Acute Myocardial Infarction in Baghdad: Admission Rate and Risk Factors

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ABSTRACT

Background: The incidence of acute myocardial infarction (AMI) among young population in Iraq has increased in last decades causing great burden on national health system.
Objectives: To estimate the admission rate of young age acute myocardial infarction (45 years and less) among AMI patients admitted to coronary care unit in Iraq and to identify the common risk factors related to young age acute myocardial infarction.
Methods: This study was a hospital based, inpatient study conducted in coronary care unit (CCU) of Ibn Al-Nafees Hospital in Baghdad between 1st of July, 2017 to the 31st of December, 2017 on sample of 100 patients with acute myocardial infarction. The acute myocardial infarction was defined according to the criteria of American college of cardiology foundation and American heart association.
Results: Admission rate of AMI among patients admitted to CCU with acute myocardial infarction was 39%. The significant risk factors related to acute myocardial infarction in young patients were male gender, singles, smoking and family history of coronary artery disease.
Conclusions: The occurrence of acute myocardial infarction among young adults was high and smoking was the most prominent risk factor.
Keywords: Acute myocardial infarction, smoking, ECG, Echocardiograph, CCU.

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The coronary artery disease (CAD) is the common cause of morbidities and mortalities all over the world. The classical presentation of CAD occurs commonly among elderly age population. Currently, CAD incidence is increased among young age population with range of 4-10% detected in age of less than 45 years[1]. The incidence of acute myocardial infarction (AMI) in young population (<55 years) is 51.1/1000 in men and 7.4/1000 in women[2]. In Iraq, a study was conducted in 1990 observed 37% total occlusion and 14% severe stenosis of coronary artery among Iraqi men aged 40 years and less[3]. Effect of genetic factors are not implicated on occurrence of MI among young age Iraqi patients while modifiable risk factors like smoking, dyslipidemia and diabetes mellitus are the main risk factors for early ST elevation myocardial infarction (STEMI) in Iraq[4].

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About two-thirds of myocardial infarction (MI) cases among young age population is presenting with non-ST elevation myocardial infarction (NSTEMI) while the remaining third is presenting with STEMI[5]. There is a decline in incidence of STEMI among young age patients but the rate of NSTEMI diagnosis is increasing due to development of diagnostic technology[2]. Unfortunately, the MI in young age patients is commonly accompanied with serious outcomes due to massive damage caused by its abrupt occurrence and absence of collateral coronary circulation[6].

MI management has not changed regarding age groups and the national therapeutic guidelines are used for both young and old age patients[7,8]. The primary angioplasty has a relative effectiveness for young AMI patients than thrombolysis[9], despite finding that young age of patients is regarded as an independent prognostic factor for thrombolysis success[10]. The short-term prognosis is generally good for young age AMI patients. The short-term

mortality is reported between 0.7-3.1%[11], in comparison to 8.3-12% short term mortality rate among elderly age AMI patients[11]. However, the seven-year mortality rate of young age patients with AMI is reaching to 15% and sometimes more in western countries with an alarming drop in survival to reach mortality rates between 25-29% for fifteen years after early AMI[2,12].

Urbanization of lifestyles, higher prevalence of obesity and non-communicable diseases like diabetes mellitus and hypertension in addition to increased smoking behavior among young age population due poor tobacco control policies in Iraq lead to evolving increase in incidence of AMI among young age population[13]. This study aimed to estimate the admission rate of young age MI (45 years and less) among AMI patients admitted to coronary care unit in Iraq and to identify the common risk factors related to young age AMI.

Methods

The present study was a hospital based, in-patient study conducted in coronary care unit (CCU) of Ibn Al-Nafees Hospital in Baghdad between 1st of July, 2017 to the 31st of December, 2017. All patients with acute myocardial infarction admitted to the CCU of the hospital were the study population. Inclusion criteria were adult age patients (> 18 years) with positive diagnostic criteria of AMI like symptoms, electrocardiogram (ECG) changes specifically ST elevation MI, non-ST elevation MI (NSTEMI) and pathological Q wave in ECG. Patients with stable angina, old cases of MI, deteriorated health status and refuse to participate were excluded from the study. A consecutive sample of 100 patients with AMI was selected after eligibility to inclusion and exclusion criteria. An approval for study was taken from the Ethical Committee of Al-Rusafa Health Directorate and an oral informed consent was taken from each patient before enrolled in the study in addition to the researchers' responsibility for maintenance of patients' management accordingly.

