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Prevalence Rate Of Metabolic Syndrome Among Patients With Acute Coronary Syndrome

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ABSTRACT

Background andAim:

Cardiovascular diseases are the main cause of death in both developed and developing countries, and coronary artery disease (CAD) is the most frequent cause of cardiovascular mortality the metabolic syndrome, This study aims to evaluate the prevalence rate of metabolic syndrome between patients with Acute Coronary Syndrome admitted in Coronary Care Unit and its impact on severity of coronary lesions.

Patients and methods:

The study included (400) patients presented with acute coronary syndrome admitted in CCU in Sohag Specialized Cardiac and Digestive System Center, The study included 287 males (71,8%) and 113 females (28,2%)

Patients with ACS were categorized according to the presence or absence of MetS at baseline, using the 2009 definition by the National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity.

The Patients were Classified in to Two Groups :

- Group (Mets): included 230 patients with metabolic syndrome.

- Group (Non-Mets): included 170 patients with non-metabolic syndrome.

Results :

As totally, the prevalence rate of metabolic syndrome between patients of ACS in our study was 230 patients(57.5%).230 patients with metabolic syndrome,70%males&30% females andno statistically significant difference between mets and gender.Waist circumference ranged from 70-123cm with a mean ± SD(96.77± 10.35)of mets patients ,&there was high statistically significant relationship between mets and waist circumference.(p_value<0,001)Weight ranged from 65-125kg , with a mean ± SD (88.10± 11.25) of mets patients &there was high statistically significant relationship between mets and weight (p_ value<0,001).178 hypertensive patients (77.39%), and 52 non-hypertensive(22.61%) of Mets patients& there was high statistically significant relationship between mets patients and hypertension.There was high statistically significant decrease in the level of HDL(36.06±10.86 vs44.21±14.49; P < 0.001), increase in the level of triglyceride (170.42±77.20 vs122.48±46.12; P < 0.001) and

cholesterol (192.15±56.40 vs174.08 ±56.81; P < 0.002) in metabolic patients than non metabolic patients . Coronary angigrophy results of mets patients included 35 patients with normal CA (15.29%), 18 patients for medical treatment (7.82%),139 patients for PCI (60.43%) ,38patients for CABG(16.52%).As totally 177 patients of mets patients had a significant lesion of coronary vessels(76.95%)

Conclusion :

Prevalence of metabolic syndrome is high in patients with coronary artery disease .Patients with metabolic syndrome have more severe coronary artery disease, so metabolic syndrome can be used as a tool for predicting severe CAD.

Keywords

Metabolic Syndrome ,Acute Coronary Syndrome National Heart, Lung, and Blood Institute, American Heart Association, World Heart Federation

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INTRODUCTION

Cardiovascular diseases are the main cause of death in both developed and developing countries, and coronary artery disease (CAD) is the most frequent cause of cardiovascular mortality. **[1].**

The metabolic syndrome, a concurrence of disturbed glucose and insulin metabolism, overweight and abdominal fat distribution, mild dyslipidemia, and hypertension, is most important because of its association with subsequent development of type 2 diabetes mellitus and cardiovascular disease (CVD).**[2].**

According to the 2009 statement of metabolic syndrome by the National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity; Metabolic Syndrome is defined as concurrence of three of total of five abnormal findings which are Elevated waist circumference (according to Population- and country-specific definitions), Elevated triglycerides (drug treatmentfor elevated triglycerides is an alternate indicator†) $\geq$150mg/dL (1.7mmol/L), Reduced HDL-C (drug treatment for reduced HDL-C is an alternate indicator†) $\leq$40 mg/dL (1.0mmol/L) in males; $\leq$50mg/dL (1.3mmol/L) in females, Elevated blood pressure (antihypertensive drug treatment in a patient with a history of hypertension is an alternate indicator). Systolic $\geq$130 and/or diastolic$\geq$85 mm Hg. Elevated fasting glucose (drug treatment of elevated glucose is an alternate indicator) $\geq$100 mg/dl,**[3].**

Acute coronary syndromes describe a spectrum of clinical syndromes ranging from unstable angina and Non-ST-elevation myocardial infarction to ST-elevation myocardial infarction. In this context Non-ST-elevation myocardial infarction is distinguished from unstable angina by the presence of elevated serum level of cardiac biomarkers .**[4].**

Patient with unstable angina have lower short term mortality (1.7 % at 30 days) than those with Non ST-elevation myocardial infarction (5.1% at 30 days)**[5].**

Studies have suggested that individuals with the metabolic syndrome are at a higher risk of myocardial infarction (MI) and coronary accidents even in the absence of major risk factors for CAD and require a wider range of therapeutic interventions to maintain the patency of coronary arteries **[6].** Different studies have demonstrated varying degrees of relationship between components of the metabolic syndrome and CAD, it was found that there is a direct correlation between of metabolic score and severity of coronary artery disease. **[7].**

AIM OF THE STUDY

This study aimes to evaluate the prevalence rate of metabolic syndrome between patients with Acute Coronary Syndrome admitted in Coronary Care Unit and its impact on severity of coronary lesions.

PATIENTS AND METHODS :

Patient selection:

The study included (400) patients presented with acute coronary syndrome admitted in CCU in Sohag Specialized Cardiac and Digestive System Center, The study included 287 males (71,8%) and 113 females (28,2%) .

Patients with ACS were categorized according to the presence or absence of MetS at baseline, using the 2009 definition by the National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity.

The Patients were Classified in to Two Groups :

- Group (Mets): included 230 patients with metabolic syndrome.

- Group (Non-Mets): included 170 patients with non-metabolic syndrome.

