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STUDY TO KNOW IMPAIRED GLUCOSE TOLERANCE AND ELEVATED SERUM URIC ACID LEVELS RELATION WITH METABOLIC SYNDROME

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Abstract:

Metabolic syndrome (MetS) is a group of disorders including high blood sugar, increased blood pressure, abnormal cholesterol, excess body fat around the waist or triglyceride levels that occur together, increasing your risk of stroke, diabetes and heart disease causing cardio-metabolic risk factors. People having cardiovascular diseases have high serum uric acid levels with mostly MetS features. The importance of high uric acid levels pathogenesis in MetS and the development of diabetes mellitus type 2 (DM) has not been fully understood.

Objective: *The purpose of the study was to determine relationship between MetS criteria and oral glucose tolerance test (OGTT) and serum uric acid levels results was investigated.*

Study Design: *A prospective Study.*

Place and Duration: *In the Endocrinology Department of Services Hospital, Lahore for 1 year Duration from August 2016 to August 2017.*

Methodology: *83 patients with at least 3 MetS diagnostic criteria approved by the National Adult Treatment Panel were selected for study. Fasting venous blood samples were collected for 12 hours followed by 2 hours of OGTT with oral glucose of 75 g. BSR levels between 140 and 200 mg / dl at 2 hours was defined positive for GTT.*

Findings: *25 of 83 patients (31%) had a glucose value of 140 mg / dl or more for 2 hours. In multiple linear regression analysis, waist circumference and uric acid, 2-hour OGTT levels and body mass index were found to be significantly important.*

Conclusion: *In this study, we found that some MetS-related uric acid levels were found in cases with high risk of type 2 DM. Uric acid concentrations did not affect insulin sensitivity and baseline blood glucose.*

Keywords: *uric acid, metabolic syndrome, glucose intolerance.*

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INTRODUCTION:

Metabolic syndrome (MS) is a group of metabolic abnormalities (DM) and high-density lipoprotein (HDL-C) that are defined as cardiovascular risk factors in a person with low levels of hypertension, visceral obesity, lipoprotein cholesterol, hypertriglyceridemia, low tolerance IGT type 2 diabetes mellitus, , the middle phase is an important natural environment. Patients with IGT are at risk of developing cardiovascular disease (CVD) and type 2 diabetes mellitus; It is an important goal in primary protection. This association of cardiovascular disease, coronary artery disease, hypertension, vascular dementia, cerebrovascular disease, preeclampsia, and renal failure, including serum uric acid is recorded. Uric acid plays an important role in MetS, and for this reason some authors provide evidence that MetS is also being tested. In this study, biochemical indices and uric acid as a ratio between renal clearance, type 2 diabetes mellitus, and uric acid levels in a group at high risk for component development suggests the addition of high serum.

MATERIALS AND METHODS:

The study was held in the Endocrinology Department of Services Hospital, Lahore for 1 year Duration from August 2016 to August 2017. By the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) At least three of the following criteria: Mets blood pressure diagnosis and "130/85 [or antihypertensive agents required for use], fasting triglycerides and "160 mg / dL; HDL-C <43 mg / dL (male) or <52 mg / dL (female); fasting plasma glucose (FPG) 115 mg / dL and greater than 102 cm waist circumference for men or for women> 88 cm. exclusion criteria are known to affect DMAP> 127 mg / dl, antihypertensive drug use, known uric acid levels or lipid-lowering drugs; hormone replacement or steroid therapy; pregnancy; hypothyroidism; hepatic, heart failure, kidney disease and gut presence. For the study approval from Local ethics committee and patient approval were obtained. The patient's detailed story was collected and physical examination of all the patients was performed. Anthropometric measurements (height, weight, waist circumference) were performed using standard measuring devices in patients with hospital wear while standing by the same person. By dividing the weight of the patient Body mass index (BMI) was calculated by the neck (mass / height2, kg / m2). The waist circumference is measured if the narrowest waist between the ASIS and the lower rib is halved rather than the light expiration. After resting for 10 minutes, the blood pressure of the patients in the sitting position was measured using a mercury blood pressure device mercury by a person based on Korotkoff Phase I and V both arms were measured. The second measurement was made after 3 minutes from the first. Mean diastolic and systolic blood pressures were recorded. Hypertension was accepted as 140 mmHg systolic and Diastolic blood pressure as 90 mmHg .OGTT was done 2 hours prior to collection of venous blood samples from fasted subjects. 75 g oral glucose. At 2 o'clock, sugar level between 145 and 200 mg / dl was considered as IGT. 12 hours after overnight fast, venous blood samples at 2500 rpm were centrifuged and sera biochemical indices were separated. Levels of total cholesterol, glucose, HDL-C, lipoprotein cholesterol (LDL-C), uric acid and triglycerides were recorded by enzymatic method and the level of insulin was determined by electro-immunoassay (ECLIA) using a E170 Roche device. By evaluating the(HOMA-IR) homeostasis model of insulin resistance, Insulin sensitivity was assessed. Accordingly, the insulin resistance was checked by the following formula: GraphPad Prism V. (mean, standard deviation) was calculated from the data of the fasting insulin (uIU / ml) level in this study using APG (mmol / L) / 22.5 x, descriptive statistical methods were used together with two independent groups t comparison test. The relationship between uric acid level and GTT was confirmed by multiple linear regression analysis. The results were evaluated significantly at p less than 0.05.

