Biolife AN INTERNATIONAL QUARTERLY JOURNAL OF BIOLOGY & LIFE SCIENCES 5(4):505-508

ISSN (online): 2320-4257
www.biolifejournal.com

BIOLIFE ORIGINAL ARTICLE

Smoking is a more dangerous risk factor than metabolic syndrome in Egyptian patients with Acute Myocardial Infarction

Samir Rafla[1], Sahar Hamdy[2], Aly Zidan[3], Maha Saeed[4]

[1-4]Cardiology Department Faculty of Medicine, University of Alexandria, Alexandria, Egypt

Email: dr.samirrafla@yahoo.com

ABSTRACT

Background: The effect of metabolic syndrome and other risk factors of myocardial infarction are not consistent in all studies. **Aim:** To assess the incidence of each risk factor in our community as a predictor of acute myocardial infarction.

Methods: Fifty patients (Pts) admitted to the main university hospital with acute MI were studied. All risk factors were recorded as well as echo measurements. Inclusion criteria were: patients diagnosed as acute ST segment elevation myocardial infarction (STEMI) based on typical retrosternal chest pain associated with typical electrocardiographic changes of STEMI, with at least one cardiac enzyme assay result above twice the limit of normal. Incident cases of acute STEMI presenting within 24 h of symptoms onset were eligible. Metabolic Syndrome (MS) components were defined as detailed in the ATP III report: 1) waist circumference >102 cm in men and >88 cm in women, 2) fasting triglycerides ≥150 mg/dl. 3) HDL cholesterol <40 mg/dl in men and <50 mg/dl in women, 4) BP ≥130/85 mmHg, and 5) fasting - glucose ≥ 110 mg/dl. Participants with at least three of these components were determined to have the MS.

Results: MS was present in 27 pts (54%) The incidence of different risk factors in the 50 pts: Family history of any point (before age 60) as coronary disease, sudden death, diabetes, Ht was present in 36 pts (72%), smoking (current or stopped less than 6 months 38 pts (76%). 60 % had diabetes.

Conclusions: Comparing to incidence in Egypt: Diabetes in infarcted patients was 5 (6) times more. Smoking was twice more, metabolic s. was twice more; HT was twice more (48%). We highlight the danger of diabetes and smoking as the most significant predictors of MI in Egyptian population.

Key words: Metabolic syndrome, risk factors, acute ST segment elevation myocardial infarction

INTRODUCTION

Predictors or predisposing factors of myocardial infarction include: Diabetes, abdominal obesity, smoking, genetics, hypertension, metabolic syndrome, sedentary life, stress and hyperlipidemia. Other factors include age and male gender.[1-3] The influence of each of these factors in our Egyptian population need to be studied.

How to Site This Article:
Samir Rafla, Sahar Hamdy, Aly Zidan, Maha Saeed (2017). Smoking is a more dangerous risk factor than metabolic syndrome in Egyptian patients with acute myocardial infarction. *Biolife*. 5(4), pp 505-508. doi:10.17812/blj.2017.5413.

Received: 23 August 2017; Accepted: 28 September, 2017; Published online: 29 October, 2017

The definition of metabolic syndrome varies from different organizations.[4-7] The World Health Organization (WHO) has proposed a working definition that includes a measure of impaired glucose regulation and/or insulin resistance as well as two or more of the following components: raised arterial blood pressure, raised plasma triglycerides and/or low HDL cholesterol, central obesity and/or high BMI, and microalbuminurea (Grundy et al). [4]

There is another scheme- The International Diabetes Federation (IDF) Guidelines: a central obesity, defined as waist circumference equal to or more than 94 cm and 80 cm (IDF cutoff level recommendations for Middle-Eastern men and women respectively) plus two or more of the following four factors: 1) raised concentration of triglycerides: 150 mg/dl (1.7 mmol/l) or specific treatment for this lipid abnormality; 2) reduced concentration of HDL cholesterol: <40 mg/dl (1.03 mmol/l) in men and <50

mg/dl (1.29 mmol/l) in women or specific treatment for this lipid abnormality; 3) raised blood pressure: systolic blood pressure 130 mmHg or diastolic blood pressure 85 mmHg or treatment of previously diagnosed hypertension; and 4) raised fasting plasma glucose concentration 100 mg/dl (5.6 mmol/l) or previously diagnosed type 2 diabetes (Alberti et al., 2005). [5, 6]

In our study we adopted the ATP III scheme – Adult Treatment Panel III report (Third report): [8] 1) waist circumference >102 cm in men and >88 cm in women, 2) fasting triglycerides ≥150 mg/dl, 3) HDL cholesterol <40 mg/dl in men and <50 mg/dl in women, 4) BP ≥130/85 mmHg, and 5) fasting - glucose ≥ 110 mg/dl. Participants with at least three of these components were determined to have the MS.