Inclusion criteria:

- Patients with Acute coronary syndrome .

Exclusion criteria:

1-Patients with non-ischemic or atypical chest pain.

2-Patients with advanced renal disease.

3Patients with advanced liver disease.

METHODS

All patient underwent the following :

A-Informed consent.

B-Full history taking: from all patients, including age, gender, smoking**,** hypertension ,diabetes mellitus ,dyslipidemia, and prior cardiac events .

C- Clinical Examination : Full clinical examination was carried out for every patient with special emphasis on the following data:1- Pulse**:** rate and rhythm.2- Blood pressure**:** 3- Head and neck examination**:** for arterial and venous pulsation.4 - Upper and lower limb examination**:** for peripheral cyanosis and lower limb oedema.5 - Chest and heart examination**:** for heart sounds, additional heart sounds, murmurs and the back for lung congesion 6 -Measurement of abdominal waist : (waist circumference >102 cm in men and >88 cm in women)

D- Total laboratory investigations including :

1- Cardiac enzyme measurement:

Biomarkers (troponin I or T, CK-MB, or bedside troponin within the first 24 hours) done by VIDAS BIOMEIUX.2-Blood Sugar level. 3-Lipid profile measuring was done after 14 hours of fasting done by phenometer 5010

E- Twelve-lead electrocardiogram (ECG). at admission to determine acute coronary syndrome and its type, by detecting ECG changes. Ischemic ECG changes criteria are new ST-segment elevation, new LBBB, ST-segment depression ≥ 1 mm or inverted T wave .

F-Trans-thoracic echocardiograghy

Transthorasic echocardiography performed with Simens ,Dimensionsechocardiograme using 3,5 MHz transducer For assessment of

- left ventricular systolic function by motion mode.
- Diastolic function.
- wall motion abnormalities.

G - **Coronary angiography:** done by using Siemens Artis zee 20×20. Invasive coronary angiography is done either immediately on admission in patients with unstable hemodynamics caused by ischemic attacks and in whom ischemic attacks cannot be controlled by intensive drug treatment or after the patient's condition has been stabilized with drug treatment

All coronary angiographies were assessed by an experienced operator blinded to all other clinical data, and assessed the severity and distribution of coronary affection , where stenosis ≥ 50% in the diameter of the left main coronary artery or stenosis ≥ 70% in one or more of the major epicardial vessels or their main branches was considered clinically significant.

H .**Statistical analysis** Statistical analysis of data

- Statistics were done by computer using Gragh Pad Instat& Med-Calc software, word processing data base and statistics programs.
- Data were described as Mean ± standard deviation for quantitative variables to measure the central tendency of data and the distribution of data around their mean and as frequency and percentage for qualitative variables.

The tests used were:

1- F analysis of variance (or ANOVO test) to test statistical significant difference(P-value) between variable means at the same time:

- Significant result is considered if $P < 0.05$.
- Highly significant result is considered if $P < 0.005$.
- Very high significant result is considered if $P < 0.001$.

2- Chi-square testwas used for comparison of distribution of qualitative variables among different groups.

RESULT

We enrolled 400 patients with Acute coronary syndrome, admitted in CCU in Sohag Specialized Cardiac and Digestive System Center, during the period of the study from October 2014 to august 2015.

A) Baseline characteristics:

A total of 400 patients of ACS met eligibility criteria ,those patients were divided into two groups :

- Group (Mets): included 230 patients with metabolic syndrome.
- Group (non-Mets): included 170 patients with non – metabolic syndrome.

Prevalence rate of metabolic syndrome between patients of ACS with results showing 230 patients(57.5%).

The Demographic data :

1-Age: ranged from 30-79 years with a mean ±SD (56.53 ± 10.01).

2-Gender: As totally 287 males (71.81%) and 113females (28.25%) .

-The group (Mets) included 161 males (70%) and 69 females (30%) .

-The group (non-Mets) included 126 males (74.11%) and 44 females (25.88%).

3-Weight: both studied groups were ranged from 60-125 kg with a mean ±SD (85.45±11.11).

4-Waist circumference: both studied groups were ranged from 68-123cm ,with a mean ± SD(94,08±10,74).

4-Lipid profile :

-HDL was ranged from 13-112mg/dl, and a mean± SD 39,52±13,15.

-LDL was ranged from 16-213mg/dl, and a mean± SD 107,39±37,37.

-Triglyceride was ranged from40-500mg/dl, and a mean± SD 150.06±69,90.

-cholesterol was ranged from 63-465mg/dl, and a mean± SD184,43±57,21.

Table (1) .Descriptive statistics for lipid profile of the studied patients.

	Mean ± SD	**Range**
HDL	39.52 ± 13.15	13 – 112
LDL	107.39 ± 37.37	16 – 213
Trigl.	150.06 ± 69.90	40 – 500
Choles	184.43 ± 57.21	63 – 465

- History of CAD: 400 patients were presented with ACS , at time of presentation was as shown in table (1) , 106 patients presented with STEMI (26.5%), 133 patients presented with NSTEMI (33.25%), 161patients presented with UA (40.25%).

-Diabetes mellitus:

-As totally 196 diabetic patients controlled on medical treatment(49.0%) and 204 patients were non-diabetics (51.0%).

- Systemic hypertension: As totally 250 hypertensive patients controlled on medical treatment (62.5%), and 150 non-hypertensive patients (37.5%).

-**History of hypercholesterolemia** : 382 patients didn't have history of hypercholesterolemia(95.5%),18 patients had history of hypercholesterolemia(4.5%).

-Smoking:

In the study groups, 202 patients were smokers (50.5%) ,current 121 smokers (30.25%),former 81smokers (20.25%)and 198 patients were non- smokers (49.5%).

