

A Study on Prevalence of Metabolic Syndrome in Coronary Artery Disease and Cerebrovascular Accident Patients

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Abstract

INTRODUCTION: The metabolic syndrome (MetS) is a major and escalating public-health and clinical challenge worldwide in the wake of urbanization, surplus energy intake, increasing obesity, and sedentary life habits. Metabolic syndrome (MetS) is widely used as a measure to predict the future risk of T2DM (Type II Diabetes Mellitus) and CVD (Cardiovascular Disease). Association between MetS and stroke has been confirmed in populations integrated by elderly subjects, and the frequency of MetS has been reported to be significantly higher in patients with a history of atherothrombotic or nonembolic ischemic stroke. This study was conducted in hundred patients who presented with either coronary artery disease or cerebrovascular accidents to know the prevalence of metabolic syndrome and its individual components as per NCEP: ATP III 2001 criteria.

METHODS: 50 Patients who had ECG and ECHO findings suggestive of coronary Artery disease. 50 Patients who had clinical & CT scan findings of cerebrovascular accident.

RESULTS : Prevalence of metabolic syndrome was about 52% in CAD patients and 46% in stroke patients as per this study. Among the individual components of metabolic syndrome, it is observed in this study that the decreasing order of prevalence is Hypertension, dyslipidemia, impaired fasting glucose and increased waist circumference in a total of 49 Metabolic syndrome cases.

CONCLUSIONS: There is high prevalence of metabolic syndrome in CAD and CVA patients. There is a strong association of central obesity, dyslipidemia, hypertension, Diabetes mellitus, smoking with metabolic syndrome. There is decreased prevalence of metabolic syndrome among alcoholics. As age advances, prevalence of metabolic syndrome also increases. Females have increased prevalence of metabolic syndrome.

Date of Submission: 24-10-2019

Date of Acceptance: 09-11-2019

I. Introduction and Background

The risk of developing type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD) increases with age,^{13, 14, 15} and with a generally aging population,¹⁶ definite measures of disease risk in elderly individuals are necessary. Such strategy would facilitate timely preventive approaches to reduce the disease burden, as well as medical costs in an aging population^{17, 18}. The metabolic syndrome (MetS) is a major and escalating public-health and clinical challenge worldwide in the wake of urbanization, surplus energy intake, increasing obesity, and sedentary life habits. Metabolic syndrome (MetS) is widely used as a measure to predict the future risk of T2DM (Type II Diabetes Mellitus)^{9, 10} and CVD (Cardiovascular Disease)^{11, 12}. Association between MetS and stroke has been confirmed in populations integrated by elderly subjects, and the frequency of MetS has been reported to be significantly higher in patients with a history of atherothrombotic or nonembolic ischemic stroke^{19, 20, 21}. MetS is considered as a first order risk factor for atherothrombotic complications. Its presence or absence should therefore be considered an indicator of long-term risk. On the other hand, the short-term (5–10 years) risk is better calculated using the classical algorithms (Framingham, REGICOR {Registre Glorí del COR}), as they include age, sex, total cholesterol or LDL, and smoking.

Depending on the definition used, the metabolic syndrome may include measures of general obesity (as reflected by BMI), central obesity (as reflected by WC or WHR), dyslipidemia (low HDL-C and / or high Triglyceride levels), hyperglycemia, high blood pressure and resistance to the action of Insulin.¹ The increasing prevalence of obesity across the world will result in increasing prevalence of metabolic syndrome. The increasing prevalence of metabolic syndrome increases the risk for developing diabetes and cardiovascular disease.

This study was conducted in hundred patients who presented with either CAD or CVA to know the prevalence of metabolic syndrome and its individual components as per NCEP: ATP III 2001 criteria.

Aims of Study

To assess the prevalence of metabolic syndrome in Coronary Artery Disease and Cerebrovascular Accident patients and association of Smoking and Alcohol with metabolic syndrome and difference in distribution of Metabolic syndrome in young and old and difference in distribution of metabolic syndrome in males and females.

