Research Article

Risk factors among young saudi male patients who underwent coronary revascularization (PCI or CABG)

Abstract

Background: Coronary artery disease has shown an increase in the incidence among young population, but the data coronary revascularization either percutaneous coronary intervention (PCI) or CABG in this group of patients are minimal. Our objective of this study was to identify the risk factors in those young Saudi male patients.

Methods: A single center study, we reviewed 890 saudi male patients who underwent cardiac catheterization with or without coronary artery intervention between 2008 and 2013. The data was retrieved retrospectively from their health informatics system. The study cohort was dichotomized into two groups; group (A) 35years and younger, and group (B) 45years and younger. The conventional cardiovascular risk factors were compared between groups.

Results: The total study cohort was 890; the number of patients who underwent PCI was 314 (35%). 35 patients aged < 35years 279 patients aged < 45years. The prevalence of the traditional cardiovascular risk factors; hypertension 253 (28%), diabetes mellitus 277 (31%), dyslipidemia 311(35%), obesity305 (34%) and smoking 530 (60%) respectively. Family history of coronary artery disease as a non-modifiable cardiovascular risk factor was presented in 104 (12%). Comparing the two groups; Group (A) <35years and Group (B) <45years; hypertension and diabetes were significantly higher among older group (p-value <0.001).

Conclusion: Male Patients age < 45years represented the majority of the cases underwent percutaneous coronary revascularization (PCI) and this could be related to higher risk factors like smoking, dyslipidemia and obesity in this group, therefore establishing an earlier risk factors modification program is essential in our society.

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Abbreviations: CAD, myocardial infarction coronary artery disease; HDL, high-density lipoprotein; PCI, percutaneous coronary intervention; CABG, coronary artery bypass graft; CCU, coronary care unit; STEMI, S-T elevation

Introduction

Coronary Artery Disease (CAD) is a global burden on health system, and used to be the disease of western countries, but in the last years it is becoming a worldwide disease involving all countries. The incidence of symptomatic CAD and myocardial infarction which can leads to death in young adults is low; majority of trials show about 3% of all CAD cases happen within this age group.[1] The manifestation of CAD in younger patients is quite uncommon, When a repeated intracoronary ultrasound-related investigation was carried out in a series study of recent heart transplants (average donor age 33.4 ± 13.2years) by Tuzcu et al.,[2] the prevalence of CAD was more than half, with one in six teenagers showing coronary atherosclerosis. Isolated risk factors were found in younger patients regarding CAD. Although noticeably high levels of cholesterol, LDL, and TG were seen in some young CAD patients, few studies have evaluated lipid profiles in those patients. Isser et al.,[3] showed substantial increase in TGs and lipoprotein (a) (Lpª) levels and a decrease in high-density lipoprotein (HDL) cholesterol in young patients coming with a first episode of MI.

Our national data regarding CAD was seen in The Saudi Study CADISS which was one of the major studies in the kingdom of Saudi arabia and was conducted by King Saud University group

showing the prevalence of CAD in urban and rural areas. The overall prevalence of CAD in KSA is 5.5%, in males and females were 6.6% and 4.4%. Significant risk factors in KSA include: male gender, age, current smoking, fasting blood glucose, body mass index (BMI), hypertension, fasting cholesterol and triglycerides.[4]

Studying the risk factors of CAD in young male Saudi patients who underwent coronary angiography has not been shown yet. Which is why we are interested to identify in addition to classic risk factors, the rare and isolated risk factors of CAD in young male adults aged 45 and below, according to their presentations to the hospital and to the morphology of their disease by angiogram. Identifying the important risk factors in our population would be important in order to improve the outcomes of our young generations.

Methods

Aims

The primary aim of this study is to identify the risk factors of coronary disease among young male Saudi patients who underwent coronary angiography and revascularization therapy either PCI or CABG.

The setting and protocol

This was a retrospective study which included 980 patients between 18-45years who had been referred to the cardiac catheterization unit. These patients underwent a clinically indicated diagnostic cardiac catheterization with or without coronary artery intervention between 2008 and 2013. Patients were obtain to sign an informed consent

before procedure. All the data had been extracted with the King Abdullah International Medical Research Centre (KAIMRC) ethical committee approval.

Patients younger than 18 and older than 45, or had a congenital heart disease, or familial hyperlipidaemia, were excluded from the study. Hospital medical records were reviewed at the time of the angiography for modifiable cardiovascular risk factors (hypertension, diabetes, dyslipidemia and smoking) and other non-modifiable risk factors (age, gender and family history of risk factors).

Hypertension was reported if the patient found to be hypertensive on the health information system or on any antihypertensive medication. Diabetes mellitus patients were defined as those with a history of diabetes or using any anti-hyperglycaemic agents. Dyslipidemic patients are those in need to receive a lipid lowering medication like statin therapy. Patients who smoking cigarette or quite of smoking for less than a year were considered as smokers, family history of coronary artery disease was considered if the patient had a first degree relative with known history of CAD.