Table (2) .Descriptive statistics for patients of acute coronary syndrome, smoking ,diabetes mellitus, hypertension, history of Hypercholesterolemia.

		No.	**%**
HX. Relevant to CAD	MI	106	26.5%
	NSTEMI	133	33.25%
	UA	161	40.25%
Smoking status	Current	121	30.25%
	Former	81	20.25%
	Never	198	49.5%
Diabetes mellitus	Diabetic	196	49,0%
	Non-diabetic	204	51.0%
HTN	No	150	37.5%
	Yes	250	62.5%

HX. of Hyprecholest	No	382	95.5%
	Yes	18	4.5%

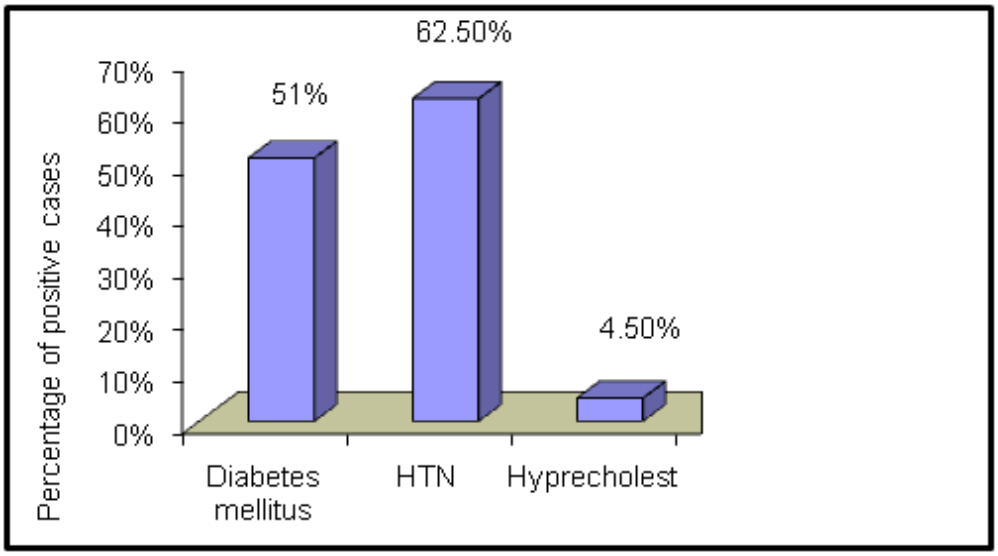

Figure (1) .Percentage of positive risk factors among the studied patients.

- Controlled hypertensive patients had a systolic B.P ranged from 100 to 170 mmhg , with a mean 125 ± 14.77 mmhg. While diastolic B.P ranged from 60 to 100 mmhg , with a mean 76.24 ± 8.49 mmhg..

- Controlled diabetic patients had fasting blood sugar ranged from 85 to 295 mmhg ,with a mean 134.79 ± 36.35mmhg.

Table (3) . Descriptive statistics for blood pressure and fasting blood sugar of patients controlled on medical treatment.

	Mean ± SD	**Range**
Systolic	125.77 ± 14.45	100 – 170
Diastolic	76.24 ± 8.49	60 – 100
FBS	134.79 ± 36.35	85 – 295

Statistical analysis to detect the relationship between metabolic syndrome and non-metabolic syndrome among ACS patients with different variables in the study :

1- Relationshipbetween mets and non-mets regarding age **:**

-In (mets) group: age ranged from 30 to 79 years with a mean 56.92 ± 9.80 year .

-In (non-mets) group: age ranged from 33 to 78 years with a mean 56.01 ± 10.31.
-There is no statistically significant difference found between mets and age .

Table (4). Relationship between mets and non-mets regarding age.

	Age			**T-test**	
	Range	**Mean ± SD**		**T**	**P-value**
Mets	30.00 - 79.00	56.92 ± 9.80		0.904	0.367
Non-mets	33.00 - 78.00	56.01 ± 10.31			

2- Relationship between mets and non-metsregading gender:

-The group (Mets) included 161 males (70%) and 69 females (30%).

-The group (non-Mets) included 126 males (74.1%) and 44 females (25.88%).

- There is no statistically significant difference between two groups and gender.

3-Relationship between mets and non-mets regarding waist circumference and weight::

-The group (Mets) waist circumference ranged from 70-123cm with a mean ± SD(96.77± 10,35),the group(non-Mets) waist circumference ranged from 68-120cm with a mean ± SD(90.44± 10.20).

-The group (Mets) weight ranged from 65-125kg ,with a mean ± SD(88.10± 11.25), the group(non-Mets) weight ranged from 60-115kg with a mean ± SD(81.85± 9.86).

- There was high statistically significant relationship between mets and waist circumference.

-There was high statistically significant relationship between two groups and weight p-value<0.001.

Table (5) .Relationship between waist circumference, weight with mets and non-mets.