Aim of the Work:

To assess the incidence of each risk factor in our community as a predictor of acute myocardial infarction.

PATIENTS AND METHODS

The study included 50 patients admitted to Main University Hospital in Alexandria.

Inclusion criteria:

Patients diagnosed as acute ST segment elevation myocardial infarction (STEMI) based on two of the following: typical retrosternal chest pain, typical electrocardiographic changes of STEMI and at least one cardiac enzyme assay result above twice the limit of normal. Incident cases of acute STEMI presenting within 24 h of symptoms onset were eligible.

1. *Demographics and risk factors of patients were assessed:*

- Age, sex, hypertension, diabetes mellitus, smoking, dyslipidemia, family history, history of myocardial infarction and ejection fraction):
  - **Age:** Their age ranged from 27 to 82 years.
  - Sex.
  - **Hypertension:** severity, duration, medications.
  - **Diabetes:** severity, duration, medications. HgA1c was not measured in all patients.
  - **Smoking:** current smoker, ex-smoker (if stopped > 6 months ago), non-smoker. Also number of cigarettes recorded (Smoking index).
  - **History and duration of angina,** previous MI or catheterization or interventions.
  - Neurologic history as transient ischemic attack or stroke.
  - **Body weight and height:** BMI was calculated.
  - **Abdominal circumference** measured midway between last rib and iliac crest. Diameter more than 102 in males and 88 cm in females is counted as risk factor.
  - Plasma cholesterol, triglyceride s, LDL and HDL.
  - **Kidney function:** urea, creatinine, uric acid.
- ECG and echo as well as any other investigations were recorded.

Body mass Index:

Body mass index was calculated = weight / square height in meters. E.g. 80 kg /square 1.7 meter 2.89 = 27.7 Normal BMI is below 27, overweight below 30, obese > 30.

Information about risk factors including hypertension and diabetes mellitus, physical measurements including waist and hip circumference, blood pressure, and body weight, and hemoglobin. HgA1c was obtained using a standardized protocol and laboratory measurement. Waist and hip circumferences were measured with a non-stretchable standard tape measure. Waist measurements were obtained over the unclothed abdomen at the narrowest point between the costal margin and iliac crest, and hip circumferences over light clothing at the level of the widest diameter around the buttocks. Hypertension was assessed using information on self-reported history and/or use of antihypertensive medication.

MS Definitions:

The MS was evaluated based on risk factors:

1- Self-reported diabetes mellitus or HgA1c ≥6.5%;
2- Self-reported hypertension or use of a prescribed antihypertensive medication;
3- Abdominal obesity as measured by waist circumference (International Diabetes Federation [IDF]); and
4- Abnormal lipid concentrations determined from serum HDL cholesterol measures.

The MS criteria adopted in our analysis of data:

MS components were defined as detailed in the ATP III report:

1- Waist circumference >102 cm in men and >88 cm in women,
2- Fasting triglycerides ≥150 mg/dl,
3- HDL cholesterol <40 mg/dl in men and <50 mg/dl in women,
4- BP ≥130/85 mmHg ,
5- Fasting - glucose ≥ 110 mg/dl.

Participants with at least three of these components were determined to have the MS. [(28-33)]

Exclusion criteria:

Non-atherosclerotic infarction were not included e.g. coronary emboli; vasculitis as in systemic lupus - induced infarction.

Statistical Analysis:

Patient characteristics and in-hospital treatments for men and women were compared using Chi and unpaired Student's t test.

Influence of various factors on mortality at discharge was investigated using multiple logistic regressions.

