Profile of Metabolic Syndrome in a Tertiary Care Hospital

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ABSTRACT

Introduction: Risk of developing cerebrovascular disease (CVD) is two times more and type 2 diabetes mellitus is four times more in people with metabolic syndrome as compared to subjects without metabolic syndrome. A prospective cross-sectional study was undertaken to explore the prevalence of metabolic syndrome in subjects with abdominal obesity in Rohilkhand region of U.P. attending Rohilkhand medical college (RMCH), Bareilly.

Material and methods: The prevalence of Metabolic syndromewas assessed in a group of 100 patients having abdominal obesity (waist circumference >90 cm in male and >80 cm in female) attending outpatient department of RMCH, Bareilly. We have noted the prevalence of metabolic syndrome and the presence components of metabolic syndrome in the subjects taken for the study. For all subjects the following parameters were noted: age, sex, blood pressure, waist circumference, blood sample for blood sugar and lipid profile. Blood pressure was taken in left arm in sitting posture by a mercury sphygmomanometer. Blood samples for lipid profile and fasting glucose were taken after 12 hrs overnight fast.

Results: Among 100 patients selected for the study; 81 patients were identified as having the metabolic syndrome out of which 28.4% were male and 71.6% were female. Out of 100 cases, 32% were non-diabetic, 23% were pre diabetic, 45% were diabetic, and 14% were non-hypertensive, 30% were pre-hypertensive, 58% were hypertensive, and 27% had total cholesterol > 200, 65% had triglyceride ≥ 150, and 56% had deranged HDL (HDL <40 in male and <50 in female).

Conclusion: The metabolic syndrome is a growing epidemic. Every 3rd OPD patient has abdominal obesity. Dyslipidemia is most common accompaniment followed by hypertension. The prevalence of metabolic syndrome rises with age and is higher in women than in men. In our population the most prevalent component of metabolic syndrome is abdominal obesity.

Key words: Dyslipidaemia; Metabolic Syndrome; Prevalence; Glucose Intolerance; Waist Circumference

INTRODUCTION

Metabolic syndrome (MS) which is also known as syndrome X is characterized by low concentration of high density lipoprotein cholesterol (HDL), hypertriglyceridaemia, impaired glucose tolerance, increased blood pressure and central obesity[1]. Risk of developing cerebrovascular disease (CVD) is two times more and type 2 diabetes mellitus is four times more in people with metabolic syndrome as compared to subjects without metabolic syndrome[2-4]. It is well known that the metabolic syndrome has a genetic basis with certain modifiable environmental factors[5,6]. Cardiovascular disease is now the most common cause of death worldwide. Nowadays CVD accounts for approximately 30% of deaths worldwide, including nearly 40% in high income countries and about 28% in low and middle income countries. In the industrialized world, physical activity continues to decline while total caloric intake increases. The resulting epidemic of overweight and obesity may signal the start of the age of inactivity and obesity. Waist circumference and skin fold thickness correlates with the amount of fat in the abdomen, and therefore is an indicator of the severity of abdominal obesity. A high waist circumference is associated with an increased risk for type 2 diabetes mellitus, dyslipidemia, hypertension and CVD in patients with a BMI in the range between 25 and 34.9 kg/m^2. Community based programmes to promote healthy living are needed to tackle this crisis.

This study was done to report the prevalence of metabolic syndrome in subjects with abdominal obesity in Rohilkhand region of U.P. attending RMCH, Bareilly. Current research aimed to study the components of Metabolic syndrome in subjects with abdominal obesity in Rohilkhand region of U.P. attending RMCH, Bareilly.

MATERIAL AND METHODS

Source of data and study design

A prospective, cross sectional study conducted at tertiary care teaching hospital in North India;over one year from October 2015 - September 2016.Patients having abdominal obesity (waist circumference >90 cm in male and >80 cm in female) who attended outpatient department for routine medical checkup were included after informed consentandPatients on oral contraceptive,Pregnancy,othercauses of abdominal distension like ascites were excluded.

Detailed historyandGeneral physical examination was done and waist circumference was measured. BP was taken in sitting posture in the right arm with mercury sphygmomanometer after 10 min of rest and avoiding smoking for last 30 minutes.

Blood sample was collected after 12 hour fasting.Blood sugar fasting/ post prandialwas done by glucose oxidase method.[7]

Glycosylated hemoglobin (HbA1c) was measured wherever indicated by Immunoturbidimetric method.