II. Materials and Methods

This study was conducted in KING GEORGE HOSPITAL/ ANDHRA MEDICAL COLLEGE VISAKHAPATNAM in the Department of Internal Medicine. The Study period extended between June 2016 to May 2017. All patients were thoroughly evaluated with a detailed history and appropriate investigations as per proforma. Metabolic syndrome in study subjects was diagnosed as per NCEP : ATP III 2001 criteria. 50 Patients who had ECG and ECHO findings suggestive of coronary Artery disease and 50 Patients who had clinical & CT scan findings of cerebrovascular accident. Already known dyslipidemic, hypertensive & diabetic were also included. Patients who smoke and consume alcohol. Patients with family history of dyslipidemia, diabetes, Hypertension, CAD & CVA were included. Patients with Valvular Heart disease, psychiatric illness on Antipsychotics, antiretroviral therapy on oral contraceptives, and patients with meningitis, systemic Malignancy, Nephrotic syndrome and vasculitis were excluded from this study.

To measure waist circumference, top of right iliac crest located. A measuring tape was placed in a horizontal plane around abdomen at level of iliac crest. Before reading measurement, it is estimated that the tape is snug but does not compress the skin and is parallel to floor. Measurement was at the end of normal expiration. Blood samples for fasting blood glucose were taken after eight hours overnight fast, lipid profile were taken after 12 hours overnight fast, Blood pressure was recorded in right upper limb with patient in sitting posture and for CVA patients it was recorded in supine posture.

Observations and Results

Total 100 cases were included of which 50 were with CAD, 50 with CVA, Of 50 CAD patients 35 were males and 15 were females with male preponderance by male to female ratio of 2.3:1, Of 50 CVA patients 36 were males and 14 were females with male preponderance by male to female ratio of 2.5:1 (table 1 & 2), prevalence of metabolic syndrome is higher in elderly, almost 90% in the age group >70yrs when compared to 27% in 28-40 year age group (table 3). MetS incidence is higher in females 62%, when compared to males - 44%, prevalent in 52% of CAD patients and 46% of stroke patients (table 4 & 5), Decreasing order of prevalence of individual components as per this study hypertension (96%), dyslipidemia, impaired fasting glucose (67%) and increased waist circumference (59%) in a total of 49 metabolic syndrome cases (table 6), highly prevalent in hypertensives (73% vs 37%) compared to non hypertensives, diabetics (81% vs 38%), smokers (51% vs 47%), non alcoholics (58% vs 37%). (table 7, 8, 9, 10)

Table: 1

Sex	Number of Patients(%)
Male	35 (70%)
Female	15 (30%)

Table: 2

Sex	Number of Patients(%)
Male	36 (72%)
Female	14 (28%)

Table: 3

S.No	Age	Number of Patients	Metabolic syndrome Patients (%)
1.	28-40	11	3 (27%)
2.	41-50	15	4 (27%)
3.	51-60	39	22 (56%)
4.	61-70	25	13 (52%)
5.	>70	10	9 (90%)

Table: 4

Sex	No of Patient	Metabolic Syndrome Patients (%)
Male	71	31 (44%)
Female	29	18 (62%)

Table: 5

Group	No of Patients	No of Mets Patients(%)
CAD	50	26 (52%)
CVA	50	23 (46%)

Table: 6

Risk Factor	Male	Female	Total
Central obesity	48%	78%	59%
TGL ≥ 150 or on treatment for Hypertriglyceridemia	61 %	94%	73%
Low HDL <40 and <50 in males and females respectively	77%	77%	77%
BP ≥ 130/85 or on Rx for Hypertension	74%	94%	96%
FBG ≥ 100mg / dl or on Rx for Diabetes.	74%	56%	67%

Table: 7

Group	No of Patients	No of Mets Patients(%)
Hypertensive	33	24 (73%)
Non - Hypertensive	67	25 (37%)

