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Impact of Metabolic Syndrome On Hospital Outcome In Patients With Acute Coronary Syndrome In Hawler Teaching Hospital

Dilshad Abdulkadir Rasul*
Abdulkareem Abdulwahhab Al-Othman.**

Abstract

Background and Objectives: According to the world health organization data published on April 2011, coronary heart disease deaths reached 14.12% of the total deaths in Iraq. The objective of the study was to evaluate the effect of metabolic syndrome on in hospital complications, left ventricular systolic function and ischemic mitral regurgitation in patients with firstacute coronary syndrome.

Patients and Methods: The study sample consisted of 95 patients (57 male, 38 female), their ages ranged between 35-90 years with thefirst acute coronary syndrome who had been admitted to the Coronary Care Unit of Hawler Teaching Hospital from October 2013 to April 2014.Patients were categorized in to group A that represent those with metabolic syndrome and group B without met-abolic syndrome.

Results: Hypertension, diabetes, fasting hyperglycemia and hypertriglyceridemia were higher among group A than group B. Cardiogenic shock, pulmonary edema, arrhythmias, mortality, early ischemic mitral regurgitation and early Left ventricular systolic dysfunction were higher among group A vs. group B but without statistical significance.

Conclusions: Metabolic syndrome is an important predictor for in hospital complications, left ventricular systolic dysfunction and early ischemic mitral regurgitation in patients with acute coronary syndrome.

Key words: Metabolic syndrome, Acute coronary syndrome.

*Candidate for Kurdistan Board for Medical Specialization in Internal MedicineM.B.CH.B, Hawler Teaching Hospital- Department of Medicine- Erbil-Iraq

**M.B.Ch.B.,F.I.C.M.S/Medicine Professor of Medicine, Department of Medicine, College of Medicine, Hawler Medical University,Erbil-Iraq.

Introduction

Metabolic syndrome (syndrome X, insulin resistance syndrome) consists of a constellation of metabolic ab- normalities that confer increased risk of cardiovascular disease (CVD) and diabetes mellitus (DM); the major feature of the metabolic syndrome (MS) include central obesity, hypertriglyceridemia, low HDL cholesterol, hyperglycemia, and hypertension1.It was estimated that around 20-25 % of the world's adult population has metabolic syndrome and they are twice as likely to die from and three times as likely to have a heart attack or stroke compared with people without the syndrome. In addition, people with metabolic syndrome have a five fold greater risk of developing type 2 diabetes2.Shehab et al found a high prevalence of MS in acute coronary syndrome (ACS) patients in United Arab Emirate (UAE), which was associated with hypertension and diabetes mellitus. Hypertension, hyperglycemia and low high-density lipoprotein cholesterol (HDLc) were associated with higher in hospital mortality and heart failure3.According to the latest World Health Organization data published on April 2011, coronary heart disease deaths reached 14.12% of the total deaths in Iraq4, however there are no published studies done in Iraq to assess the impact of metabolic syndrome on in hospital outcome of patients with ACS.We therefore set out to evaluate the effect of metabol- ic syndrome on in hospital clinical complications, left ventricular systolic function and ischemic mitral regur- gitation in patients with first acute coronary syndrome.

