The mean age of the participants was 59.48±10.49 years in 2005, 59.94±10.66 years in 2006, 60.17±10.49 years in 2007, 60.37±10.64 years in 2998, and 61.25±10.58 years in 2009, respectively. Of the all the patients, the youngest was 30 and the oldest 96 years of age during this period of 5 years.

The patients with coronary artery involvement were those at higher ages (57.73 vs. 60.48) and men. The mean age of the patients suffering from coronary artery involvement in the men and women was 63.45 and 59.17 years old, respectively, which was statistically significant (p value≤0.001).

The mean age of the participants with abnormal angiography in terms of sex and time of angiography is shown in Tables 1 and 2. During the investigation, no significant difference was observed in the mean age of the women, while the increase in the mean age of the men from 2005 to 2009 was significant (p value=0.002). Post hoc analysis determined that this significant difference occurred as a result of a mean age increase from 2007 to 2009 in comparison with that from 2005 to 2006 (Fig. 1).

In addition, the mean age increase of the involvement of the left main coronary was significant after 2006 compared with 2005. However, no considerable difference was observed in the mean age of involvement of three or more vessels during these 5 years.

14

Table 1-Mean CAD patient age based on sex and year of study

Sex	Age(years) (Mean ± SD)					P value
	1384[a]	1385[b]	1386[c]	1387[d]	1388[e]	
Men	58.11±10.63[de]	58.78±10.84 [e]	59.05±10.77 [e]	59.08±10.88 [ae]	60.00±10.85 [abcd]	<0.001
number	1593	2000	1940	2563	2203	
Women	62.88±9.30	62.85±9.61	63.02±9.17	63.06±9.59	63.89±9.46	>0.05
number	641	793	762	1219	1032	
total	59.48±10.49 [de]	59.94±10.66 [e]	60.17±10.49 [e]	60.37±10.64 [ae]	61.25±10.58 [abcd]	<0.001
number	2234	2793	2702	3782	3235	

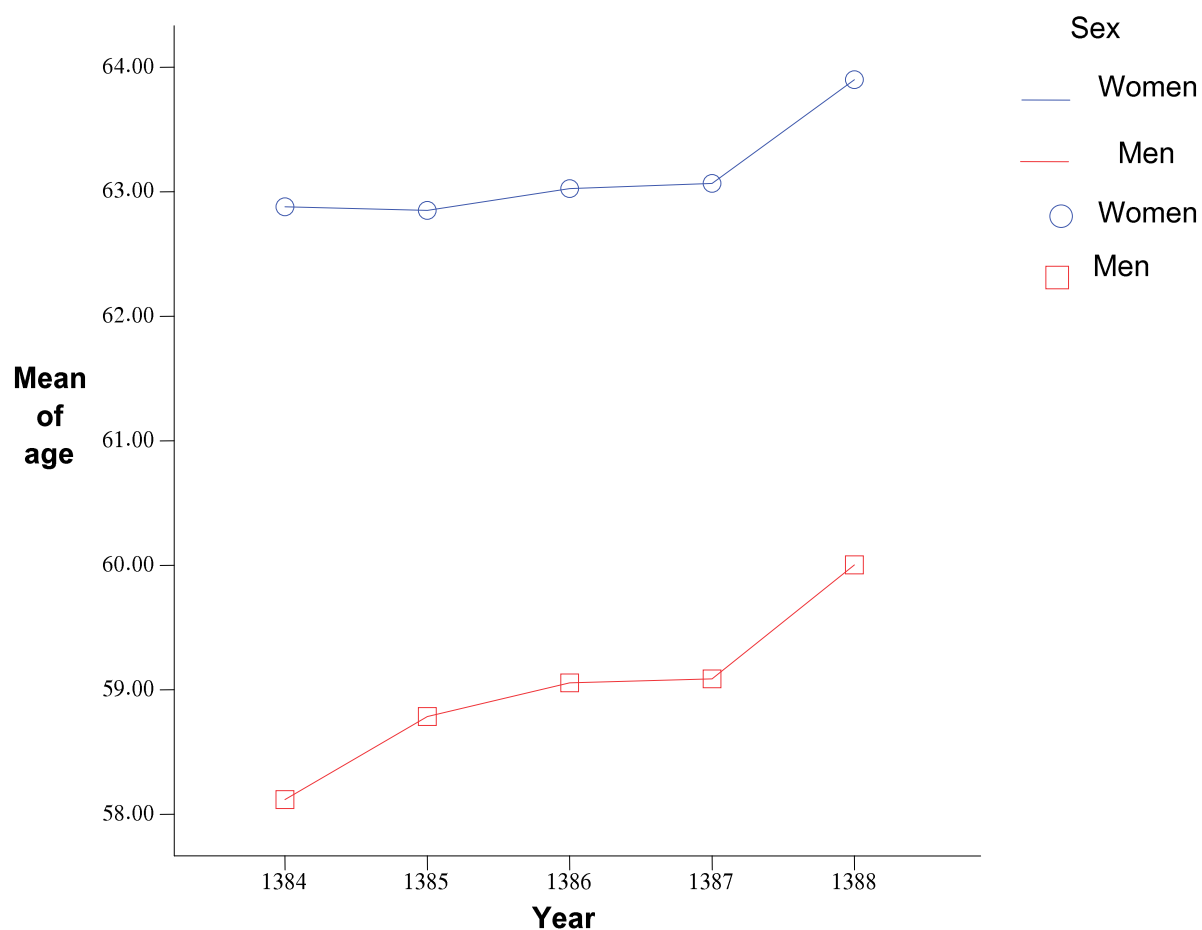This show difference between different years: abcde