Angiographic analysis

The angiographic analysis was done by an interventional cardiologist who had long time experience in the coronary artery intervention procedures at this center using Xelera system that provided by Philips, to identify obstructive and non-obstructive coronary angiography studies.

Statistical methods

Categorical data were summarized using percentages and Continuous data were reported as mean ± standard deviation. Groups comparisons were made using chi-square test and fisher exact test for categorical data as appropriate and continues data were compared using t-test.

Results

A total of 890 male patients were included in the study and the mean age was 39 ± 5.7. Patients in Group A with age < 35years was 143(16%) vs Group B with age <45years was 747 (84%) and P-value 0.500. The smoking (60%) was the most common risk factor, followed by dyslipidemia (35%), and obesity (34%) in this young male group (Figure 1). Obstructive coronary artery disease was found in 389 patients (44%); 269 (30%) were ST Elevation myocardial Infarction (STEMI) and 120 (13%) were Non-STEMI (Figure 2). STEMI in Group A was in 45 patients (16.7%) vs Group B was 224 patients (83.3%) and P-value was 0.849. Non-STEMI in Group A was in 17 patients (14.2%) vs Group B was 103 patients (83.8%) and P-value 0.600.

The prevalence of patients with a family history of coronary artery disease (CAD) was 104 (12%). Family history was positive in Group A 24 patients (23.1%) vs Group B 80 patients (77%) and P-value was 0.069

The modifiable cardiovascular risk factors like Dyslipidemia, in Group A was 40 patients (13%) vs Group B was 271 patients (87%) and P-value was 0.045.

Hypertention in Group A was 20 patients (8%) vs Group B 233 patients (92%) and P-value was <0.001, (Figure 3). Diabetes Mellitus in Group A was 20 patients (7%) vs Group B 257 patients (93%) and P-value was <0.001, (Figure 3). Smoking in Group A was 84 patients (16%) vs Group B 446 patients (84%) and P-value was 0.680.

The main results of this study was in revascularization therapy either PCI or CABG and we found more and significant difference in PCI mainly in group B which is the patients < 45years old, PCI was done in 35 patients Group A (11%) vs 279 patients Group B (89%) with p- Value = 0.003. The CABG was done in only 1 patient (7%) vs 13 patients (13%) with P-Value =0.488 (Figure 4).
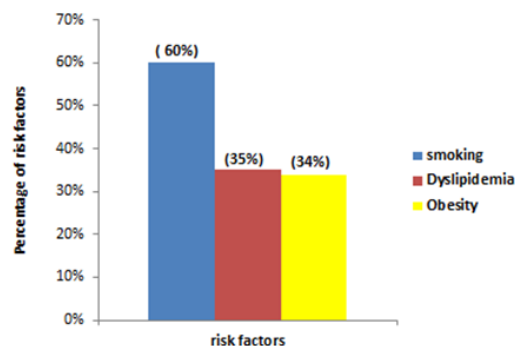

Figure 1 This figure showing percentage of three risk factors among the total number of 890 male patients.
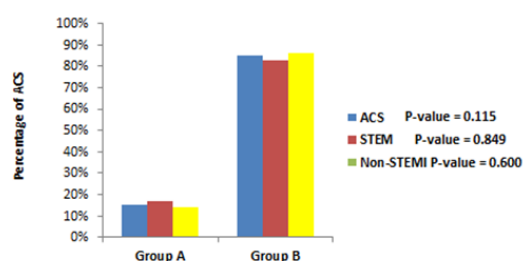

Figure 2 The percentage of ACS including the STEMI and Non-STEMI in both Group A and Group B.
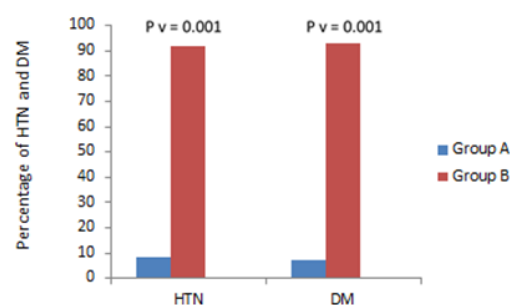

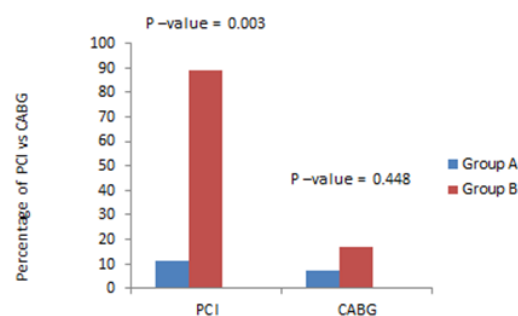**Figure 3** This figure showing a significant difference of HTN and DM between the two age groups.