Patients and methods

A prospective review of series of cases with ACS was carried out during the period from October 2013 to April 2014. The study included 95 patients, 57males (60%) and 38 females (40%), with first attack of ACS, who had been admitted to the Coronary Care Unit (CCU) of Hawler Teaching Hospital (Erbil-Iraq) within the first 24 hours of pain were included in the study. The mean age (±SD) was 61.75±10.9 years, ranging from 35-90 years.According to the new International Diabetic Federa- tion(IDF)5; metabolic syndrome diagnosed when the patients presented with: Central obesity defined as waist circumference ≥ 94cm for men and ≥ 80cm for women; Plus any two of the following four factors: 1- Raised TG level: ≥ 150 mg/dL or specific treatment for this lipid abnormality. 2- Reduced HDL cholesterol < 40 mg/dL in males and < 50 mg/dL in females, or specif- ic treatment for this lipid abnormality.3- Raised blood pressure: systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg, or treatment of previously diagnosed hypertension. 4- Raised fasting plasma glucose (FPG) ≥ 100 mg/dL or previously diagnosed type 2 diabetes.ST-elevation myocardial infarction (STEMI) was con- firmed by ST elevation of 2mm or more in chest leads or ST elevation of ≥ 1mm in two or more limb leads. Patients who had ST-T changes with raised cardiac en- zymes were labeled as non-ST elevation myocardial infarction (NSTEMI) while negative cardiac enzymes with ST-T changes had unstable angina6.Patients who presented with the following were exclud- ed from the study: a-Left bundle branch block. b-Previ- ous history of the following conditions: ischemic heart disease, heart failure, valvular heart disease, rheumatic heart disease, congenital heart disease ,chronic kidney disease, percutaneous coronary intervention (PCI), and coronary artery bypass graft (CABG), c-Patients with poor echocardiographic windows.History of diabetes mellitus, hypertension, smoking, alcohol consumption and in-hospital mortality were re- corded,

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thorough physical examination had been done for all patients including waist circumference. Labora-tory study had been done for all patients on admission to the CCU, including resting ECG, cardiac enzyme, FBS, RBS, lipid profile and renal function test.Hypertension defined as clinical history of document- ed elevated blood pressure or persistent systolic blood pressure ≥140 mmHg and diastolic blood pressure≥90 mmHg7. Diabetes mellitus diagnosed according to the American Diabetic Association8 published in 2013 (FBS≥126 mg/dl or RBS≥200 mg/dl, twice if asymp- tomatic and once if symptomatic or patients who cur- rently on treatment for diabetes).Cardiogenic shock defined as systolic blood pressure less than 90 mm Hg or diastole <60 mmHg, or decrease of 30 mm Hg from the baseline for >30 minute, after exclusion of the Other types of shock 9.Transthoracic two-dimensional Color Doppler Echo-cardiography had been performed for all those patients within 5 days of admission to the CCU using Vivid S5 GE (2012). Ejection fraction was determined from api- cal and four chambers view using the Simpsons biplane formula10. Left ventricular systolic dysfunction (LVSD) in patients without mitral regurgitation (MR) defined, as left ventricular ejection fraction (EF%) ≤50%11. LVSD in the presence of moderate to severe MR was defined, as EF is ≤60 % 11,12.Patients with acute coronary syndrome were divided in to group A that represent those with metabolic syn- drome and group B without evidence for metabolic syndrome.Verbal consent obtained from all patients, and this study approved by the ethical committee of Kurdistan Board for Medical specialties.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 19). Chi square test ofassociation was used to compare between proportions of the two study groups. When the expected count of more than 20% of the cells of the table was less than 5, Fisher's exact test was used. Student's t test was used to compare between means of the two study groups. P val-ue of ≤ 0.05 was considered statistically significant[13].

Results

The prevalence of metabolic syndrome (group A) in our patients with first acute coronary syndrome was 60 (63%), (figure 1).our patients with first acute coronary syndrome was 60(63%), (figure 1).sive LES (N=31, 25.8%), ineffective esophageal mo- tility (N=9, 7.5%), hypotensive LES (N=5, 4.2%) and diffuse esophageal spasm (N=3, 2.5%). The HRIM was normal in 28 patients (23.3%). Figure 2 clarifies the esophageal motility findings in this study. Of the 44

