Original Article

Smoking Effect on Ischemic Heart Disease in Young Patients

Bassam Al-Halabi MD[1], Khaled Hbejan MD[1*]

1. Department of Internal Medicine, Faculty of Medicine, Aleppo University Heart Hospital, Syria.

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Abstract

Background: *Smoking predisposes individuals to several atherosclerotic clinical syndromes, including myocardial infarction and other acute coronary syndromes, stable angina and sudden death. Smoking can trigger myocardial infarction in individuals with minimal atherosclerosis or even with normal coronary arteries, especially among the young, promoting temporary coronary vessel occlusion, as a result of thrombus formation, coronary artery spasm or both. This study aims to evaluate the effect of tobacco smoking on the risk of ischemic heart disease (ST elevation myocardial infarction, non ST elevation myocardial infarction, unstable angina, and Prinzmetal`s angina) in young adults (≤ 45 years).*

Methods: *A retrospective study was conducted over a 2-year Period from January 2008 to March 2010. One hundred and thirty five consecutive cases of acute myocardial infarction (STEMI and NSTEMI), Unstable angina, and Prinzmetal`s angina in young patients (≤ 45 years) who present to the emergency department (ED) of the Aleppo University Hospital, Aleppo University Heart Hospital, and admitted to the cardiovascular care unit (CCU). Data were compared between smoker patients and non smoker patients.*

Results: *The mean age was 39.7±3 years (range20–45), 87.60% were males. The major risk factor was tobacco use (78.48%), followed by hypertension (23.70%), dyslipidemia (21.48%), obesity (18.51%), family history of IHD (15.55%), and diabetes mellitus (3.7%). (56.6%) of patients had a smoking as a single risk factor for ischemic heart disease without another risk factors. (59.25%) of patients had STEMI; (22.96%) had NSTEMI; (16.29%) had unstable angina; and (1.48%) had Prinzmetal`s angina. (56.89%) of patients had single vessel disease as documented by angiography; (20.68%) had tow-vessel disease, (13.79%) had three-vessel disease ; and (8.62%) had normal coronary arteries.*

Conclusions: *The study focuses our attention on the rising incidence of acute MI in young individuals. Smoking was the major risk factor followed by hypertension, dyslipidemia, obesity, family history of IHD, and diabetes mellitus. These observations are important for primary prevention of such diseases in young individuals.*

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Corresponding Author: *Khaled Hbejan MD, Department of Internal Medicine, Faculty of Medicine, Aleppo University Heart Hospital, Syria. Tel: +963 932 42 52 80 E-Mail: dr_khaled.981@hotmail.com*

Introduction

The number of cigarette smokers in the world is estimated at 1.3 billion and this figure is expected to rise to 1.7 billion by 2025.[1] The morbidity and mortality resulting from smoking have been extensively documented. Smoking harms nearly every organ of the body, causing many diseases and reducing the health of smokers in general.[2] Every second a smoker will die of a tobacco-caused disease.[1] Because the smoke and constituents from cigarettes are inhaled and immediately reach the lung tissue and vasculature, patients, as well as physicians, more readily recognize and accept the pulmonary consequences of smoking, but do not readily recognize the cardiovascular risks of smoking. As an example, coronary heart disease is responsible for higher excess mortality in smokers aged under45 years compared with any other tobacco-related disease.[3] It should be emphasized that smoking is one of a number of risk factors for cardiovascular disease (CVD) and all contributory factors should be addressed. The relative risk of death from coronary heart disease in a smoker is 70% higher than for non-smokers. This relative risk is even higher (200%) in heavy smokers (greater than two packs per day).[4] The risk is Further more increased in smokers with other concurrent Risk factors.[3,4] Further, smoking has been identified as a strong risk factor for myocardial infarction in younger women.[5,6] Recently the World Health Organization MONICA project showed that as many as 81% of men and 77% of women aged 35–39 years who experienced non-fatal myocardial infarction smoked, giving an attributable risk of well over one-half.[7] Furthermore smoking increases cardiovascular morbidity and mortality among participants in trials using medications known to reduce cardiovascular events.[8] Cigarette smoking has also been shown to be a risk factor for congestive heart failure.[9] The increased risk of congestive heart failure from smoking is probably mediated, however, through coronary heart disease, which is the underlying cause of the majority (65%) of congestive heart failure cases.[2]

