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Assessment of risk factor profile in young patients undergoing elective coronary artery bypass grafting surgery in Armed Forces Institute of Cardiology/National Institute of Heart Disease, a tertiary care cardiac facility

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Abstract

Objective: To identify modifiable and non-modifiable risk factors among young patients undergoing elective coronary artery bypass graft surgery.

Methods: The descriptive cross-sectional study was conducted at the Department of Adult Cardiac Surgery of the Armed Forces Institute of Cardiology and National Institute of Heart Disease, Rawalpindi, Pakistan, from January 1, 2015, to April 24, 2018, and comprised patients who underwent elective coronary artery bypass grafting. Data was collected using a predesigned questionnaire, and the risk factors studied were hypertension, diabetes, smoking, serum cholesterol, family history and body mass index. Data was analysed using SPSS 23.

Results: Of the 1270 patients, 838(66.1%) were males and 432(33.9%) were females. The overall mean age was 39.29±8.64 years (range: 18-49 years). Of the total, 319(25.2%) patients were hypertensive; 170(13.3%) were diabetics; 303(23.9%) had history of smoking.

Conclusion: There was a high prevalence of hypertension, smoking and obesity in the patients undergoing coronary artery bypass graft surgery at age <50 years.

Key Words: Coronary artery disease, Risk factors, Young patients.

Introduction

The incidence of coronary artery disease (CAD) at age <45 years is characterised as young CAD[1]. However, numerous studies have deliberated the age limit varying from 35 years to 55 years in the spectrum of young CAD[2-4]. This field of cardiology has acquired significance recently due to higher prevalence in this age group over the last few decades, with fluctuating risk factor profiles and alteration in prognosis as well as longevity after an acute coronary episode.

Prevalence of conventional risk factors like hypertension (HTN), diabetes mellitus (DM), smoking, dyslipidemia and obesity accounts for about 85% to 90% of premature CAD patients. Often young CAD patients have multiple concomitant risk factors contributing to the disease[5,6]. The most common risk factor associated with young CAD seems to be smoking. The prevalence of smoking in individuals aged <45 years, with CAD, was documented as 60-90% compared to 24-56% in individuals aged >45 years[7]. Smoking in the presence of additional risk factors, like DM, HTN and obesity, predisposes a young individual to increased risk of future acute coronary events[7, 8].

The current study was planned to identify modifiable and non-modifiable risk factors among young patients undergoing elective coronary artery bypass graft (CABG) surgery.

Patients and Methods

The descriptive cross-sectional study was conducted at the Armed Forces Institute Of Cardiology and the National Institute of Heart Diseases (AFUIC-NIHD) from January 1, 2015, to April 24, 2018, and comprised patients aged 18-49 years who underwent elective CABG. After approval from the institutional ethical review board, the sample size was calculated with 29% prevalence noted in statistics[9]. To increase the validity of results the sample size was increased over four-fold. Patients who had undergone emergency CABG were excluded. A questionnaire was designed to collect data from the patients that included history and biochemical markers.

HTN, DM, smoking, serum cholesterol, family history of cardiovascular disease, and body mass index (BMI) were studied as the risk factors in patients. HTN was defined as systolic blood pressure (SBP) >140mmHg and diastolic blood pressure (DBP) 90mmHg, as per the World health Organisation (WHO) criteria[10] and was further categorizzed into two groups controlled with medication and uncontrolled HTN. DM was defined as random blood glucose (RBG) ≥200mg/dl or fasting blood glucose (FBG) ≥126mg/dl[11]. Diabetics were divided into three sub-groups: those on oral therapy, on insulin, and patients whose diabetes was controlled by diet. On the basis of smoking history, the subjects were classified into three categories; current smokers, past smokers who had given up smoking >8 weeks ago, and non-smokers who had never smoked. Serum cholesterol level was divided into three ranges; normal, >200 and level >300. Patients were asked about their family history regarding CAD. Body mass index (BMI) was calculated by dividing the patients' weight (in kg) by the patients' height squared (in m^2). BMI values were categorized into normal (18.5-24.9kg/m^2), underweight (<18.5kg/m^2), overweight (25-29.9kg/m^2) and obese (≥30kg/m^2).

Data was analysed using SPSS 23. Continuous variables were expressed as mean ± standard deviation (SD) and qualitative variables were expressed as frequencies and percentages.