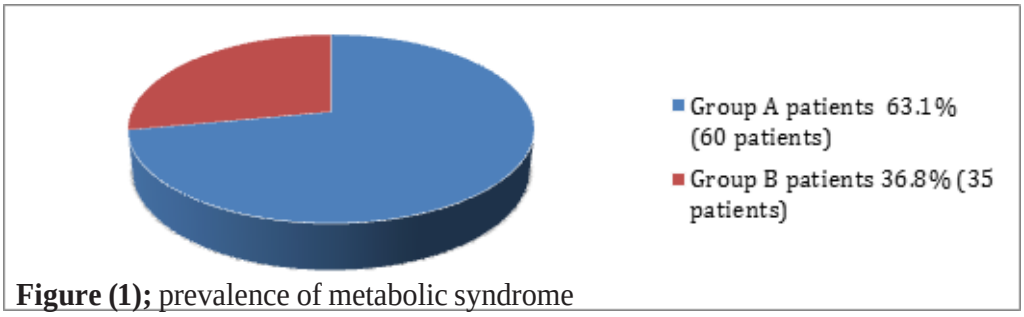

Figure (1); prevalence of metabolic syndrome

Table (1): Baseline characteristics in patients with and without metabolic syndrome

Variables			Group A n=60	Group B n=35	P
Age, mean ± SD, years			61.3±10.3	62.4±11.8	0.622
Gender	(Male (n.57		(% 50) 30	(% 77) 27	0.09
	(Female (n.38		(% 50) 30	(% 23) 8	
Hypertension			(% 82) 49	(% 40) 14	*0.001>
Diabetes Mellitus			(% 63) 38	(% 11) 4	*0.001>
Smoker			(% 23) 14	(% 34) 12	0.376
Diagnosis		STEMI	(% 71) 43	(% 77) 27	0.225
		NSTEMI	(% 13) 8	(% 3) 1	
		UA	(% 15) 9	(% 20) 7	
Thrombolytic therapy			(% 27) 16	(% 43) 15	0.104

Metabolic syndrome (group A) was associated with high-er admission mean RBS, FBS, TG, vs. group B (P<0.001),while there was no significant difference between the twogroups in relation to the HDL, blood urea and Creatinine(table 2).

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Table (2): Laboratory findings according to the presence of metabolic syndrome

Variables (Mean (mg/dl)±SD)	Group A (n=60)	Group B (n=35)	P
Admission RBS	103±245	56±154	*0.001 >
FBS	112±46	36±99	*0.001
TG	103±178	45±111	*0.001 >
HDL	10±39	9±40	0.814
Mean blood urea	54+31	49+19	0.402
S. creatinine	1.2+1	1.1+0.4	0.441

Group A =patients with metabolic syndrome *statistically significant, FBS=fasting blood sugar, TG=triglyceride Group B=patients without metabolic syndrome s=serum, HDL=High density lipoprotein Pulmonary edema, arrhythmias and cardiogenic shock were more frequently reported among group A patients vs. group B patients without statistical significance. One deathreported among group A patients vs. non in-group B patientswithout statistical significance (table 3).

Table(3): Impact of MS on early clinical outcome

Variables		Group A n=60	Group B n=35	P
Pulmonary edema		(46.7%) 28	(25.7%) 9	*0.232
Arrhythmia	VT, VF	(5%) 3	(5.7%) 2	*0.615
	Other	(13.4%) 8	(2.9%) 1	
	Total	(18.3%)11	(% 8.6) 3	
Cardiogenic shock		(8.3%) 5	(2.8%) 1	**0.232
Mortality		(1.7%) 1	0	**1.000

Group A =patients with metabolic syndrome, Group B=pa- tients without metabol syndromeVT=Ventricular tachycardia, VF=Ventricular fibrillation, *By Fisher's Exact Test, ** By chi squareMetabolic syndrome (group A) was associated with higher frequency rate of early ischemic MR 21 (35%) vs. group B6 (17%), but without statistical difference (table 4). Higher frequency rate of left ventricular systolic dysfunction among group A has been reported 27 (45%), vs. group B 11 (31%), without statistical significance (table 4).

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Table (4): Impact of metabolic syndrome on ischemic mitral regurgitation and left ventricular systolic function di- agnosed by transthoracic echocardiography.