		Mets	**Non-mets**	**Independent t-test**	
				T	**P-value**
Waist Circumference	Mean ± SD	96.77± 10.35	90.44 ± 10.20	6.086	<0.001
	Range	70 – 123	68 – 120		

Weight	Mean ± SD	88.10 ± 11.25	81.85 ± 9.86	5.786	<0.001
	Range	65 – 125	60 – 115		

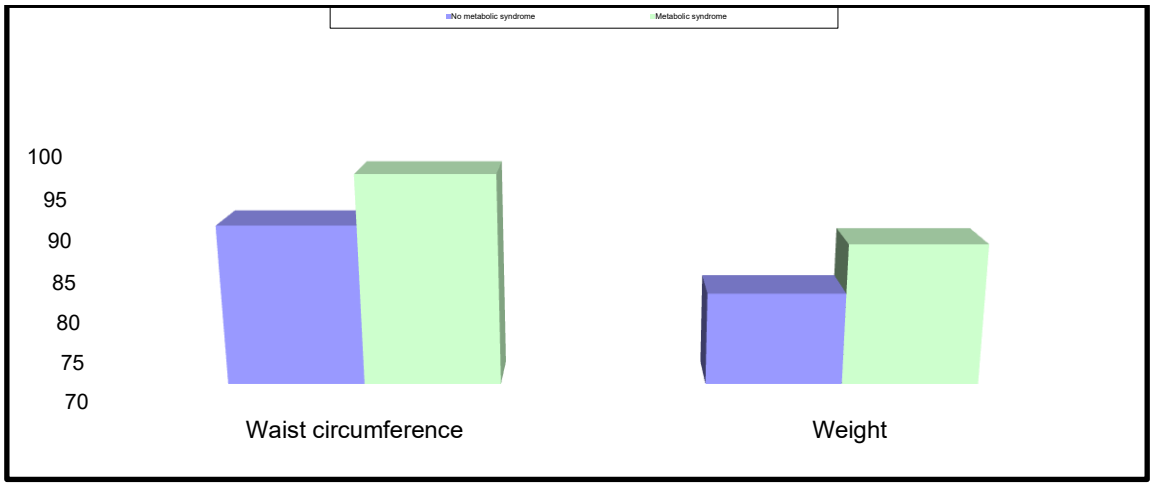

Figure (2) .Comparison between patients with mets and non-mets regarding waist circumference and weight.

4-Relationship between diabetes mellitus withmets and non-mets :

- There were 147 diabetic patients (63.91%), and 83 non-diabetic (36.18%) of Mets patients.

-There were 49 diabetic patients (28.8%),and 121non-diabetcs (71.17%)of non-Mets patients.

-There was high statistically significant relationship between two groups and diabetes mellitus.

Table (6) .Relationship between mets and non-mets regarding D.M.

D.M.	Mets		Non-mets		Total		Chi-square	
		%		%		%	X^2	P-value
Yes	47	63.91%	9	28.83%	96	49%	48.162	<0.001
No	3	36.18%	21	71.17%	04	51%		
Total	30	100.00%	70	99.97%	00	100%		

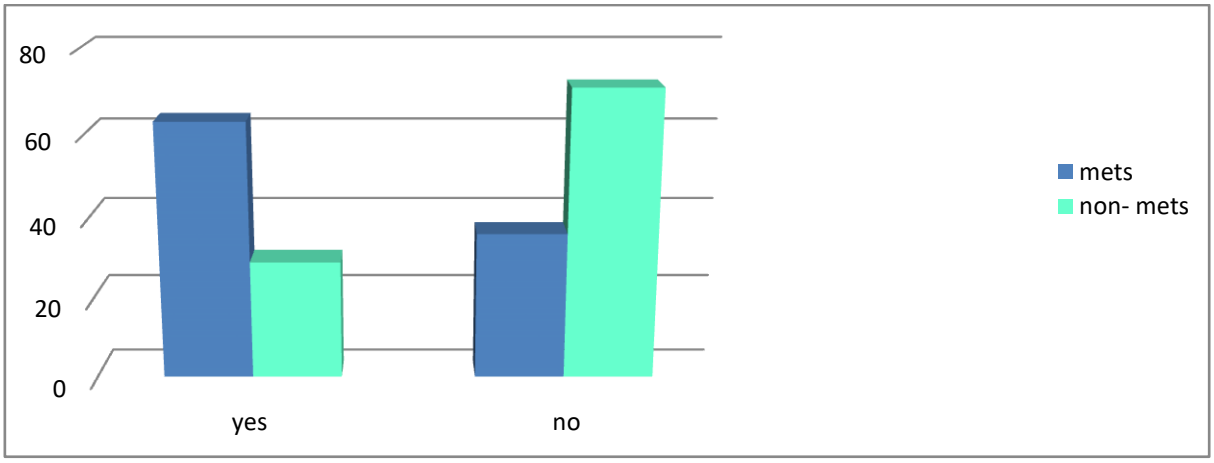

Figure (3) .Comparison between patients with mets and non- mets regarding D.M.

5-Relationship between mets and non-mets regardinghypertension :

-There were 178 hypertensive patients (77.39%), and 52 non-hypertensive(22.61%) of Mets patients.

-There were 72 hypertensive patients(42.35%),and 98 non-hypertensive (57.64%)of non-Mets patients.

There was high statistically significant relationship between two groups and hypertension.

Table (7) .Relationship between mets and, non –mets .patients regarding HTN.

resting H.T.N	mets		Non-mets		Total	Chi-square	
		%		%	N	X^2	P-value
Yes	78	77.39%	2	42.35%	250	51.203	<0.001
No	2	22.61%	8	57.65%	150		
Total	30	99,99%	70	99,99%	400		