RESULTS

MS was present in 27 pts (54%). The incidence of different risk factors in the 50 pts: Family history of any point (before age 60) as coronary disease, sudden death, diabetes, Ht was present in 36 pts (72%), smoking (current or stopped less than 6 months 38 pts (76%). Comparison of those with MS vs. those without: Male to female ratio: Not significant (NS), Diabetes present/absent: 21/6 vs. 9/14, p=0.005; HT : 18/9 vs. 6/17, p=0.004; Smoking 18/9 vs. 20/3, p=0.09; family history of any major risk factor including sudden death or premature coronary disease: 21/6 vs. 16/7, p=NS; BMI >30 : 14/13 vs. 5/18, p=0.02; waist > 102, 88 in m and f respectively: 18/9 vs. 7/14, p=0.01. LV hypertrophy was present in 6 pts 3 vs. 3, p=NS. Comparison with Egyptian prevalence: data in our study vs. prevalence in Egypt above age 15 y respectively: Diabetes: 30 (60%) vs. 10%, p=0.000; HT 24 (48%) vs. 26%, p=0.007; smoking 76% vs. 40 in males, p=0.000; Ms 27 (54%) vs. 24%, p=0.0003 Conclusions: Smoking was the highest risk factor among pts with acute MI (76%) followed by positive family history (72%) then diabetes (60%), metabolic s. (54%), HT (48%). We highlight the danger of smoking beside other factors as predictors of MI in Egyptian population.

Table-1. Results according to metabolic syndrome

	Group I (non metabolic syndrome) (n= 23)	Group II (metabolic syndrome) (n= 27)	χ^2 (p)
M/F	21/2	21/6	1.691 (0.193)
Diabetes (–ve / +ve “1+2”)	14/9	6/21	7.729* (0.005)
HT (–ve / +ve)	17/6	9/18	8.194* (0.004)
Smoking = 38 pts (nonsmoker / ex-smoker + smoker)	3/20	9/18	2.803 (0.094)
Family history + = 37 pts	16	21	NS
BMI ≥30 = 19 pts	5	14	4.78 0.028
Waist ≥ 102, 88 = 25 pts	7	18	6.52 0.010

χ^2: Chi square test
*: Statistically significant at p ≤ 0.05

Patients were divided into two groups 1- those without metabolic syndrome, 2- those with metabolic syndrome. Gender: no difference. Diabetes: more in the second group, hypertension more in the second group, smoking more in the first group, positive family history not different in the two groups.

Table-2. Results according to risk factors

	Total =50	%
Age	55± 11	
Males	42	84
Non diabetic	20	40
Type 1 diabetes mellitus	1	2
Type 2 diabetes mellitus	29	58
No hypertension	26	52
Hypertensive	24	48
Smoking history		
None or ex-smoker	12 +10	44
Current smoker	28	56
Degree of obesity		
None obese	8	16
Over weight	23	46
Obese	12	24
Severe obese	7	14
Waist circumference		
Normal	29	58
Abnormal	21	42
Precipitating factors		
No	12	24
Physical stress	20	40
Emotional stress	13	26
Heavy meal	5	10
HDL		
Normal	11	22.0
High risk	39	78.0
TRIGLYCERIDES		
Normal	18	36.0
High	32	64.0
LVH	6	12
Normal	44	88

DISCUSSION

There is no internationally agreed upon definition for the metabolic syndrome, but the World Health Organization (WHO) has proposed a working definition that includes a measure of impaired glucose regulation and/or insulin resistance as well as two or more of the following components: raised arterial blood pressure, raised plasma triglycerides and/or low HDL cholesterol, central obesity and/or high BMI, and microalbuminurea (Grundy et al).[4]

Mente and Salim Yusuf et al and Chintala Priyanka and Estari Mamidala in 2010 and 2016 respectively studied 26,903 persons with metabolic syndrome (MS), they reported the following results: Results: The MS is associated with an increased risk of MI, both using the WHO (OR: 2.69; 95% confidence interval [CI]: 2.45 to 2.95) and IDF (OR: 2.20; 95% CI: 2.03 to 2.38) definitions, with corresponding population attributable

risks of 14.5% (95% CI: 12.7% to 16.3%) and 16.8% (95% CI: 14.8% to 18.8%), respectively. The associations are directionally similar across all regions and ethnic groups. Using the WHO definition, the association with MI by the MS is similar to that of diabetes mellitus (OR: 2.72; 95% CI: 2.53 to 2.92) and hypertension (OR: 2.60; 95% CI: 2.46 to 2.76), and significantly stronger than that of the other component risk factors. The clustering of ≥3 risk factors with subthreshold values is associated with an increased risk of MI (OR: 1.50; 95% CI: 1.24 to 1.81) compared with having component factors with "normal" values. The IDF definition showed similar results.

Diabetes was 5 times more in infarcted patients than in population. Smoking was twice more in infarcted pts. Ht was twice more in infarcted patients than in general population.