Table: 8

Group	No of Patients	No of Mets Patients (%)
Diabetic	26	21 (81%)
Non-diabetic	74	28 (38%)

Table: 9

Group	No of Patients	No of Mets Patients(%)
Smokers	39	20 (51%)
Non-Smokers	61	29 (47%)

Table: 10

Group	No of Patients	No of Mets Patients(%)
Alcoholics	41	15 (37%)
Non alcoholics	59	34 (58%)

III. Discussion

In our study, the prevalence of MetS in CAD patients was 52% and 46% in CVA patients correlating with study performed regarding the prevalence of MetS in CAD and CVA patients by Sumit Pal Singh Chawla et al.,2014² in CAD patients, 58% and among CVA patients, 46% had metabolic syndrome.

Components of MetS have various effects on CVD, however, each component acts as an independent risk factor for CAD/CVA, and all of them interact synergistically, and thus lead to increased risk of CAD/CVA. The prevalence of individual components of MetS with various rates in CAD/CVA patients has been reported in earlier studies Ming-Hui Gui et al³, 2016 hypertension in 90.9%, elevated TG in 80.9%, Reduced HDL in 79.8%, increased waist circumference 62.4%, impaired fasting blood glucose 44.8%, N.Senthil et al⁴, 2015 Prevalence is Hypertension 85%, impaired fasting Glucose/diabetes 72%, dyslipidemia-(High TGL- 70% and low HDL – 66%) and increased waist circumference 42% in a total of 53 metabolic syndrome cases. The abdominal obesity, dyslipidemia (high TG and low HDL-C) hypertension and hyperglycemia most often were reported as the MS components, and the severity of CAD/CVA increased with the number of components. The results of present study showed decreasing order of prevalence is hypertension, dyslipidemia, impaired fasting glucose and increased waist circumference in a total of 49 metabolic syndrome cases.

A study reported that the prevalence of CAD/CVA in the diabetic patients with MetS was significantly higher than in those without MetS⁵. Other investigation also reported that the long-term diabetes is linked to development of atherosclerosis.

It has been clarified that hypertension as one of the components of MetS, several cross-sectional investigations performed have shown that the incidence rate of hypertension was significantly higher in CAD patients compared to healthy population and in non-insulin-treated than insulin-treated type 2 diabetes mellitus. It was higher in men than in women, and increased with older age.⁶

Ishizaka nobukazu and his colleagues⁷ in their study has shown that both former and current smoking was associated with an increased incidence of metabolic syndrome, and the finding that former and current smokers have lower HDL-C levels. Present study showed MetS was present in 51% smokers slightly higher compared to non smokers.

Present study showed MetS prevalence in alcoholic is 37% which is lower than in non alcoholic group..Bruna Angelo Vieira et al⁸, 2016 Association of alcohol ingestion with the metabolic syndrome depends

on much more than the mere quantity ingested. When taken with meals, alcohol was consistently associated with a lower frequency of the metabolic syndrome than when taken outside of meals. This translated into the syndrome being significantly less frequent in those taking alcohol in smaller quantities with meals, and significantly more frequent in those taking alcohol in larger quantities outside of meals.

It seems that modification in food pattern and lifestyle among population leads to low activity and increases abdominal obesity, resulting in an increase in the rate of all coronary risk factors. Since many of those at risk are not identified, further prospective studies are recommended for more clarification.

Limitations of Study

Age specific prevalence rates may not reflect exact prevalence in general CAD & CVA patients. Prevalence of Hyperinsulinemia was not determined in this study as serum Insulin measurement is not a criteria for diagnosis of Mets as per NCEP : ATP III. Waist circumference in most of the stroke patients could only be measured in supine posture.

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Mounika Chintada. "A Study on Prevalence of Metabolic Syndrome in Coronary Artery Disease and Cerebrovascular Accident Patients." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 11, 2019, pp 49-52.