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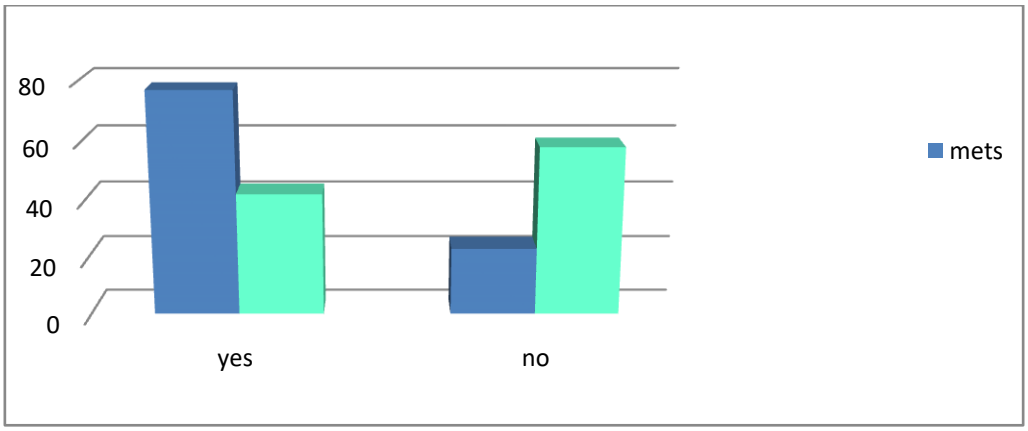

Figure (4) .Comparison between mets and non-mets patients regarding HTN.

Table (8) .Comparison between non-mets and mets patients regarding blood pressure and fasting blood sugar.

		Non-mets	Mets	Independent t-test	
				t	P-value
Systolic	Mean ± SD	122.60 ± 13.85	128.10 ± 14.47	3.818	<0.001
	Range	100 - 170	100 - 170		
Diastolic	Mean ± SD	74.85 ± 7.99	77.26 ± 8.71	2.826	0.005
	Range	60 - 95	60 - 100		
FBS	Mean ± SD	126.68 ± 33.11	140.77 ± 37.52	3.901	<0.001
	Range	85 - 270	88 - 295		

The previous table shows that there was high statistically significant increase in blood pressure and fasting blood sugar in metabolic patients than non metabolic patients.

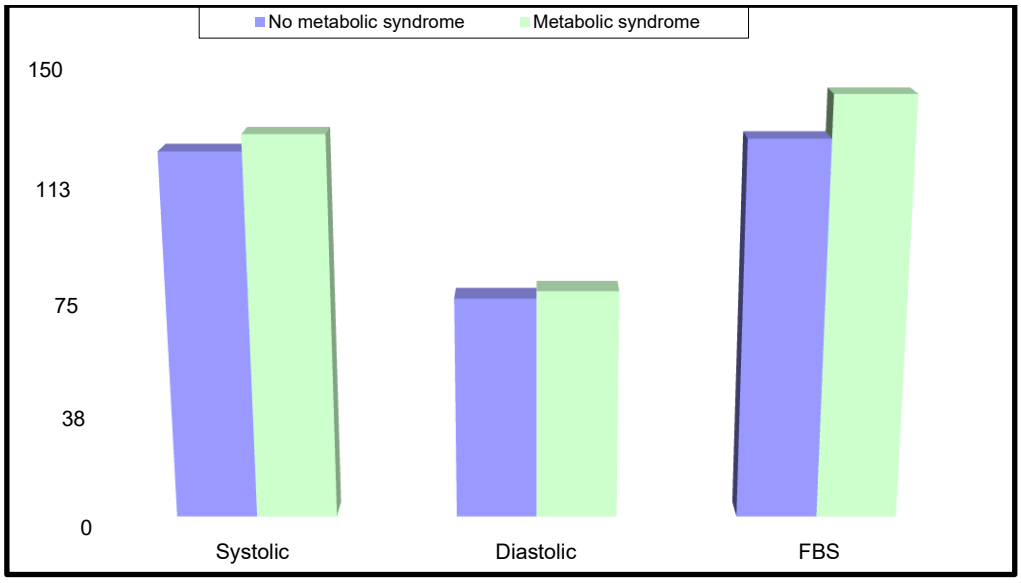

Figure (5).Comparison between patients with mets and non-mets regarding blood pressure and fasting blood sugar.

6-Relationship between mets ,and non-mets regarding a history of hypercholesterolemia:

-There were 17patients (7.39%) who had a history of hypercholestermia, and 213did n'thave a history of hypercholestermia (92.61%)of Mets patients.

-There was one patient had a history of hypercholestermia (0.58%),and 169 did n't have a history of hypercholestermia (99.42%) of non-Mets patients.

-There was high statistically significant relationship between two groups and a history of hypercholesterolemia.

Table (9) . Relationship between mets ,and non-mets regarding a history of hypercholesterolemia.

Hx Hypercholesterolemia	Mets		Non-mets		Total		Chi-square	
		%	N	%	N	%	X^2	P-value
Yes	17	7.39%	1	0.58%	18	4.5%	10.527	0.001
No	213	92.60%	169	99.41%	382	95.5%		
Total	230	99.99%	170	99.99%	400	100.00		

6-Relationship between mets and non-mets regarding the presentation of patients in CCU:

-106 patients presented by STEMI (26.52%), 74 patients presented by NSTEMI(32.17%),and 95patients presented by UA(41.30%) of mets patients.

While 45 patients presented by STEMI (26.47%), 59 patients presented by NSTEMI(34.70%),and 66 patients presented by UA(38.82%) of non-mets.

-There was no statistically significant difference found between them.

Table (10). Relationship between mets and non-mets regarding a history of C.A.D.

Hx. of CAD	mets		Non-mets		Chi-square	
		%	N	%	X^2	P-value
MI	1	26,52%	45	26,47%	0.000	1.000
NSTEMI	4	32,17%	59	34,70%	0.282	0.595
UA	5	41,30%	66	38,82%	0.25	0.617

7- Relationship between mets and non-mets regarding smoking status :

-The mets group included 69 current (30.01%),41 former(17.82%) smokers and 120 not smokers patients (52.17%).

-The non- mets group included 52current(30.58%) ,40 former(23.52%) smokers ,and 78 not smokers patients(45.88%).

