

Original Article

Risk factor assessment of young patients with acute myocardial infarction

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Abstract: The Middle East represents an attractive area for young individuals to seek employment, where they are exposed to numerous environmental conditions. The pursuit of a better standard of living has driven hundreds to the Middle East over the recent decades. This influx has also resulted in a predisposition to premature coronary artery disease (CAD). The aim of this study was to provide an overview of the risk factors in patients younger than 45 years, presenting with acute myocardial infarction (AMI). Out of the 148 patients analyzed, 137 were males and 11 females. 119 were from South Asia and 29 were Arabs. Their mean age was 36 ± 4.2 years. Smoking was the most prevalent risk factor in both groups at 67.6%. This was followed by hypertension, family history of CAD, hyperlipidemia and Diabetes mellitus. There was no significant difference in the clinical risk factor profile between these two groups. ST elevation myocardial infarction (STEMI) was noted in 67.6%, while 32.4% patients suffered a Non ST elevation myocardial infarction (NSTEMI). 84.5% received coronary stents, 8.8% had lone thrombus aspiration or balloon angioplasty only, while the rest were treated by conservative medical management or referred for coronary artery bypass surgery. Conclusion: There is no significant difference in the CAD risk profile between young South Asian and Arab patients. Preventive strategies focused on risk factor reduction, especially smoking cessation, should be implemented to protect young adults in the most productive years of their life.

Keywords: Young patients, acute myocardial infarction, smoking

Introduction

CAD is the leading cause of death in the western world [1, 2]. Advancing age is a well-recognized risk factor for acute myocardial infarction (AMI). Studies show a 2 to 10% incidence of AMI in patients age 45 years or younger [3-7, 10]. Compared to older patients the reported incidence of MI is 8 times lower in younger population. The protection offered by young age is slowly being taken away by increased prevalence of risk factors for CHD in the adolescents [9]. In search of livelihood the Middle East attracts young people from all over the globe. Different socio-economic and environmental conditions may predispose them to increased risk of coronary artery disease (CAD). Ignorance of CAD and false sense of security attributable to young age prevents them from seeking medical advice. Rather than stable or worsening

angina, as seen in older patients, the first onset of angina rapidly progresses to fully evolved myocardial infarction (MI) in young patients. The vast majority of young patients deny history of chest pain prior to MI. It is clear that the prevalence is bound to increase. Early recognition and risk factor modification in this population sub-set is of key importance. These patients have different risk profile, presentation, and prognosis. The lack of published literature in young immigrant population regarding CAD is the basis for our review. This information will help guide physicians for better identifying and targeting primary and secondary preventative therapies.

Materials and methods

173 patients younger than 45 years of age had cardiac catheterization at Tawam hospital over

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Table 1. Clinical Variables

	Asian N = 119	Arab N = 29	All patients N = 148
Age: Mean (SD)	36.3 (4.3 SD)	35.2 (4.4 SD)	36.04 (4.2 SD)
Gender: n (%)			
Male			137 (92.6)
Female			11 (7.4%)
Male/Female	111/8	26/3	137/11 (92.6/7.4%)
Female	8	3	11 (7.4%)
STEMI	81 (68.1%)	19 (65.5%)	100 (67.6%)
NSTEMI	38 (31.9%)	10 (34.5%)	48 (32.4%)
Diabetes	27 (22.7%)	4 (13.8%)	31 (20.9%)
Hypertension	36 (30.3%)	8 (27.6%)	44 (29.7%)
Hyperlipidemia	22 (18.5%)	11 (37.9%)	33 (22.3%)
Smoking	80 (67.2%)	16 (57.1%)	96 (67.6%)
Family history	27 (23.5%)	7 (25.9%)	34 (23.9%)
Body Mass Index	30.29 (8.48 SD)	32.08 (8.98 SD)	30.93 (8.36 SD)

Table 2. Laboratory Results

	Mean (Standard Deviation)
Hemoglobin	14.43 (1.22)
Platelets	295.86 (86.12)
Creatinine	71.36 (12.59)
Urea	3.86 (1.51)
Total Cholesterol	4.79 (1.7)
LDL Cholesterol	3.14 (1.51)
Triglycerides	2.21 (1.57)
Peak CPK	1526.71 (2201)
Peak CPK-MB	172.71 (256.36)
Peak Troponin I	53.14 (87.23)

a two-year period. Only patients from South Asian and Arab origin and with angiographically proven coronary artery disease were included in our study. Medical records were analyzed for the patient's CAD risk factor profile i.e. history of diabetes, hypertension, hyperlipidemia, family history and smoking. Details of the coronary angiogram, laboratory investigations, and metabolic and cardiac biomarkers were reviewed.

Results

Baseline characteristics

Baseline characteristics and laboratory investigations are shown in **Table 1**. The Median age was 36.4 ± SD of 4.2 years. 92.6% were male patients, 7.4% female. 80.4% patients were South Asian, while 19.6% were Arabs. 48% of the Arabs were Emiratis. 67.6% of the whole group was smokers, 29.7% had hypertension, and 23.9% had family history of coronary artery

disease. Hyperlipidemia was noted in 22.3% and diabetes in 20.9% of patients. The average Body mass Index of the group was 30.39 kg/m². The majority of patients had STEMI, accounting for 67.6% of the total, while the rest 32.4% suffered from NSTEMI.

Clinical variables are summarized in **Table 1**. The laboratory results are shown in **Table 2**. The mean complete blood count, kidney function tests were normal, with a slightly elevated lipid profile. Peak CPK and Troponin I was elevated due to the myocardial infarction.