Methods

135 patients (≤ 45 years) with a diagnosis of ischemic heart disease (STEMI, NSTEMI, unstable angina, and Prinzmetal`s angina) who present to the emergency department (ED) of the Aleppo University Hospital, and Aleppo University Heart Hospital, and admitted to the cardiovascular care unit (CCU). Between January 2008 and March 2010 were included in this study. A diagnosis of STEMI is considered to be present in patients having typical rise and/or gradual fall (troponin) or more rapid rise and fall (CK-MB) of biochemical markers of myocardial necrosis with at least one of the following: a. Ischemic symptoms, b. Development of pathologic Q waves on the ECG, c. ECG changes indicative of ischemia (ST segment elevation or depression), d. Imaging evidence of new loss of viable myocardium or a new regional wall motion abnormality, NSTEMI is considered to be present in patients having ischemic symptoms suggestive of an ACS and elevation in troponins or CK-MB, with or without ECG changes indicative of ischemia (ST segment depression or transient elevation or new T wave inversion). Unstable angina is considered to be present in patients with ischemic symptoms suggestive of an ACS and no elevation in troponins or CK-MB, with or without ECG changes indicative of ischemia (ST segment depression or transient elevation or new T wave inversion). Prinzmetal`s angina is considered to be present in patients with spontaneous episodes of angina in association with ST segment elevation during chest discomfort with return of the ST segment to baseline upon resolution of symptoms. All patients were evaluated for risk factors(hypertension, dyslipidemia, diabetes mellitus, family history of IHD, obesity) with concentration on smoking (the purpose of our study), clinical manifestations, laboratory findings, echocardiographic and angiographic findings. We retrospectively compared the risk factors, clinical manifestations, laboratory findings, features of coronary angiographic (CAG) and echocardiographic findings of smoker patients with nonsmoker patients. hypertension was defined as systemic blood pressure ≥ 140mmHg with / or diastolic blood pressure ≥ 90 mmHg or a history of previous treatment; diabetes mellitus was defined as fasting blood glucose ≥126 mg/dl or the use of

specific treatment, dyslipidemia was defined depend on cholestol- LDL and the number of patient`s risk factors for ischemic heart disease: (0-1 risk factors: cholestol-LDL ≥190 mg / dl, 2 or more risk factors: cholestol-LDL ≥ 160 mg / dl, coronary heart disease or coronary heart disease equivalent: cholestol-LDL ≥ 130 mg / dl), a family history was defined as definite myocardial infarction or sudden death before age 55 years in male first-degree relative and before age 65 in female first-degree relative, an obesity was defined as body mass index(BMI) ≥30 kg/m2, Clinical manifestations, electrocardiography (ECG), laboratory findings, echocardiography, coronary angiography (CAG) were performed for 58 patients, Significant coronary artery stenosis was defined as at least a 70% reduction in the internal diameter of the left anterior descending (LAD), or right, left circumflex coronary Arteries (LCX) and their major branches, or a 50% reduction in the internal diameter of the left main trunk (LM).

Statistical analysis

Data are expressed as mean ± SD and frequencies are defined as percentages (%). The smoker and nonsmoker groups were compared using the chi-square test and unpaired Student's t-test according to standard statistical methods using SPSS for windows statistical software v.16 (SPSS Inc. Chicago, IL, USA). In all analyses, significance was accepted at $p<0.05$.