Figure 4 Showing the percentage of revascularization both PCI and CABG in both age group.

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Discussion

The classification of CAD risk factors into modifiable and non-modifiable is well established. Modifiable risk factors include obesity, diabetes, hypertension, sedentary life style, smoking, and hypercholesterolemia. Non-modifiable include gender, age, and family history. Which may occur alone or may intertwine leading to one another such as obesity leading to hypertension and diabetes. It is well known that,the more risk factors a patient has the higher the possibility of having CAD. One of the commonest worldwide would be Metabolic syndrome; a combination of hypertension, elevated insulin levels, high waist circumference, and high triglyceride levels, this can occur even in the younger age groups <45years and highly increases with age.[5] This study was unique it focused on a young Saudi male patients group < 35-45years old. Due to modern lifestyles and easy accessibility in our country, smoking has become common among the younger population. This might explain the high incidence (60%) of smoking as major risk factors in this age group.

In one of good size study of CT-coronary angiography to predict CAD either with coronary stenosis > 50% or presence atherosclerotic plaque, they found more lesions in young men than women, and they conclude that, male sex was the strongest predictor in this study.[6] Not too far from Saudi Arabia, a study conducted in Kuwait on patients younger than 35years who had coronary angiography,and they found that smoking was the highest predictor of significant CAD in 70% of those young patients.[7] In another study, an analysis of 35 patients out of 2400 patients with a mean age of 32years showed smoking had been the most common risk factor in those young patients and other patients (89%).[8] From India a systematic review of multiple studies. They showed that the main risk factors leading to CAD in all ages were in the following order: smoking, HTN and diabetes.[9] In a GRACE study there was a strong association between cigarette smoking and more ST-elevation MI at early presentation in younger patients with ACS.[10]

The Canadian study from montreal showed that CAD is one of the major reasons for sudden cardiac death in adults, was conducted on autopsies of patients aged above 20 years. This study also revealed that in young patients 30-40years old, obesity and hyperlipidemia were the main risk factors predictors in this particular group of patients.[11] NO need.[12]

Another recent multicenter study from North India showed that there was a significant increase in the lipid blood levels in the younger aged patients < 45years with CAD vs older patients.[12] The traditional Saudi foods are rich in saturated fats we have found that hyperlipidemia (35%) was the second common risk factor among this study group of young male patients, and this could be related to the change of life style in Saudi Arabia and the introduction of western foods. Most studies showed an important link between hyperlipidemia and obesity. Our study also supports the link between the two revealing the incidence of obesity to be (34%) which we also believe is co-related. Prevalence of diabetes in the in general Saudi population was between 28-30% as published in studies previously. In our study the incidence of diabetes mellitus as a risk factor for coronary artery disease was found to be (31%). In addition, prevalence of Hypertension was (28%).

A study done in young metabolic syndrome patients, it was found that CAD and acute coronary syndrome were more severe in those egyptian patients who are known cases of obesity, hyperlipidemia and DM.[13] In a Finns study, high youth LDL-C and systolic HTN showed to be independent risk factors of middle age CAD, showing adolescence risk factor levels play a significant role in the formation of coronary atherosclerosis.[14] Usually insulin-dependent DM patients carry a high risk for CAD, the incidence of diabetes was seen in 15% to 20% of the young patients with CAD.[15]

Recent data suggest high homocysteine and high Lp(a) are independent CAD predictors for young men. In an old study it was found that there was not a difference in the type of CAD when comparing young women to other patients. According to their coronary angiography which were done in 239 women less than 45years of age.[16] Diabetes and hyperlipidemia are common among young CAD patients. These risk factors play big roles in the pathogenesis of CAD and their powerful influence to quicken the progression of atherosclerosis is well documented in the literature.[17]

A study in Framingham, Massachusetts concluded that total cholesterol, blood pressure, and LDL cholesterol are predictors for CHD in the middle-aged white population.[18] In addition to the previous predictors, old age, male sex, low HDL-C, diabetes are associated with altered CHD events in patients with low LDL-C, according to MESA (Multi-Ethnic Study of Atherosclerosis) by the American College of Cardiology Foundation.[19] The lowest risk factor among the patients studied was having family history of CAD which accounted for (12%) of the population studied. This indicates that in our society CAD in younger age less than 45 is not a familial disease and it is mainly related to male gender and life style habits such as smoking.

Conclusion and recommendations

Male Patients age < 45years represented the majority of the cases underwent percutaneous coronary revascularization (PCI) and this could be related to higher risk factors like smoking, dyslipidemia and obesity in this group, therefore establishing an earlier risk factors modification program is essential in our society.

Study limitation

This study was a single center study, and patient numbers and samples are medium-sized compared with international centers.

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Conflicts of interest

Author declares there are no conflicts of interest.

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