RESULTS:

(median age 50.1 ± 14.2 51.1 ± 9.5, 19 males 64 female, mean age) were followed up for the diagnosis of metabolic syndrome. 18-year-old or older due to 83 patients. In the study OGTT results, 58 glucose tolerance and 25 (31%) had IGT. 140 (p> 0.05) between the HOMA-IR and OGTT levels, 140 (p> 0.05), 1 hour of OGTT 140 Were higher significantly in the IGT group (p <0.001) (Table-I).

Table-I: Distribution of subjects with MetS by OGTT results.

	>140 (n=25)	<140 (n=58)	t	p
Age (year)	52.2±10.84	50.26±10.44	0.77	0.444
SBP (mmHg)	148.8±16.91	148.53±16.86	0.07	0.948
DBP (mmHg)	95.6±4.86	95.43±8.29	0.10	0.925
BMI (kg/m²)	33.28±3.41	33.19±4.66	0.09	0.927
WC (cm)	98.12±7.82	98.21±6.83	-0.05	0.96
FPG (mg/dl)	113±5,89	110,41±9,18	1,30	0,199
Uric acid (mg/dl)	4.55±1.27	4.84±1.25	-0.98	0.331
HDL-C (mg/dl)	47.84±8.75	46.57±12.44	0.46	0.644
Triglyceride (mg/dl)	144.76±74.74	180.45±115.38	-1.42	0.159
Insulin (µU/ml)	11.44±5.03	12.1±5.21	-0.54	0.594
OGTT 1-hour	106.56±10.22	96.84±12.86	3.35	0.001
HOMA-IR	3.19±1.45	3.26±1.3	-0.20	0.844
Trigyceride/ HDL-C	3.14±1.71	4.36±3.34	-1.73	0.087

SBP: systolic blood pressure, DBP: diastolic blood pressure, BMI: body mass index, WC: waist circumference, FPG: fasting plasma glucose, C: cholesterol, OGTT: oral glucose tolerance test, HOMA-IR: Homeostasis Model Assessment of Insulin Resistance

Linear regression analysis was done to know the uric acid levels relation with MetS and IGT components. This was associated with a uric acid level of 2 hours (r = 0.288, p = 0.0001, waist circumference (r = 0.180), BMI (r = 0.250, p = 0.008) and screening value p = 0.039).

DISCUSSION:

MetS is linked with high risk of cardiovascular mortality and morbidity. Although many studies on epidemiology have shown that risk factor for cardiovascular morbidity and mortality is uric acid at high levels, this case has not yet been clarified. The risk of higher glucose metastasis varies among patients with elevated uric acid, metabolic and cardiovascular disease, plasma factor for type 2 diabetic resistance is thought to be a determinant for developing a risk factor of fasting insulin after OGTT. However, in each patient, OGTT is not a suitable method, and blood is recommended for testing in patients with a fasting glucose level of 110-126 mg / dL. As a result, MetS high-risk group should be identified and then components of the insulin resistance must be studied. IGT also states that people in these countries should be extremely sensitive to atherosclerotic disease is a pre-diabetic condition located somewhere between normal glucose tolerance and diabetes. Hyperuricemia has been shown to cause higher CVD incidence proven in large epidemiological studies and higher mortality in CVD patients. During the epidemiological study follow-up, 5937 people were followed for an average of 15.94 years. The increase in levels of serum uric acid measured at the beginning of the study was associated independently with the high mortality. In addition, when corrected for other risk factors, an increase of 1 mg / dL, ischemic heart disease and cardiovascular mortality were both increased for both men and women. Kekalainen et al., In a prospective study of 8 years. Dyslipidemia, hypertension and uric acid levels have been found to correlate with insulin resistance, hypertension and cholesterol, very low-density lipoprotein insulin secretion altered first phase. In patients with high uric acid plasma concentrations and insulin resistance are increase due to decreased renal uric acid clearance. To know insulin resistance level of uric acid in the plasma is not a sensitive indicator. Normal uric acid levels does not mean sensitivity of insulin. Although a significant 2-hour relationship was observed between uric acid level and OGTT level in our study, basal glycemia and insulin sensitivity were not affected. The CARDIA study assessed changes in serum uric acid at 10 years and changes in other metabolic risk factors in young adults. In this study, although changes in all metabolic factors were associated with changes in uric acid, only multivariate analysis showed BMI and triglycerides and uric acid levels. Obesity is one of the most important factors associated with MetS and type 2 DM in recent years. In studies with adults, the increase in BMI was associated with hyperuricemia. Leptin is one of the hormones that are produced in adipocytes and play an important role in the control of body mass. In this study, no relationship was found between triglyceride levels and uric acid levels, waist circumference and BMI. The association of uric acid with waist circumference and BMI supports the knowledge that uric acid is strongly associated with abdominal obesity and obesity in particular.

CONCLUSION:

In conclusion, in MetS subjects with IGT and obesity, the treatment and evaluation of uric acid levels seem to be beneficial in the prevention of atherosclerotic heart disease.

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