- Abdominal circumference was only increased in 48% of infarcted pts.
- Comparison with Egyptian prevalence 9-13: data in our study vs. prevalence in Egypt above age 15 y respectively: Diabetes: 30 (60%) vs. 10%, p=0.000; HT 24 (48%) vs. 26%, p=0.007; smoking 76% vs. 40 in males, p=0.000; Ms 27 (54%) vs. 24%, p=0.0003.

The incidence of different risk factors in the 50 pts: Family history of any point as before age 60 as coronary disease, sudden death, diabetes, Ht was present in 36 pts Comparison of those with MS vs. those without: Male to female ratio: Not significant (NS), Diabetes present/absent: 21/6 vs. 9/14, p=0.005; HT : 18/9 vs. 6/17, p=0.004; Smoking 18/9 vs. 20/3, p=0.09; family history of any major risk factor including sudden death or premature coronary disease: 21/6 vs. 16/7, p=NS; BMI >30 : 14/13 vs. 5/18, p=0.02; waist > 102, 88 in m and f respectively: 18/9 vs. 7/14, p=0.01.

CONCLUSIONS

Smoking was the highest risk factor among pts with acute MI (76%0 followed by positive family history (72%) then diabetes (60%), metabolics. (54%), HT (48%). We highlight the danger of smoking beside other factors as predictors of MI in Egyptian population. Comparing to incidence in Egypt: Diabetes in infarcted patients was 5 (6) times more. Smoking was twice more, metabolic s. was twice more; HT was twice more (48%). We highlight the danger of diabetes as the most significant predictor of MI in Egyptian population. Smoking is a more dangerous risk factor than metabolic syndrome in Egyptian patients with acute myocardial infarction.

Study limitations: Small sample size.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

References

1. Bennett W, Lombardi D, Eisenhart A, Acosta J, Cerbone D, Mccoy L, et al. Risk factors for acute myocardial infarction in our patient population: a retrospective pilot study. NY MJ 2008; 88: 83.
2. Mente A, Yusuf S, Islam S, McQueen MJ, Tanomsup S, Onen CL, et al. Metabolic syndrome and risk of acute myocardial infarction. a case-control study of 26,903 subjects from 52 countries. J Am Coll Cardiol, 2010; 55:2390-8.
3. Lanas F, Avezum A, Bautista LE, Diaz R, Luna M, Islam S, et al. Risk Factors for Acute Myocardial Infarction in Latin America The INTERHEART Latin American study. Circulation 2007;115(9):1067-74.
4. Grundy SM, Brewer HB, Jr., Cleeman JI, Smith SC, Jr., Lenfant C, American Heart A, et al. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. Circulation 2004;109(3):433-8.
5. Chintala Priyanka and Estari Mamidala (2015). Incidence of cataract in type 2 diabetes mellitus among Rural people. The Ame J Sci & Med Res, 1(1):108-111. doi:10.17812/ajsmr2015119
6. Beilby J. Definition of metabolic syndrome: report of the national heart, lung, and blood institute/American heart association conference on scientific issues related to definition. Clin Biochem Rev 2004; 25(3): 195–8.
7. Alberti KG, Zimmet P, Shaw J. The metabolic syndrome--a new worldwide definition. Lancet 2005;366(9491):1059-62.
8. Alberti KG, Zimmet P, Shaw J. Metabolic syndrome--a new world-wide definition. A Consensus Statement from the International Diabetes Federation. Diabet Med 2006;23(5):469-80.
9. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation 2002;106(25):3143-421.
10. Ibrahim MM, Appel LJ, Rizk HH, Helmy S, Mosley J, Ashour Z, et al. Cardiovascular risk factors in normotensive and hypertensive Egyptians. J Hypertens 2001;19(11):1933-40.
11. Ibrahim MM, Rizk H, Appel LJ, el Aroussy W, Helmy S, Sharaf Y, et al. Hypertension prevalence, awareness, treatment, and control in Egypt. Results from the Egyptian National Hypertension Project (NHP). NHP Investigative Team. Hypertension 1995;26(6 Pt 1):886-90.
12. Ibrahim MM. Abdominal obesity in Egypt: cut-off values of waist circumference and associated cardiovascular risk. In press.
13. Ibrahim MM. Hypertension surveys in the developing world: Lessons from the Egyptian National Hypertension Project (NHP). J Human Hypertens 1997; 11:709-26.
14. Galal OM. The nutrition transition in Egypt: obesity, undernutrition and the food consumption context. Public Health Nutr 2002; 5(1A): 141- 8.