Table (11).Relationship between mets and non-mets regarding smoking status.

Smoking status.	mets		Non-mets		Chi-square	
		%	N	%	X^2	P-value
Current	9	30%	52	30,58%	0.016	0.899
Former	1	17,82%	40	23,52%	1.969	0.160
Never	20	52,17%	78	45,88%	1.548	0.213

8-Relationship between mets and non-mets regarding lipid profile:

There was high statistically significant decrease in the level of HDL(36,06±10,86 vs44,21±14,49; P < 0.001), increase in the level of triglyceride(170,42±77,20 vs122,48±46,12; P < 0.001) and cholesterol (

192,15±56,40 vs174,08 ±56,81; P < 0.002) in metabolic patients than non metabolic patients ,while no statistically significant difference found between them regarding LDL level (110,07±39,38 vs103,76±34,23 ; P <0.095.

Table (12). Relationship between mets and non-mets regarding lipid profile.

		Non-metabolic syndrome	Metabolic syndrome	Independent t-test	
				T	P-value
HDL	Mean ± SD	44.21 ± 14.49	36.06 ± 10.86	-6.432	<0.001
	Range	19 - 112	13 – 69		
LDL	Mean ± SD	103.76 ± 34.23	110.07 ± 39.38	1.672	0.095
	Range	33 - 198	16 – 213		
Trigl.	Mean ± SD	122.48 ± 46.12	170.42 ± 77.20	7.181	<0.001
	Range	53 - 300	40 – 500		
Choles	Mean ± SD	174.08 ± 56.81	192.15 ± 56.40	3.153	0.002
	Range	93 - 383	63 – 465		

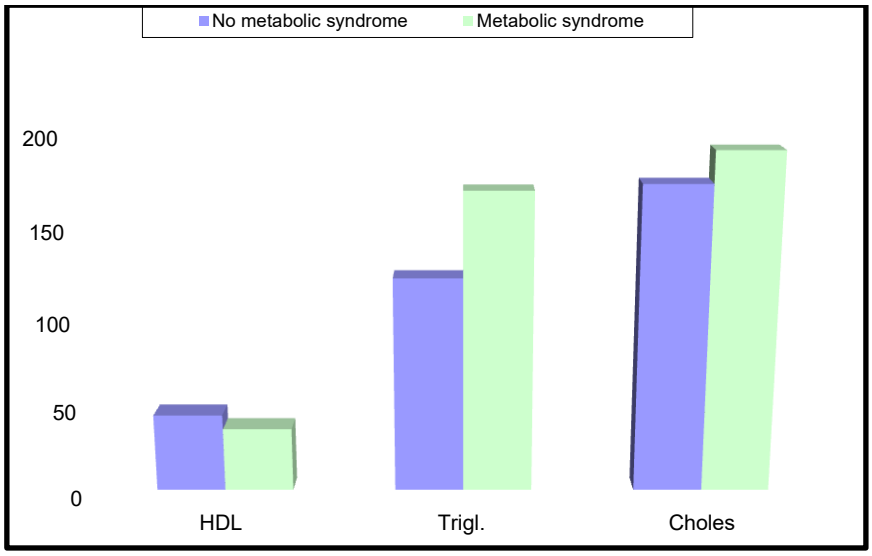

Figure (6) .Comparison between patients with mets and non- mets regarding HDL, triglyceride and cholesterol.

Relationship between mets and non-mets regarding coronary angiography results :

-Themets group included 35 patients with normal CA (15.29%),18 patients for medical treatment (7.82%),139 patients for PCI (60.43%) ,38patients for CABG(16.52%).

-As totally 177 patients of mets group had a significant lesion of coronary vessels(76.95%).

-The non- mets group 60 patients with normal CA (63.25%), 29 patients for medical treatment (17.05%),61 patients for PCI (35.88%) , 20 patients for CABG(8.82%).

-As totally 81 patients of non-mets group had a significant lesion of coronary vessels.(47.64%).

_There was high statistically significant relationship between mets and presence of a significant lesion of coronary vessels , while there was no statistically significant relationship between mets patients and non- a significant lesion of coronary vessels.

Table (13) .Relationship between mets and non-mets regarding coronary angiography results.

Angiogram results	Mets		Non-mets		Chi square test	
	No.	%	No.	%	X^2	P-value
Normal	35	15,21 %	60	35,29%	2,354	0.43
Medical	18	7,82%	29	17,05%	1.315	0.251

PCI	139	60,43 %	61	35,88%	7,213	<0.01
CABG	38	16,52 %	20	8,82%	0.431	0.01

-As totally 177 patients of mets group & 81 patients of non-mets group had a significant lesion of coronary vessels .

Single vessel diseases decrease of percentage (49.15% vs 64.19%),two vessels diseases increase of percentage (29.37% vs 20.98%),and multi vessels diseases increases of percentage (21.46% vs 14.81%) of metabolic syndrome than non-metabolic syndrome.

Coronary artery affected in mets group included LM (6.77%), LAD (55.93%) ,LCX(11.93%),and RCA (25.98%) .

Coronary artery affected in non-mets group included LM (7.40%),LAD (51.85%) ,LCX(8.64%),and RCA (32.09%).