Serum total cholesterol was measured by CHOD-PAP (cholesterol oxidaseparaaminoantipyrine) method.[8]

Serum TG wasmeasured by GPO- PAP(glycerol

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peroxidaseparaaminoantipyrine) method.[9]

HDL-Cholesterol and LDL-cholesterol was measured by Directimmunoturbidimetric method.

VLDL was assessed indirectly by applying Freidewald formula.

VLDL (mg/dl/) =TG/5

Metabolic syndrome was diagnosed according to the NCEP:ATP III criteria (National Cholesterol Education Program and Adult Treatment Panel III). Three or more of the following criteria formed the basis for defining the metabolic syndrome:

1. Central obesity: waist circumference ≥ 90 cm in men and ≥80 cm in women.
2. Hypertriglyceridemia: trglyceride level ≥ 150 mg/dl or specific medication.
3. Low HDL cholesterol: < 40 mg/dl and < 50 mg/dl for men and women, respectively, or specific medication.
4. Hypertension: blood pressure ≥ 130mmhg systolic or ≥ 85mmhg diastolic or specific medication.
5. Fasting plasma glucose level ≥ 100mg/dl or specific medication or previously diagnosed type 2 diabetes.[10,11]

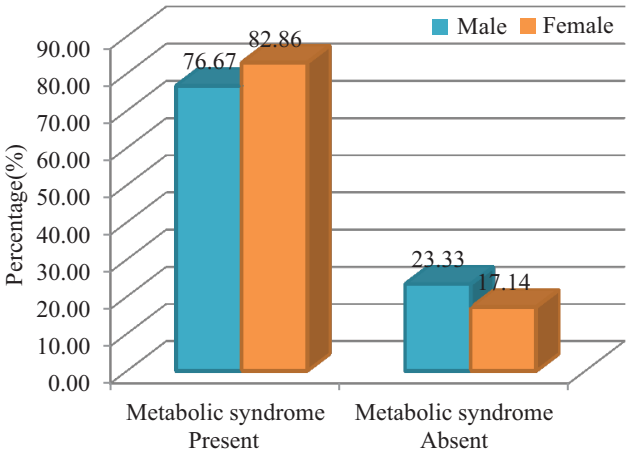
STATISTICAL ANALYSIS

Data are presented as arithmetic mean +/- standard deviation. Student's t-test was used for comparison of numerical variables. Multivariate logistic regression was used to define predictors of metabolic syndrome. Chi-square test was used to determine the level of significance for categorical variables. P values < 0.05 were considered statistically significant. Analysis was done using SPSS statistical software.

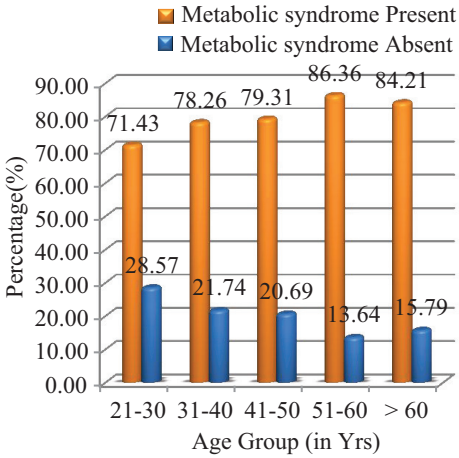
RESULT

Among 100 patients selected for the study; 70 (70%) were women and 30 (30%) were men. The mean age was 49.81 years (age range: 21–80 years). Out of 30 male patients 76.67% were in category of metabolic syndrome and out of 70 female patients 82.86% were in category of metabolic syndrome.(P=0.4696). Out of 100 patients with abdominal obesity, 81%patients were identified as having the metabolic syndrome.(Graph-1)

Out of 81% patients having metabolic syndrome, 6.17%were in between age of 21-30yr (P<0.0001), 22.22% were in between age of 31-40yr (P<0.0001), 28.40% were in between age of 41-50yr (P<0.0001), 23.46% were in between age of



Graph-1: Genderand prevalence of metabolic syndrome.



Graph-2: Age-wise distribution of metabolic syndrome in abdominal obesity patients.

