

An Evaluation of the Risk Factors of Coronary Artery Disease in Patients Undergoing Coronary Artery ByPass Graft Surgery in Babol

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ABSTRACT

BACKGROUND AND OBJECTIVE: Awareness of the prevalence of modifiable cardiovascular risk factors and attempts to correct and control it can be effective in reducing the chance of advanced cardiovascular disease that leads to complicated surgical procedures. Since the risk factors of advanced heart disease in northern Iran are unclear, this study was conducted to evaluate the risk factors of coronary artery disease in patients undergoing coronary artery bypass graft surgery in Babol, northern Iran.

METHODS: This cross-sectional study was performed on 460 patients who underwent coronary artery bypass graft surgery from the beginning of 2011 to the end of 2015 in Ayatollah Rohani Hospital in Babol. The modifiable risk factors of coronary heart disease were evaluated according to the data in medical records of patients.

FINDINGS: The prevalence of hypertension in the total samples was 56.74% (261 patients), the prevalence of hyperlipidemia was 32.16% (150 patients) and the prevalence of diabetes was 38.91% (179 patients). 31.09% (143 patients) had history of myocardial infarction in the past. 12.6% (58 patients) were smokers, all of whom were male. In terms of gender distribution, 53% (244 patients) were male and 47% (216 patients) were female. The mean age of the patients was 61.4±9.72 years and the mean weight of the patients was 68±12.57 kg. In terms of body mass index, the total mean was 26.3±4.25.

CONCLUSION: According to the results of this study, hypertension, diabetes, and obesity are significantly common in the population of cardiac patients in Babol. The prevalence of risk factors in women is higher. Therefore, timely screening and precise monitoring of these issues can be important in preventing long-term complications.

KEY WORDS: Risk Factors, Coronary Heart Disease, Coronary Artery Bypass Surgery.

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Introduction

Coronary Artery Disease (CAD) is one of the most serious and highly growing diseases. Today, this disease is associated with a high prevalence in both developed and developing countries and is one of the most important causes of death (1). In 2013, the disease was recognized as the leading cause of death in the world, responsible for the deaths of more than 17.3 million patients, and it is expected that with the rapid growth of this disease, the mortality rate of this disease will exceed 23.6 million people by 2030 (1).

Due to this high prevalence and high mortality rate, this disease has much been considered in recent decades. So far, many studies have been conducted on the pathophysiology, causes of the prevalence and risk factors of coronary artery disease. The classical and known risk factors for coronary artery disease include age, gender, race, positive family history, high blood pressure, diabetes, hypercholesterolemia, obesity and lack of appropriate physical activity, unhealthy diet, smoking and psychological stress, all of which except for age, gender, race and positive family history can be corrected (2). Based on strong evidence regarding the significant role of high blood pressure, hyperlipidemia, diabetes, and smoking in the pathogenesis of coronary heart disease, these four are known as "conventional risk factors" (3). Appropriate and reasonable approach to deal with these patients is more based on controlling the modifiable risk factors of this disease to prevent its development and the incidence of serious cardiac events such as angina pectoris, myocardial infarction, congestive heart failure, and death (4).

That is because the use of aggressive therapies such as Percutaneous Coronary Intervention (PCI) and Coronary Artery Bypass Graft (CABG) is still considered risky despite recent advances in medical science (5). The prevalence of coronary artery disease is increasing in most human societies, including Iran. Considering the significant rate of mortality due to this disease and high costs for therapeutic interventions, identification of the most important factors influencing the incidence and progression of these diseases is important for the development of preventive approaches (6, 7). In the present study, the prevalence of some risk factors for coronary artery disease has been evaluated in a group of patients undergoing coronary artery bypass graft surgery. Identifying these risk factors can be effective in predicting the probability of advanced cardiovascular diseases that lead to severe and complicated surgery. With the awareness of the regional

prevalence of these risk factors, appropriate measures can be taken to prevent the progression of these diseases and treat the disease as soon as possible.

Methods

After obtaining permission from the Ethics Committee of the Babol University of Medical Sciences with the code Mubabol.Rec.1396.13, this cross-sectional study was carried out among 460 patients who underwent elective coronary artery bypass graft surgery from the beginning of 2011 to the end of 2015 in Ayatollah Rohani Hospital in Babol. The medical data were extracted and recorded in specific checklists. Cardiovascular risk factors including age, gender, weight, body mass index, history of hypertension, hyperlipidemia, diabetes, and smoking were separately studied based on gender. High blood pressure was having a history systolic blood pressure equal to or greater than 140, or having diastolic blood pressure equal to or greater than 90 (8) and diabetes was a history of fasting blood glucose greater than or equal to 126, and non-fasting blood glucose greater than or equal to 200, or hemoglobin A1C more than 6.5 (9). Smoking was defined as history of consumption in most days or nicotine – dependence (10).

In addition, the prevalence of patients with previous history of myocardial infarction was evaluated according to the information in the records. All patients underwent examinations before surgery and their information was recorded in medical records. Meanwhile, the names of patients and their personal information was kept confidential. The extracted data were entered into Excel software and after calculation, their frequency was shown.