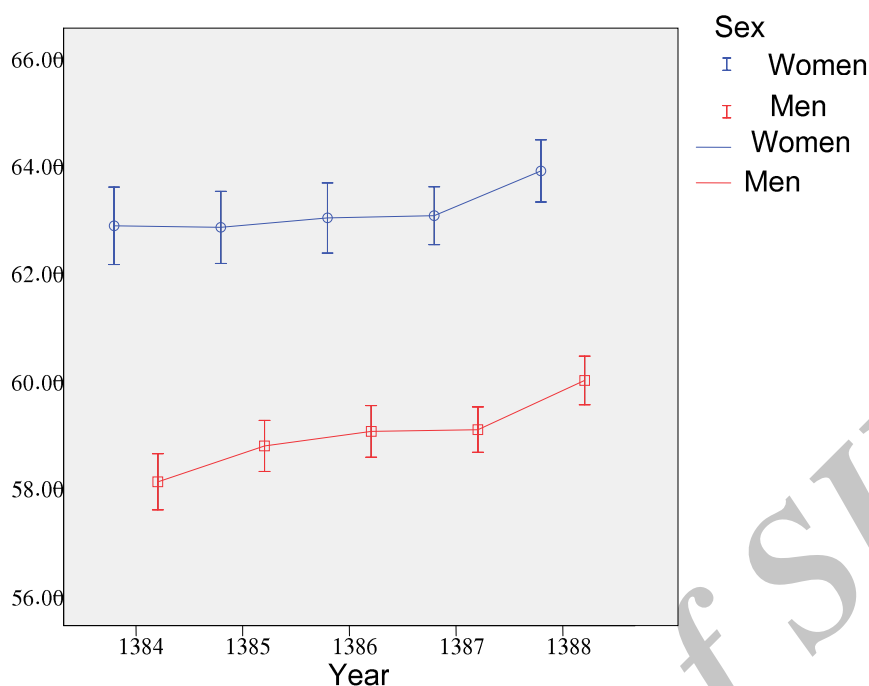Figure 1) Trend of CAD in different years in both sexes

Figure 2) Trend of left main coronary artery disease in both sexes in different years

Discussion

Analysis of the coronary angiography reports during a period of five years showed that the mean age of the men with CAD considerably increased, whereas no change was observed in the mean age of the women. Moreover, the results indicated a 4-year difference in the mean age of the women, suffering from CAD, compared with the men with the same disease.

In a study conducted in 2010 in the US, 37.6% of the diagnostic angiographies were reported as CAD (14). A comparison of these results to those of other studies shows that more evaluation is required in selecting patients for cardiac angiography in our society.

In the present study, older age and male sex were the independent predicting factors for CAD. In studies conducted in North America, ischemic heart diseases were shown to be diagnosed more in men than women; initial diagnosis was 5.4% and 4.6% among the Canadian men and women and 8.4% and 5.6% in the American men and women, respectively (11).

Failure to diagnose this disease in women is not only due to its lower incidence among women but also due to their higher age at the time of diagnosis, late visit to medical centers, and the late commencement of necessary medications.

A previous study in Isfahan, Iran, shows that the prevalence of definite and possible MI based on the ECG was higher in men; however, a higher prevalence of possible and definite ischemia was found in

16

women (15). The prevalence of CAD based on the Rose questionnaire was higher in women of all age groups (16). Be that as it may, in general, the rates of clinical diagnosis and angiography of acute coronary syndrome have increased in the previous studies during the recent 20 years (17).

Hyvarinen M et al. in 2010 conducted a study, which indicated that women were 10 years younger than men at the time of acquiring cardiovascular diseases, which was explained by environmental and hormonal differences (18). The results of the present study showed a 4-year difference between men and women with CAD and earlier occurrence of the disease in women, which could be related to the differences in risk factors of CAD in women in Iran as well as the result of late referral to cardiologists or their assumption that CAD occurs less often in women than men. Furthermore, it was observed that the mean age of women with CAD had no significant difference during these 5 years. In contrast, a considerable increase was observed in the mean age of CAD occurrence in men. Post hoc analysis determined that this significant difference occurred as a result of the mean age increase from 2007 to 2009 in comparison with that from 2005 to 2006 (Figure 1).

Despite the increase in life expectancy in women and men from 2003 to 2008 and a tendency toward healthy lifestyle as well as preventive and medical measures for controlling risk factors in cardiovascular diseases, the mean age of women with CAD has not increased. This contradiction indicates a lack of significant effect of these preventive measures among women.

Having a considerable number of angiography reports in governmental and private hospitals was among the strengths of this study. However, the main limitation of this study was having no data of clinical status, risk factors and non-invasive studies prior to angiography; it was not possible to investigate the relationship between these factors and positive angiography results.

Conclusion

In conclusion, better selection of patients for coronary artery angiography will considerably decrease normal angiography cases. Moreover, as the sex-based difference in age of CAD occurrence is low and regionally there is an earlier occurrence of CAD among women, we suggest that specific plans be devised to improve lifestyle behaviors and to arrange programs for decreasing risk factors in this group.

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18

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19