Data were collected by the researcher using a prepared questionnaire. The acute myocardial infarction was defined according to the criteria of American College of Cardiology Foundation (ACCF) and American Heart Association (AHA) depending on symptoms, ECG changes and cardiac biomarkers[14]. The selected patients were examined carefully in CCU by the researcher and confirming AMI diagnosis after interpretation of chest x-ray, ECG and echocardiography findings. The collected sociodemographic characteristics of patients were age, gender, occupation and marital status. Risk factors studied were hypertension (HT), diabetes mellitus (DM), smoking, hyperlipidemia, history of previous coronary artery disease and family history of coronary artery disease. The HT was considered positive if systolic blood pressure >140 mmHg and/or diastolic blood pressure >90 mm Hg. The DM was considered positive with previous confirmed diagnosis of physician with anti-diabetic treatment or fasting blood glucose >120 mg/dl. The smoking was categorized into non-smoker, current (at least one cigarette per day) or ex-smoker (at least one year after quitting). Hyperlipidemia was considered positive when serum cholesterol above 200 mg/dl or taking anti-lipid agents advised by physician.

The statistical analysis was conducted by using Statistical Package for Social Sciences (SPSS) version 22. Multiple contingency tables were performed. Chi-square test or fishers exact test were used to compare between categorical variable. The level of significance was ≤0.05.

Results

One hundred AMI patients were enrolled with mean age of 37.9±14.5 years, 39% of patients were ≤45 years age and 61% of them were >45 years age. Males were more than females (88% vs. 12%). Public servants AMI patients were predominant (70%) and majority of patients were married (92%). Distribution of risk factors was HT

(33%), DM (43%), current smoking (50%), hyperlipidemia (11%), history of CAD (8%) and family history of CAD (5%), (Table 1).

The common ECG findings for AMI patients were anterior wall ST elevation (52.9%), inferior wall ST elevation (22%), anterioseptal ST elevation (8.1%), etc. The common echocardiography findings for AMI patients were anterior wall hypokinesia (48%), anterioseptal hypokinesia (19%), inferior wall hypokinesia (13%), apical wall hypokinesia (10%), etc. (Table 2).

There was a significant association between age of AMI patients and male gender (p=0.02). No significant differences were observed between young and old age AMI patients regarding occupation and history of CAD. The single marital status was significantly associated with young AMI patients (p=0.01). The HT, DM and hyperlipidemia were significantly associated with old age AMI patients ($p = 0.003$, $p = 0.005$, $p = 0.005$, respectively). Current smoking and family history of CAD were significantly associated with young age AMI ($p < 0.001$, $p = 0.004$, respectively), (Table 3).

There was a significant association between anterioseptal ST elevation ECG changes and young AMI patients (p=0.004), for old age AMI patients, anterior wall ST elevation was prevalent. The significant echocardiography findings accompanied young age AMI patients were apical and septal wall hypokinesia, while old age were accompanied with anterior and inferior wall hypokinesia (p<0.001), (Table 4).

Table 1: General characteristics of AMI patients (n=100).

Variable	No. (%)
Age (mean ±SD=37.9±14.5 years)	
≤45 years	39 (39.0)
>45 years	61 (61.0)
Gender	
Male	88 (88.0)
Female	12 (12.0)
Occupation	
Unemployed	9 (9.0)
Public servant	70 (70.0)
Self-employed	21 (21.0)
Marital status	
Married	92 (92.0)
Single	4 (4.0)
Divorced/Widow	4 (4.0)
Positive HT	33 (33.0)
Positive DM	43 (43.0)
Smoking	
None	37 (37.0)
Current	50 (50.0)
Ex	13 (13.0)
Positive hyperlipidemia	11 (11.0)
Positive history of coronary artery disease	8 (8.0)
Positive family history of coronary artery disease	5 (5.0)

Table 2: ECG and echocardiography findings of AMI patients (n=100).

Variable	No. (%)
ECG	
Inferior wall MI	30 (22.0)
Anterioseptal ST elevation	11 (8.1)
Anteirolateral ST elevation	6 (4.4)
Anterior wall ST elevation	72 (52.9)
RBBB	3 (2.3)
LBBB	2 (1.4)
Inferioanterior ST elevation	3 (2.3)
ST depression in precordial leads	5 (3.7)
T inversion in precordial leads	4 (2.9)
Echocardiography	
Inferior wall hypokinesia	13 (13.0)
Anterior wall hypokinesia	48 (48.0)
Apical wall hypokinesia	10 (10.0)
Septal wall hypokinesia	5 (5.0)
Anterioseptal hypokinesia	19 (19.0)
Global hypokinesia	1 (1.0)
Inferioposterior hypokinesia	4 (1.0

Table 3: Distribution of general characteristics according to young and old AMI patients.