Results

In the evaluation of samples, 53% of the patients were male (244 patients) and 47% of patients were female (216 patients). The mean age of all patients was 61.4 ± 9.72 years old (60.8 ± 10.55 years in men and 62 ± 8.68 years in women) and the mean weight of the patients was 68 ± 12.57 kg (71.1 ± 12.98 in men, and 64.5 ± 11.14 in women). In terms of BMI, the mean of the total BMI was 26.3 ± 4.25 , which were 25.4 ± 3.81 in men and 27.3 ± 4.51 in women (Table 1). The prevalence of blood pressure in the total sample was estimated to be 56.74% (261 people). 25.44% (117 patients) of

patients with high blood pressure were men and 31.30% (144 patients) were women. The prevalence of hyperlipidemia was 32.61% (150 patients), which was 15.43% (71 patients) in men and 17.17% (79 patients) in women. The prevalence of diabetes was 38.91% (179 patients), which was 13.26% (61 patients) in men and 25.65% (118 patients) in women. 31.09% (143 patients) had a history of myocardial infarction in the past (Table 2). Regarding smoking, 12.61% (58 patients) smoked cigarette based on patient's history, all of which were male. The prevalence of continuous or occasional opium use in patients was 8.48% (39 patients), of which 1.74% were women. The mean ejection fraction in the patients was $47.5 \pm 8.43\%$. The intra-hospital mortality rate in this population was 1.3% (6 out of 460 patients), of which 5 were female and 1 was male.

Table 1. The status of other risk factors in the study samples based on gender and according to mean and standard deviation.

Risk factor	Male Mean $\pm$ SD	Female Mean $\pm$ SD	Total Mean $\pm$ SD
Age	60.8 $\pm$ 10.55	62 $\pm$ 8.68	61.4 $\pm$ 9.72
Weight	71.1 $\pm$ 12.98	64.5 $\pm$ 11.14	68 $\pm$ 12.57
Height	167 $\pm$ 7.48	153.9 $\pm$ 11.14	160.8 $\pm$ 9.73
Body Mass Index	25.4 $\pm$ 3.81	27.3 $\pm$ 4.51	26.3 $\pm$ 4.25

Table 2. Prevalence of cardiovascular risk factors in the samples based on gender

Risk factor	Male (%)	Female (%)	Total (%)
High blood pressure	20.43	31.30	56.74
Hyperlipidemia	15.43	17.17	32.61
Diabetes mellitus	13.26	25.65	38.91
History of myocardial infarction	20.00	11.09	31.09
History of smoking	12.61	0.00	12.61

Discussion

In the present study, 91% of patients had at least one of the risk factors. More than 50% of patients had high blood pressure and nearly 40% of them had diabetes. The prevalence of all of these risk factors was higher in women compared to men. Many of the risk factors have been identified following previous studies, among which conventional factors including high blood pressure, hyperlipidemia, diabetes, smoking, and positive family history can be mentioned. The effects of each of them alone or along with other factors have been definitively proven in the incidence of atherosclerosis of coronary arteries or even peripheral arteries (11, 12). Despite several similar studies conducted in this area,

due to the regional differences in epidemiology of diseases as well as habits and lifestyles of people, it is reasonable that the cardiovascular risk factors be assessed separately in each population. Thus, we can educate people, explain prevention methods, screen for patients, and perform therapeutic interventions in patients with regard to the demographic conditions of the very same area.

Yaribeygi et al. reported a high prevalence of risk factors in a similar study on a wide range of patients in Tehran (5). In a study conducted in a hospital in Tabriz on 700 patients undergoing coronary artery bypass grafting, Safaei et al. reported a high prevalence of coronary artery disease risk factors with regard to their age and gender (6). According to the results of Kasliwal et al. in India, the prevalence of typical cardiovascular risk factors including blood pressure, dyslipidemia, and diabetes was high in patients undergoing coronary artery bypass grafting. According to their findings, 95.9% of patients had at least one of the classical risk factors for coronary artery disease (10).

However, relatively different results were obtained in the present study; in terms of the demographic characteristics of the samples, the mean age of the studied patients was higher than the results of previous studies. In addition, contrary to previous studies, in which men had a higher share, gender distribution was almost similar in the present study (47% women and 53% men). Based on the findings of this study, it seems that compared to other studies, the incidence of severe coronary artery disease was higher among women in our study population. It is worth noting that the mean BMI of the samples was higher than the normal range (26.3 ± 3.25), and overweight was more common in women compared to men. Overall, it can be concluded that in the target population of this study, women are at significant risk for severe coronary heart disease that leads to coronary artery bypass graft surgery. Particularly, the high risk factors of HTN, HLP, DM, and BMI are more frequent in women than in men. Therefore, it is logical to have more screening programs to identify these risk factors, especially in women. Preventive approaches based on educational programs to modify the life-style and target-oriented screening of risk factors for timely treatment, are safe and cost-effective methods compared to other diagnostic methods, such as angiography and the EuroSCORE, which can reduce the costs of invasive treatments to some extent. The fact that nearly 9% of patients did not have any conventional risk factors can somewhat reflect the genetic effects and atypical risk factors such as

chronic inflammatory disease, renal failure, metabolic syndrome, homocysteine disorders, etc. in severe cases of coronary artery disease in our study population. Therefore, it is suggested that future studies evaluate the prevalence of these risk factors in cardiac patients.

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