Results

Of the 1270 patients, 838(66.1%) were males and 432(33.9%) were females. The overall mean age was 39.29±8.64 years. Of the total, 319(25.2%) patients were hypertensive, 170(13.3%) were diabetics and 303(23.9%) had history of smoking. The cholesterol level was recorded for 129(%) patients, and the mean level was 160±45.9. of these patients, 21(16.2%) had it >200mg/dl. Family history of cardiovascular disease was known in 221(17.4%) patients and 6(0.5%) had no knowledge about family history. The mean weight was 67.53±15.24kg, the mean height was 165.21±11.04cm, and the mean BMI was 24.66±5.36 kg/m^2. Overall, 158(12.5%) patients were obese (Table).

Discussion

The current study looked into six risk factors for ischemic heart disease (IHD) in patients aged 49 years and younger. IHD was more prevalent among the males. The most common factor present in the study population was a raised BMI, followed by HTN, smoking, family history and DM. DM was the least common risk factor.

Conventionally, coronary heart disease is considered a disease of the male gender, but it is becoming common in women and a higher prevalence of HTN, DM and obesity in older women has led to an increase in the number of women suffering from coronary heart disease[12]. Smoking and lipid abnormalities in women also play a major role[12]. IHD is the most common cause of death among women in western countries[13]. Another study showed that heart disease develops 7-10 years later in women than in men[14].

In the current study, 25.2% patients suffered from HTN. A study in India stated 70.9% hypertensives[15]. A study in Iran on CAD patients aged <45 years showed 37% HTN[16]. In a Karachi–based CAD analysis, only 19% patients were hypertensive[17] which was lower than our findings.

The current study had 13.3% diabetics A study showed DM incidence of 10% in CAD patients aged <40 years[18]. A study in India reported a higher DM prevalence of 47.5%, but the mean age of patients in that study was 59.73 years[15]. In Iran, it was 27%[16], and in Karachi it was 15.4%[17].In the current study, 23.9% patients were smokers compared to 58.7% reported earlier[1]. Foroughi M et al. documented 54% prevalence among Iranians[16]. The prevalence of smoking in young CAD patients was 92% in another study and smoking was more common among younger patients[19]. In a study done on risk factors for premature CAD, the prevalence of smoking was higher in patients aged <40 years (58.7%) compared to tose aged >90 years (43%)[20].

As for hyperlipidemia, it was 17.7% in the current study compared to 39% in Iranian patients[16]. A study in Seattle reported that31% patients <90 years had hyperlipidemia, and the lipid abnormalities were more common among males <40 and females <50 years[21].

In the current study, 17.4% patients had a family history of cardiovascular disease, whereas it was 38% in Iran[16] and 39% in a study done in London. Positive family history has been reported to be more common among young men[16,22]. Christus T et al. documented a positive family history of CAD among younger patients (39%) compared to older patients (11%)[4].

Mean BMI in the study was 24.9912+5.39kg/m^2 whereas it was 28+4.7 kg/m in Iran[16]. Raised BMI was the most prevalent (44.8%) risk factor in our study in which 32.3% patients were overweight and 12.5% were obese, with (9.1% having class 1 obesity, 2.1% class 2 and 1.3% had class 3 obesity. In a study in Karachi, 24% subjects were obese[17].

The current study has limitations. It was done at a single centre and the cholesterol levels were recorded for only a portion of the sample. Also, the study population was limited to elective patients only, and majority belonged to a poor socioeconomic background and mainly uneducated. Thus, they were unsure of their family history.

To calculate the true incidence and prevalence of these risk factors, future studies are required to evaluate the epidemiological transition toward a rising trend of CAD in young population and to guide evidence-based practices in prevention and screening of high-risk individuals.

Conclusion

There was a high prevalence of HTN as well as modifiable risk factors, like smoking and obesity, in patients aged <50 year undergoing CABG surgery.

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226 **Table: Demographic characteristics N= 1270**

S. No	Characteristic	Percentage
1	Hypertension • Controlled (medication) • Uncontrolled	25.2% 24.6% 0.6%
2	Diabetes • Oral Therapy • Insulin • Dietary Control	13.3% 10.2% 2.4% 0.8%
3	Smoking • Current smokers • Past smokers	23.9% 8.7% 15.1%
4	Cholesterol • Normal • Above normal • >200 • >300	 82.3% 17.7% 16.27% 1.55%
5	Family History of Coronary Artery Disease • Known • Unknown	 17.4% 82.6%
6	Weight	67.53±15.24
7	Height	165.21±11.04
8	Body Mass Index (BMI) • Underweight • Normal • Overweight • Obese	 10.6% 44.6% 32.3% 12.5%

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