Table (14). Relationship between mets and non-mets regarding number of vessels affected

Angiogram results	**Mets**		**Non-mets**	
	No.	**%**	**No.**	**%**
Single vessel diseases	87	49.15%	52	64.19%
Two vessels diseases	52	29.37%	17	20.98%
Multivessels diseases	38	21.46%	12	14.81%
Totally	177	99.98%	81	99.98%

Table (15) . Relationship between mets and non- mets regarding distribution of vessels affected**.**

Coronary artery affected	Mets			Non- mets		
	NO	%	% of	No.	%	% of lesions

			lesions			
LM	12	6.77%	90-95%	6	7.40%	85-90%
LAD	99	55.93%	75-95%	42	51.85%	65-85%
LCX	20	11.93%	75-95%	7	8.64%	70-90%
RCA	46	25.98%	70-95%	26	32.09%	50-85%
Totally	177	99.98%	-	81	99.98%	-

DISCUSSION

Cardiovascular diseases are the main cause of death in both developed and developing countries .**[8].**

CAD accounts for the greatest number of cardiovascular diseases (CVDs) in the world & a leading cause of death globally 140

Metabolic syndrome is an important and widely seen health problem across the world in the 21stcentury **[9].**

The WHO reported in 2009 that CAD is now the leading cause of death worldwide; it is on the rise and has become a true pandemic that respects no borders **[10].**

Metabolic syndrome patients have a significantly greater risk for the development of cardiovascular disease in general and coronary artery disease (CAD) in particular**[11].**

This work was aiming at studying relationship between metabolic syndrome & CAD occurring in patients In our study , prevalence of metabolic syndrome identified According to the 2009 statement of metabolic syndrome by the National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity among patients presenting with ACS is about (57,5%), this was in agreement with findings of other authors , e.gKoutsovasilis A. et al (2009) reported it to reach about 72 % in patients with ACS in certain populations, it was about 46% patients presented with ACS in six Middle Eastern arabian countries using the same 2009 definition (but patients are of no special age), study done by Jassim Al Suwaidi et al. **[12].**

In our study , included 400 patients hospitalized for ACS, we found 230 (57,5%) patients of metabolic syndrome ,and 170 (42,5%) patients of non Mets

This is supported by reports of the prevalence of MetS in United Arab Emirates(UAE) (67.6%) was very similar to the 66% recently reported for an ACS population in Oman **,[13].**.

There was no statistical difference between the mean age of the patients having metabolic syndrome and patients without Met S (P=0.367).

This result is similar to that in the study of NohaHassanin et al **,** who conducted a study on 122 patients of ACS subjects, with no statistically significant difference in age between metabolic and non metabolic syndrome patients (P = 0.148**)[14].)**

This result is also similar to that in the study , Al-Aqeedi et al, 467 consecutive patients hospitalized for ACS, with no statistically significant difference in age between metabolic and non Mets patients (p=0.012) **[15].**

This finding is of significant concern because studies as.**[16]**. have shown decreased survival in women with MS compared to women without MS. Earlier studies have reported mixed results regarding predisposition of sex to development of MS. Some have indicated increased prevalence in females, others studies as Sawantetal, have indicated increased prevalence in men while a study in US reported little difference in prevalence in general population between men and women. **[17].**

Regarding waist circumference and Weight

In our study ,there was highly statistically significant difference between metabolic syndrome and non metabolic syndrome patients regarding waist circumference and weight (.p=<0.001)

This result is similar to that in the study of Al-Aqeedietal Patients with MS had a higher prevalence waist circumference and weight as compared to the group without MS(p<0.001**).[17].**

This result is also similar to that in the study of Al Suwaidietel,between patients of Mets and non metabolic syndrome patients regarding waist circumference and wieght(p=<0.001)**.[16].**

Regarding diabetes mellitus and hypertension: there was high statistically significant relationship between metabolic syndrome and them with p=<0.001. This is supported by Al-Aqeedietal , 467 consecutive patients hospitalized for ACS, there was a higher prevalence of diabetes and hypertension among patients in the Mets than in the non-Mets group (p=<0.001).

This That is similar to the studyofAbdullaShehabetal , Of 1259 patients with ACS in the(UAE), there was a higher prevalence of diabetes and hypertension among patients in the Mets than in the non-Mets (p=<0.006).

[13]. It is agree with the study of Hasanin et al have reported**,** 122 patients of ACS at Kasr Al Ainy Hospital **,** the prevalence of hypertension and diabetes were found to be significantly higher in Mets patients (P = 0.007) than non Mets . **[14].**

Regarding lipid profile; In our study shows that there was high statistically significant decrease in the level of HDL and increase in the level of triglyceride and cholesterol in metabolic patients than non metabolic patients while no statistically significant difference found between them regarding LDL level (p-value <0.001).

This is supported by Al-Aqeedietal,the mean value of HDL was significantly lower in MS than in non-MS patients(p<0.001), While triglycerides mean value was significantly higher in MS than in non-MS patients(p<0.001)**.**

This is also similar to NohaHassaninetal, The most frequent metabolic risk in patients with metabolic syndrome was reduced HDL-C. Seventy-one patients (87.6%) had low HDL (P< 0.001),52 patients (64.1%) had elevated triglycerides,

(P< 0.001).**[14]**

This finding is in agreement with Abdulla Shehabetal , showed that there was highly statistically significant decrease HDL-C levels (P < 0.001),with higher total cholesterol (P < 0.001), low-density lipoprotein cholesterol (P = 0.045), and triglycerides (P = 0.001)in patients of Mets than non-Mets.**[13]**.

Regarding coronary angiography results: our study included 177 patients had a significant lesion of coronary vessels of mets(76,9%) ,and 85 patients had a significant lesion of coronary vessels of non- mets (50%).

It was found to be statistically significantly higher in patients with metabolic syndrome than those without (P = 0.001).