Table 3 shows the vessel involved and type of treatment received. Single vessel disease was noted in 85.1% of the patients, two vessels in 11.5% and three-vessel disease was seen in 3.4% patients. The Left anterior descending artery was the most common single vessel involved at 48% followed the right coronary involved 18.2% of the time and Left circumflex artery 17.6%. 42.6% patient's received drug eluting stents, 41.9% received bare metal stents, and while 8.8% had either lone thrombus aspiration or balloon angioplasty only. Conservative medical management and coronary artery bypass surgery was recommended for 4.1% and 2.7% patients respectively.

Discussion

Studies have shown substantial differences in risk factors, management and outcomes of myocardial infarction among young and old patients [10]. Compared to healthy, age matched control subjects, young patients with myocardial infarction have a higher percentage of smoking, and other coronary artery disease risk factors [11-14]. This has not been yet addressed in the young immigrant population of UAE.

Stable angina and multivessel disease is uncommon in the young [15]. The first onset of angina in the young rapidly progresses to fully

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Table 3. Vessel Involved and treatment

	Asian N = 119	Arab N=29	All patients N = 148
Left Anterior Descending	57 (47.9%)	14 (48.3%)	71 (48%)
Right Coronary Artery	23 (19.3%)	4 (13.8%)	27 (18.2%)
Left Circumflex	19 (16%)	7 (24.1%)	26 (17.6 %)
Left Main	2 (1.7%)	0 (0%)	2 (1.4%)
2 Vessel	13 (9.9%)	4 (13.8%)	17 (14.9%)
Three Vessel	5 (4.2%)	0 (0%)	5 (3.4%)
DES	42 (35.3%)	21 (72.4%)	63 (42.6%)
BMS	55 (46.2%)	7 (24.1%)	62 (41.9%)
Thrombus aspiration only	12 (10.1%)	0 (0%)	12 (8.1%)
Medical management	5 (4.2%)	1 (3.4%)	6 (4.1%)
Coronary artery bypass surgery	4 (3.4%)	0 (0%)	4 (2.7%)
Balloon angioplasty only	1 (0.8%)	0 (0%)	1 (0.7%)

evolved MI [16]. Up to one third of the young patients deny history of chest pain prior to MI [17]. In Contrast, older patients usually have multivessel disease [12, 18-23]. The Long-term prognosis of patients depends upon the number of diseased vessels, and the degree of LV dysfunction [24-26]. Our study was in line, showing the majority having first episode of acute coronary syndrome without prior symptoms and 85% had single vessel disease. The lack of warning signs stresses the need for primary preventative measures. Contradictory data exists in literature regarding the frequency of coronary artery involved in AMI in young individuals [18, 19, 27-29]. Our study shows the left anterior descending to be involved 48% of time, followed by and equal RCA and LCx involvement at approximately 18%.

Smoking is traditionally recognized as the most common risk factor for heart disease and is associated with MI at young age [20, 29]. In patients with PCI proven CHD the prevalence of smoking is higher among patients younger than age 45 compared to over 60 (58.7 vs. 43%) [30]. History of smoking is has been reported in 73% to 90% of young patients with MI [11-13, 19-21, 28, 29]. The high incidence of smoking noted in our patients was 68%. It was equally high in the South Asian and Arab patients. Our data and others [32] support the need of promoting smoking prevention programs in the young population.

Oral contraceptives in combination with smoking have been associated with MI in young women [33, 34]. Fortunately compared to the

west, where smoking in girls has been shown to be more prevalent and persistent (they smoker for longer time) reaching up to 9% [35], there was no history of cigarette smoking in our female patients.

Metabolic syndrome and insulin resistance is found in two thirds of the young patients with MI [36]. Obesity is on the rise worldwide with a threefold increase in UK in the past two decades

[35, 37, 38]. Lipid abnormalities, insulin resistance and obesity are more common in patients with family history of premature CHD [39]. Our patient population somewhat differs, many of these young people are physically active by virtue of their professions of being manual laborers. The average BMI at 30.1 kg/m² does not seem to be the major contributing factor to the MI. In patients with known CAD, studies have shown an inconsistent incidence of hyperlipidemia and hyper-triglyceridemia in young vs. older patients [20, 21, 31, 34, 40]. Our study showed 30% patients were hypertensive, 22% had hyperlipidemia and 21% were diabetics.

Compared to normal subjects, family history of cad is prevalent patients with known CAD [20, 31]. This finding is inconsistent, as other studies do not find the same association [12, 19]. In a study by Zimmerman et al, family history of CAD was more common only in young men [40], while in young patients with MI, positive family history of premature coronary artery disease was found in 39% participants [15]. Family history of cad was noted in 24% of our patient population. This is somewhat equal to generally found in normal population.

Conclusion

MI at youthful (early) age raises the disconcerting/alarming/disturbing potential of malignant atherosclerosis disease and subsequent adverse prognosis. It has devastating effects on patients, their families and community at large. Risk factor modification is a challenging task in young patients. A particular challenge

that remains for the health care worker is the high/alarming incidence of smoking noted in our young patients. Smoking is traditionally recognized as the most common risk factor for heart disease. Preventive educational programs along side with smoking cessation clinics need to be established. Smoking cessation, diabetic and cholesterol education should be a priority of the medical community. If not treated appropriately, long-term mortality may reach 30%. The limitation for the current study is that this is a retrospective study.

Disclosure of conflict of interest

None.

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