	Metabolic syndrome		
	Present	**Absent**	**Total**
No HTN	7(8.6%)	8(42.11%)	15(15%)
Pre HTN	23(28.4%	8(42.11%)	31(31%)
Stage I HTN	24(29.6%)	0(0%)	24(24%)
Stage II HTN	27(33.3%)	3(15.79%)	30(30%)
Total	81(81%)	19(19%)	100(100%)
X^2 - VALUE=19.631, P = 0.0002 (Highly significant)			

Table-1: Prevalence of hypertension in metabolic syndrome patients.

	Metabolic syndrome		
	Present	**Absent**	**Total**
Non –Diabetic	19(23.5%)	11(57.9%	30(30%)
Prediabetics	21(25.9%)	5(26.3%)	26(26%)
Diabetic	41(50.6%)	3(15.8%)	44(44%)
Total	81(81%)	19(19%)	100(100%)
X^2 - VALUE=10.328, P = 0.005 (Highly significant)			

Table-2: Prevalence of diabetes in metabolic syndrome patients.

	Metabolic syndrome			
	Present	**Absent**	**Total**	**P-Value**
TC >200	22(27.2%)	5(26.32%)	27(27%)	0.8907
TG ≥ 150	59(72.8%)	6(31.58%)	65(65%)	<0.0001
HDL< 40mg/dl (in men)	13(56.5%)	0(0%)	13(13%)	<0.0001
HDL< 50mg/dl (in women)	40(69.0%)	3(15.79%)	43(43%)	<0.0001

Table-3: Prevalence of dyslipidemia in metabolic syndrome patients.

51-60 yr (P<0.0001) and 19.75% were in between age of >60 yr(P<0.0001).(Graph-2).

Out of 100 patients, 32% were non-diabetic, 23% were pre diabetic, 45% were diabetic; 14% were non hypertensive, 30% were pre hypertensive, 58% were hypertensive (25% stage 1HTN and 33% stage 2 HTN); 27% had TC >200, 65% had TG ≥ 150 and 56% had deranged HDL, (i.e. HDL <40 mg/dl in men and <50 mg/dl in women).

Out of 81patients having metabolic syndrome, 8.6% were non hypertensive, 28.4% were pre hypertensive 29.6% were stage 1 hypertensive, 33.3% were stage 2 hypertensive(P=0.0002) (Table-1); and 23.5% were non diabetic, 25.9% were prediabetic and 50.6% were diabetic.(P=0.005).(Table-2)

Out of 27 patients having TC >200, 27.2% were in category of metabolic syndrome (P=0.8907); out of 65 patients having TG ≥150, 72.8% were in category of metabolic syndrome (P<0.0001) and out of 13 male patients having deranged HDL, 56.5% were in category of metabolic syndrome (P<0.0001) and out of 43 female patients having deranged HDL, 69% were in category of metabolic syndrome (P<0.0001). (Table-3)

DISCUSSION

The National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III defined the criteria for the diagnosis of metabolic syndrome and laid down guidelines for its management[10]. Insulin resistance is reported to be the key component for the clustering of risk factors that lead to metabolic syndrome[11].

In this prospective cross-sectional study, 76.6% of men and 82.86% of women were diagnosed with the metabolic syndrome. Our results show that the prevalence of metabolic syndrome increase with age and the prevalence of metabolic syndrome was more in women as compared to men. In this study dyslipidemia is most common accompaniment followed by hypertension and diabetes mellitus. Abdominal obesity is the most prevalent component of metabolic syndrome in our population.

In different population, it will be valuable to measure factors associated with metabolic syndrome to identify the prevalence of syndrome and also to establish whether its prevalence differs according to religion, region and life style[12]. By finding out the presence of metabolic syndrome, it would be possible to prevent the early precipitation of diabetes or cardiovascular events in a community. This may help to establish basic guidelines of cure and prevention[13]. It will be best approach to formulate a health policy at a community level to provide health care and also educate the medical graduates to understand the basic health needs of the community they serve.

CONCLUSION

Our study found that there was a high prevalence of metabolic syndrome in subjects with abdominal obesity. Hence, subjects with abdominal obesity must be routinely screened for the presence of metabolic syndrome. Most of the patients of metabolic syndrome usually were found to have more than three components of metabolic syndrome. Hence, detection of one components of metabolic syndrome should lead to search for the other components and appropriate management. The screening and preventive measures should be particularly vigorous for those with family history of type 2 diabetes mellitus and/or premature cardiovascular disease. Measurement of anthropometric parameters like waist circumference, waist-hip ratio and BMI, which is a simple clinical method to detect obesity, should not be neglected and should be included as a routine measurement in day to day clinical practice.

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