Variables	Group A n=60	Group B n=35	P
Ischemic MR	(35%) 21	(17%) 6	0.06 2
LV systolic dysfunction	(45%) 27	(31%) 11	0.42 6

MR=Mitral regurgitation Group A =patients with metabolic syndrome

Group B=patients without metabolic syndrome

Discussion

In our study, the prevalence of MS among patients with ACS was 60 (63%), this is in agreement with a recent study done in 6 Middle Eastern countries including the Gulf and the UAE and reflects both the high risk of ACS among MS patients and the high prevalence of MS in these populations due to sedentary lifestyle, lower health awareness and higher income14.The frequency of female patients among group A was higher than group B but without statistical significance, this can be explained by the higher rate of obesity and diabetes, and sedentary life style seen in women, this is similar to study done in Spain15, in addition this gender deference may be due to hormonal deference between male and female, male had lower plasma leptin levels comparing to female, this hormone regulate the total amount of fat stored in the adipose tissues also energy imbalance16 ,17, while our study disagree with study done in the UAE which showed male more frequently had MS than female in patients with ACS3.The mean age for group A and for group B were 61.3±10.3 years and 62.4 ±11.8 years respectively without statistical significance, this is comparable with a study done in Eastern Finland18.This study showed that group A patients were more likely to be hypertensive and diabetic 49 (82 %), 38 (63%) respectively (p <0.001), this ACS22,23.This study showed that highest frequency of in-hospital complications among group A patients were pulmonary edema and may be explained by that in this study we depend on the IDF criteria for the diagnosis of MS of which hypertension and diabetes are among the diagnostic criteria. Also group A patients had high admission RBS, FBS and TG vs. group B (P<0.001), our result were similar to zeller ET al19, which showed MS patients more likely to be hypertensive, diabetic, higher admission FBS and RBS. It seems that the higher prevalence of hypertriglyceridemia and hyperglycemia may be related to genetic and high in- take of carbohydrate (especially through bread and dates consumption) and fat (especially through satura ed fat and margarines, fried food and butter20.Recently there has been growing interest in the components of MS, not only in relation to the number present, but also their different combinations, in the prediction of cardiovascular risk. In this study, hypertriglyceridemia and hyperglycemia and hypertension were the most prevalent components of MS, this was also the most frequent combination observed in patients with ischemic heart disease as shown that combination of DM and hypertension sharply increases cardiovascular risk21.There was no statistically significant difference of HDLc level between both groups; this is may be due to falsely low HDLc concentrations in the presence of acute-phase reactants after an cardiogenic shock (46.7 %, and 8.3 % respectively), Pulmonary edema and cardiogenic shock risk may not be associated

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with the metabolic syndrome per se, but rather with individual risk factors reflected by metabolic syndrome may play role, which is similar to study done in Korea 24.Mortality reported in 1 (1.7%) of group A patients, while non among group B, without statistical significance, this is in disagreement to zellar et al19, which showed that patients with STEMI who fulfill the criteria for MS, the mortality is significantly higher (P=0.01),this is may be due to small number of patients and short duration of the study. Arrhythmias occurred to 11(18.3 %) of group A patients (VT and VF=5%, others=13.4%) and this is higher than group B patients 3(8.6 %), (VT and VF=5.7%, others=2.9%) without statistical significance, this is similar to zellar ET al19, which showed metabolic syndrome didn't appear to have an impact on the risk of ventricular tachyarrhythmia. Left ventricular systolic dysfunction account for 45 % of group A vs. group B 31%, without statistical significance, this is in consistence with study done in turkey which showed that patients who fulfill the criteria for MS with first attack of STEMI their LV systolic function more severely impaired without statistical significance25.Higher frequency rate of Ischemic mitral regurgitation were recorded among group A 21 (35 %) vs. group B 6 (17 %), but without statistical significance, until now no study have been done to assess the impact of MS on early ischemic mitral regurgitation in patients with ACS, although it's shown that MS may alter left ventricular geometry and which may be implicated to the occurrence of ischemic mitral regurgitation 26.

Conclusions

High frequency rate of acute pulmonary edema, serious arrhythmias, early left ventricular systolic dysfunction and ischemic mitral regurgitation has been observed in patients with metabolic syndrome vs. non metabolic syndrome in the early phase of acute coronary syndrome but without statistical significance.

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