It is agree with the study of NohaHassanin et al have reported**,** 122 patients of ACS at Kasr Al Ainy Hospital , Patients were subjected to coronary angiography. Totally occluded vessels were found in 33.3% of metabolic syndrome patients and in 26.8% of non metabolic syndrome patients (P< 0.05). ; it was found to be statistically significantly higher in patients with metabolic syndrome than those without. **[14].**

It is agree with the study DeryaAtiketal have reported , 335 patients of ACS at the Cardiology Clinic of a Private Hospital in Osmaniye , patients were subjected to coronary

Angiography ,reported patients 40,3% for PCI, and coronary artery bypass grafting (CABG) was decided for 15.5% of them,**[18].**

CONCLUSIONS

In our study, we could conclude that :

-Prevalence of metabolic syndrome is high in patients with coronary artery disease .

- Detection of metabolic syndrome and assessment of metabolic risk score improves risk assessment for CVD .

-Patients with metabolic syndrome have more severe coronary artery disease, so metabolic syndrome can be used as a tool for predicting severe CAD .

-No enough data available regarding the contributing factors and the rate of increasing prevalence of metabolic syndrome in patients of our community .

-Preventive measures against metabolic syndrome and its components are very important and could be helpful for avoiding large economic burden of secondary prevention.

RECOMMENDATION

Searching for metabolic risk factors and presence of metabolic syndrome among people at risk for CVD ,or already have some form of it, is a very important issue and should be an integral step at evaluation of these patients either during routine examination or if they present at hospital with acute cardiovascular events; this is especially important ,as from the above data , MetS could be considered as a contributor to disease progression, before the development of clinically detected CAD or DM; also, its relevance in patients who have already experienced a coronary event, as a predictor of future risk and cardiovascular (mainly CAD) event recurrence.

The literature and current status of our knowledge on the MS/CAD association strongly suggests more studies are needed to detect factors that contribute to the increasing prevalence of metabolic syndrome in our population especially in young (e.g. life style changes) and the magnitude of the problem regarding its impact on increasing incidence of coronary artery disease in young adults and worsening prognosis. We should do further studies that aim at defining metabolic syndrome in the most accepted way for our community (considering racial and demographic criteria for our population).

Preventive and therapeutic strategies against metabolic syndrome or its individual components are strongly needed with evaluation of their cost benefit effectiveness in order to choose the best.

Preventive strategies should include increasing awareness of the general population about faulty lifestyle and behavioral changes and importance of early management of metabolic derangements

STUDY LIMITATION

The current study has the following limitations:

It included only one medical center

The number of our study population is not large enough to consolidate our findings regarding the prevalence of metabolic syndrome globally allover Egypt

Waist circumference threshold used in diagnosis of metabolic syndrome in our study is derived from European data as no strong national data available considering the high rate of obesity in Egypt

Fasting blood glucose was measured during hospital admission for acute coronary syndrome, during this period the patient may have stress hyperglycemia, this may overestimate the prevalence of metabolic syndrome (especially with the last definition criteria for metabolic syndrome that are used in our study, fasting blood glucose level is to be considered as a positive criteria at 100 mg/dl). The same also may apply for the condition of blood pressure levels used in this definition, Systolic >130 and/or diastolic > 85 mm Hg.

SUMMARY

Cardiovascular diseases are the main cause of death in both developed and developing countries, and coronary artery disease (CAD) is the most frequent cause of cardiovascular mortality.

Different studies have demonstrated varying degrees of relationship between components of the metabolic syndrome and CAD, it was found that there is a direct correlation between of metabolic score and severity of coronary artery disease.

At the same time there is increasing prevalence of metabolic syndrome in patients. This study was conducted to study the prevalence and relationship between metabolic syndrome and extent of CAD in patients. We studied 400 patients at Sohag cardiac specialized center, all of them presented with acute coronary syndrome. Clinical examination, twelve lead ECG,,transthrorasicechocardiology ,laboratory examination and coronary angiography were done for all the patients. Metabolic syndrome was assessed for all the patients using the 2009 statement of metabolic syndrome by the National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity; as the most recent definition for diagnosing metabolic syndrome. For each patient metabolic risk score was calculated

As totally,the prevalence rate of metabolic syndrome between patients of ACS in our study was 230 patients(57.5%).

230 patients with metabolic syndrome,70%males&30% females and no statistically significant difference between mets and gender.

Waist circumference ranged from 70-123cm with a mean ± SD(96.77± 10.35)of mets patients ,&there was high statistically significant relationship between mets and waist circumference.(p_value<0,001)

Weight ranged from 65-125kg , with a mean ± SD(88.10± 11.25) of mets patients &there was high statistically significant relationship between mets and weight (p_ value<0,001).

147 diabetic patients (63.91%), and 83 non-diabetic (36.18%) of Mets patients. & there was high statistically significant relationship between mets patients and diabetes mellitus.

178 hypertensive patients (77.39%), and 52 non-hypertensive(22.61%) of Mets patients& there was high statistically significant relationship between mets patients and hypertension.

There was high statistically significant decrease in the level of HDL(36.06±10.86 vs44.21±14.49; P < 0.001), increase in the level of triglyceride (170.42±77.20 vs122.48±46.12; P < 0.001) and cholesterol (192.15±56.40 vs174.08 ±56.81; P <0.002) in metabolic patients than non metabolic patients ,while no statistically significant difference found between them regarding LDL level (110.07±39.38 vs103.76±34.23 ; P <0.095.

Coronary angigrophy results of mets patients included 35 patients with normal CA (15.29%), 18 patients for medical treatment (7.82%),139 patients for PCI (60.43%) ,38patients for CABG(16.52%).

As totally 177 patients of metspatients had a significant lesion of coronary vessels(76.95%)

There was high statistically significant relationship between mets and presence of a significant lesion of coronary vessels , while there was no statistically significant relationship between mets patients and non- a significant lesion of coronary vessels.

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