Variable	≤45 years	>45 years	P
	No. (%) (n=39)	No. (%) (n=61)	
Gender			**0.02*** S
Male	38 (97.4)	50 (82.0)	
Female	1 (2.6)	11 (18.0)	
Occupation			0.1* NS
Unemployed	1 (2.6)	8 (13.1)	
Public servant	29 (64.4)	41 (67.2)	
Self employed	9 (23.0)	12 (19.7)	
Marital status			**0.01*** S
Married	35 (89.8)	57 (93.5)	
Single	4 (10.2)	0 (-)	
Divorced/Widow	0 (-)	4 (6.5)	
Positive HT	8 (20.5)	25 (41.0)	**0.03**** S
Positive DM	10 (25.6)	33 (54.1)	**0.005**** S
Smoking			**<0.001**** S
None	9 (23.1)	28 (45.9)	
Current	29 (74.3)	21 (34.4)	
Ex	1 (2.6)	12 (19.7)	
Positive hyperlipidemia	0 (-)	11 (18.0)	**0.005*** S
Positive history of CAD	3 (7.7)	5 (8.2)	0.9* NS
Positive family history of CAD	5 (12.8)	0 (-)	**0.004*** S

** Fishers exact test, ** Chi-square test, S=Significant, NS=Not significant.*

Table 4: Distribution of ECG and echocardiography findings according to young and old AMI patients.

Variable	≤45 years	>45 years	P
	No. (%) (n=39)	No. (%) (n=61)	
ECG findings			**0.004*** S
Inferior wall MI	12 (21.8)	13 (17.2)	
Anterioseptal ST elevation	10 (18.2)	1 (1.3)	
Anteirolat. ST elevation	4 (7.4)	2 (2.6)	
Anterior ST elevation	22 (40.0)	50 (65.9)	
RBBB	2 (3.6)	1 (1.3)	
LBBB	1 (1.8)	1 (1.3)	
Inferioanterior ST elevation	2 (3.6)	1 (1.3)	
ST depression in precordial leads	1 (1.8)	4 (5.2)	
T inversion in precordial leads	1 (1.8)	3 (3.9)	
Echocardiography findings			**<0.001*** S
Inferior wall hypokinesia	6 (15.4)	7 (11.5)	
Anterior wall hypokinesia	15 (38.5)	33 (54.1)	
Apical wall hypokinesia	9 (23.1)	1 (1.6)	
Septal wall hypokinesia	5 (12.8)	0 (-)	
Anterioseptal hypokinesia	3 (7.7)	16 (26.2)	
Global hypokinesia	1 (2.6)	0 (-)	
Inferioposterior hypokinesia	0 (-)	6 (6.6)	

** Fishers exact test, S=Significant.*

Discussion

Since the second half of last century, there was an epidemiological transition in Iraq with increase incidence of non-communicable diseases specifically heart diseases to become the first cause of death[15]. The acute myocardial infarction represented the main cause of morbidity and mortality in Iraqi hospitals[16].

Current study showed that 39% of patients admitted to CCU were young (≤45 years). This finding is close to results of Chaudhary et al[17] study in India which found that 40.5% of patients with AMI were young in age. However, our study finding is higher than that reported by Mohammad et al [1] study in Iraq of 31% with premature coronary artery diseases in young age. Admission rate of 39% for young AMI by present study is higher than young age admission rate of 6.8% found by Morillas et al [18] study in Spain. This higher rate of present study might be due to fact that it was single center study in addition to higher prevalence risk factors for AMI among young age population of Iraqi community.

Present study revealed that the significant risk factors for AMI among young patients were male gender (0.02), singles (p<0.001), smoking (p<0.001) and family history of CAD (p=0.004). These findings are consistent with many previous literatures[2,19,20]. Nafakhi study in Iraq[21] and Al-Khadra study in Saudi Arabia[22] documented that tobacco smoking as the main risk factor for AMI in young age patients. Inconsistently, Mirza et al[13] study in Iraq reported that smoking is important risk factor for young AMI patients. Smoking,

obesity, male gender and other risk factors were all found as risk factors for AMI in young patients with variance in effect attributed to difference in methodological design and inclusion criteria between different studies. Regarding old age AMI patients in our study, the significant risk factors for AMI were HT (p=0.03), DM (p=0.005) and hyperlipidemia (p=0.005). These findings are similar to results of Hamid study[16] in Iraq and Quintana et al[23] study in Sweden.

This study found a significant association between anteropseptal ST elevation on ECG and young AMI patients (p<0.001). This finding coincides with results of de Andrade et al[24] study in Brazil which stated that ECG of young AMI patients is always accompanied with anterior wall ST elevation. Coppola et al[25] reported that anteropseptal ECG wave is the result of septal hypertrophy that leads to high R voltage. Current study showed a significant relationship between apical wall hypokinesia on echocardiography and AMI in young patients (p<0.001). This finding is in agreement with results of Güvenç et al[26] study in Turkey. Saricam et al[27] reported that echocardiography is a sensitive tool for diagnosis of acute myopericarditis in young adults. The limitations of current study were hospital based single center study and selection bias.

This study concluded high admission rate of young adults with acute myocardial infarction and the main risk factors for AMI in young patients were male gender, singles, smoking and family history of CAD. Anteroseptal ST elevation and apical wall hypokinesia were the common findings for ECG and echocardiography, respectively. Strict control public polices for tobacco smoking with early screening programs of risk factors of AMI in young age adults are the main recommendations of present study.

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Conflict of interest: None

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