Results

A total number of 135 patients with ischemic heart disease (STEMI, NSTEMI, unstable angina, or Prinzmetal`s angina) were admitted to Aleppo University Hospital and Aleppo University Heart Hospital during the 2-year study period. These patients were aged 45 years or younger (range 20-45 years), the clinical characteristics and risk factors in the patients are summarized in Table 1. Smoking was the commonest risk factor encountered in (78.48%) of the patients, followed by hypertension (23.70%), dyslipidemia (21.48%), obesity (18.51%), family history of IHD (15.55%), and diabetes mellitus (3.7%), STEMI was the commonest type of ischemic heart disease encountered in (59.25%) of the patients, followed by NSTEMI (22.96%), unstable angina (16.29%), and Prinzmetal`s angina (1.48%). We study the relationship between smoking and other risk factors of ischemic heart disease with the incidence of ischemic heart disease, the patients divided into 4 groups depending on the number of risk factors:
Group (0):refer to patients without another risk factors.
Group (1): refer to patients with one risk factor (any risk factor) regardless of the smoking.
Group (2): refer to patients with two risk factors (whatever) regardless of the smoking.
Group (3): refer to patients with three risk factors (whatever) regardless of the smoking.
Group (4): refer to patients with four risk factors (whatever) regardless of the smoking.
The relationship between risk factors and the incidence of ischemic heart disease in the patients are summarized in Table 2. Analysis showed that smoking as an isolated risk factor was important in the incidence of ischemic heart disease where (56.6%) of the smoker patients had the smoking as a single risk factor without the presence of any other risk factor compared with non smoker patients where (21.4%) of non-smoker patients did not have any other risk factor ($P< 0.001$).
Coronary angiography was performed in 58 of our patients (42.9%), overally, angiography identified higher incidence of one-vessel disease in the patients (56.89%), followed by tow-vessel disease (20.68%), three-vessel disease (13.79%), and normal coronary arteries were observed in (8.62%) of the study patients, all the coronary angiography data are indicated in table 3.

Table 1- Clinical Characteristics of the Study Patients

	Number N=135	Percentage (%)
Men	118	87.40
Women	17	12.60
Smoking	106	78.51
Hypertension	32	23.70
Dyslipidemia	29	21.48
Obesity	25	18.51
Family history	21	15.55
Diabetes mellitus	5	3.70
STEMI	80	59.25
NSTEMI	31	22.96
Unstable angina	22	16.29
Prinzmetal`s angina	2	1.48

Table 2- The relationship between risk factors and the incidence of ischemic heart disease in the Study Patients

No. of Risk factors	Smoker patients		Non smoker patients		p value
	No .of patients	%	No .of patients	%	
0	60	56.6	7	24.1	< 0.001
1	27	25.4	13	44.8	NS
2	16	15.2	3	10.3	NS
3	3	2.8	5	17.2	NS
4	0	0	1	3.6	NS

Table 3 - Angiographic findings of the study patients

	No .of patients	%
Left main trunk	2	3.44
Left anterior descending artery	14	24.13
Right coronary artery	11	18.96
Left circumflex	6	10.34
No .of diseased vessels		
0	5	8.62
1	33	56.89
2	12	20.68
3	8	13.79

Discussion

This study was conducted on 135 patients aged between (20-45 years), mean age was (39.7±3 years), this age is higher than the youngest age reported by Kanitz MG et al,[10] while it is similar to that reported by Akram H et al,[11] females represented (12.6%) of our study patients which is less than the reported females by Kanitz MG et al, while it was reported to be (3.1%) by Akram H et al.[11] this may be due to a genuine low prevalence of ischemic heart disease in young women in developing countries together with the well known lower prevalence in premenopausal women. The smoking was the commonest risk factor in our study patients present in (78.51%) which is similar to the reported numbers in other studies.[10, 11] The second most frequent risk factor in our study was hypertension (23.7%), in contrast to a positive family history for IHD reported by Kanitz MG et al,[10] and in contrast to a dyslipidemia reported by Akram H et al.[11] The prevalence of diabetes mellitus was much less in our study group compared with that reported by Akram H et al.[11] Dyslipidemia was present in (21.48%) of our study patients which is resemble to that reported by Kanitz MG et al (20%),[10] while it was reported to be (33.8%) by Akram H et al.[11] A family history for ischemic heart disease was positive in (15.55%) in our study which is resemble to that reported by Akram H et al (15.4%), while it was higher than that reported by Kanitz MG et al (40%).[10] Hypertension was close in the rate of occurrence reported by Kanitz MG et al and Akram H et al (26%) and (18.5%).[10,11] Our study aimed to demonstrate the smoking effect on ischemic heart disease in young patients aged 45 years or younger, analysis showed that smoking as an isolated risk factor was important in the incidence of ischemic heart disease where that (56.6%) of the smoker patients had the smoking as a single risk factor without the presence of any other risk factor compared with non smoker patients that (21.4%) of non-smoker patients did not have any other risk factor (P< 0.001). Our study included all types of ischemic heart disease: STEMI was reported in (59.25%) of our study patients, NSTEMI (22.96%), unstable angina (16.29%), and Prinzmetal`s angina (1.48%). while other studies included patients with STEMI only.[10, 11] Coronary angiography identified higher incidence of one-vessel disease (56.89%) in our study patients which is close in the rate of occurrence to that reported by Kanitz MG et al (62%),[10] while normal coronary arteries were identified in (8.62%) only which is less than that reported by Kanitz MG et al (14%).[10] All comparison data between our study with other studies are indicated in table 4.

Table 4- comparison between our study with other studies

	Our study	Kanitz MG et al [10]	Akram H et al [11]
Mean age (years)	39.7±3	34.8	40
Male (%)	87.4	81	96.9
Female (%)	12.6	19	3.1
Smoking (%)	78.51	81	76.9
Hypertension (%)	23.7	26	18.5
Diabetes mellitus (%)	3.7		30.8
Dyslipidemia (%)	21.48	20	33.8
Family history (%)	15.55	40	15.4
Pattern of IHD studied (%)	STEMI, NSTEMI, unstable angina, Prinzmetal`s angina	STEMI	STEMI
Angiographic finding			
One–vessel disease (%)	56.89	62	
Multi-vessel disease (tow and three) (%)	34.47	42	
Normal coronary arteries (%)	8.62	14	

References

1. The World Health Report 2003: Shaping the Future. World Health Organization; 2003. www. who. int/ whr/ 2003. [Accessed: October2004]
2. US Department of Health and Human Services. The health consequences of smoking: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2004.
3. Burns DM. Epidemiology of smoking-induced disease. ***Prog Cardiovasc Dis*** 2003; 46(1):11- 29.
4. US Department of Health and Human Services: The health consequences of smoking: cardiovascular disease. A report of the Surgeon General Atlanta, GA:US Department of Health and Human Services , Public Health Service, Office of the Surgeon General, Office of smoking and Health; 1983.DHHS Publication No. (PHS) 84- 50204.
5. Rosenberg L, Kaufman DW, Helmrich SP, Miller DR, Stolley PD, Shapiro S. Myocardial infarction and cigarette smoking in women younger than 50 years of age. ***JAMA*** 1985; 253 (20): 2965- 2969.
6. Croft P, Hannaford PC. Risk factors for acute myocardial infarction in women: evidence from the Royal College of General Practitioners' oral contraception study. ***BMJ*** 1989; 298: 165- 168.
7. Mahonen MS, McElduff P, Dobson AJ, Kuulasamma KA, Evans AE. Current smoking and the risk of non-fatal myocardial infraction in the WHO MONICA Project populations. ***Tob Control*** 2004; 13(3): 244-250.
8. Dagenais GR, YiQ, Lonn E, Sleight P, Ostergren J, Yusuf S. Impact of Cigarette smoking in high-risk patients participating in a clinical trial. A sub study from the Heart Outcomes prevention evaluation (HOPE) trial. ***EurJ Cardiovasc Prev Rehabil*** 2005; 12(1): 75- 81.
9. He J, Ogden LG, Bazzano LA, Vupputuri S, Loria C, Whelton PK. Risk factors for congestive heart failure in US men and women. ***Arch Intern Med*** 2001; 161(7): 996–1002.
10. Kanitz MG, Giovannucci SJ, Jones JS, Mott M. Myocardial infarction in young adults: risk factors and clinical features. ***J Emerg Med*** 1996; 14(2):139-145.
11. Akram H AL-Khadra. Clinical profile of young patients with acute myocardial infarction in Saudi Arabia. ***International Journal of Cardiology*** 2003; 91(1): 9-13.