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Determining the Frequency of Metabolic Syndrome among Patients with gout

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ABSTRACT

The metabolic syndrome describes a group of modifiable risk factors occurring in the same individual and associated with an increased risk of developing cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM). Increased serum urate concentration and gout were already recognized as important features. The aim of this study was determining the prevalence of metabolic syndrome among patients with gout.All patients referred to Kims Hospital and St. philomenas hospital who were diagnosed with gout were studied according to the criteria of metabolic syndrome. The variables included: age, sex, weight, height, BMI, blood pressure, waist circumference, cigarette smoking, triglyceride, liver enzymes, and liver sonography. SPSS version 19 was used for statistical analysis.A total of 70 patients with gout (62 male) with mean age 46+/-14.2 years (range 75-34) years and mean period of 4.5 years of gouty arthritis, the prevalence of metabolic syndrome was 84% (59 patients). The prevalence of other abnormalities was: Body mass index (BMI) >24 75.5%, central obesity 68.5%, hypertension 52.8%, fatty liver 37.2%,TG 31.4%, T2DM 12.4%,Also, 38.5% of patients had a history of cigarette smoking. The mean BMI in this group of patients was 26kg/m^2.The prevalence of metabolic syndrome among patients with gout is so high. Efforts should be aimed at decreasing the cardiovascular risk factors among these patients.

Keywords: Metabolic syndrome – patients with gout – prevalence.

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INTRODUCTION

The first description of patients with clustering of various metabolic abnormalities was as early as 1923 but it was more than five decades later, in 1988, that Reaven coined the term 'syndrome X' for this entity[1]. A clustering of various metabolic abnormalities, e.g., hypertension, hyperglycemia, and hyperuricemia, was observed in some patients as early as 1923[2]. More than five decades after this observation, Reaven coined the term 'syndrome X' for this conglomeration of various metabolic abnormalities, including glucose intolerance, hypertension, increased very-low-density lipoproteins (VLDL), triglycerides, and decreased high-density lipoprotein cholesterol (HDL-C), with insulin resistance being the basic underlying pathophysiologic problem[3]. WHO defined metabolic syndrome (MS) in (1999) : glucose intolerance, impaired glucose tolerance (IGT) or diabetes mellitus (DM), and/or insulin resistance, together with two or more of the components listed below:

1. Raised arterial pressure, i.e., ≥140/90 mm of Hg
2. Raised plasma triglyceride (≥ 150 mg/dl) and/or low HDL-C (<35 mg/dl in men and <39 mg/dl in women)
3. Central obesity, i.e., waist/hip ratio (WHR) >0.9 in men and >0.85 in women and/or body mass index (BMI) >30 kg/m^2
4. Microalbuminuria, i.e., urinary albumin excretion rate ≥ 20 µgm/minute or albumin/creatine ratio ≥ 30 µgm/mg[4].

The European Group for Study of Insulin Resistance (EGIR) proposed a modification of the WHO definition, using the term insulin resistance syndrome rather than MS. According to the EIGR definition the diagnostic criteria included elevated plasma insulin (>75th percentile) plus two other factors from among the following:

1. Abdominal obesity: waist circumference (WC) ≥94 cm in men and ≥80 cm in women
2. Hypertension: ≥140/90 mm of Hg or on antihypertensive treatment
3. Elevated triglycerides (≥150 mg/dl) and/or reduced HDL-C (<39 mg/dl for both men and women)
4. Elevated plasma glucose: impaired fasting glucose (IFG) or IGT, but no diabetes

   Notably, EGIR focused more on abdominal obesity than did WHO, but in contrast to WHO, EGIR excluded patients with type 2 DM from their syndrome because insulin resistance was viewed primarily as a risk factor for diabetes[5]This definition was followed by a simpler definition released by the National Cholesterol Education Program Adult

Treatment Panel III (NCEP ATP III)[6]. According to this definition, a subject has the MS if he or she has three or more of the following criteria:

1. Abdominal obesity: WC ≥102 cm in men and ≥88 cm in women
2. Hypertriglyceridemia: ≥150 mg/dl (1.695 mmol/l)
3. Low HDL-C: <40 mg/dl in men and <50 mg/dl in women
4. High blood pressure (BP): >130/85 mmHg
5. High fasting glucose: >110 mg/dl

Identification of MS (metabolic syndrome) can be made more clinical by including clinical parameters like age, family history, personal history, etc., as parameters to define MS. Indian diabetes risk score (IDRS) is one such parameter comprising simple clinical information like age, WC, family history of diabetes, and physical activity[7]. IDRS ≥ 60 has been found to be useful in predicting MS and cardiovascular disease[8].Gout is an inflammatory arthritis that is associated with hyperuricemia, and also is widely known to be associated with obesity, dyslipidemia, hyperglycemia and hypertension. Such metabolic abnormalities have recently been increasingly recognized as not being separate illnesses, but rather they are a clustered syndrome that has been termed the ‘‘metabolic syndrome’’[9].Hyperuricemia may be an asymptomatic condition, with an increased serum uric acid concentration as the only apparent abnormality. A urate concentration greater than 7.0 mg/dL is abnormal and associated with an increased risk for gout. Acute attacks of gouty arthritis may be precipitated by stress, trauma, alcohol ingestion, infection, surgery, rapid lowering of serum uric acid by ingestion of uric acid-lowering agents, and ingestion of certain drugs known to elevate serum uric acid concentrations[10].Treatment strategies include: (1) Reducing inflammation during acute attacks (with colchicines, Non steroid anti inflammatory drugs(NSAIDs) , or Glucocorticoids) (2) Accelerating renal excretion of uric acid with uricosuric drugs (probenecid or sulfinpyrazone) (3) Reducing (with allopurinol or febuxostat) the conversion of purines to uric acid by xanthine oxidase[11].the objective of this study was to determine the frequency of metabolic syndrome and frequency dyslipidemia in patients with gout, frequency of fatty liver, frequency of smoking, frequency of Diabetes, frequency of high blood pressure, in patients with gout.

MATERIALS AND METHOD

The study was a cross _sectional Study conducted on both inpatients and outpatients who were diagnosed with gout of Kims hospital and St. Philomenas Bangalore from 2015 April to 2016 March .We enrolled 70 patients with gout in our study. The studies were conducted in all individuals of either sex, age, diagnosed with gout (joint swelling and joint tenderness, inflammation include

redness, warmth, and blood urate level greater than of 0.7mg/dl). Were included in the study. Data were extracted from the patient case sheets, lab reports (blood sugar levels, blood lipids, blood urate levels) and were collected by using a data collection form. Information was collected and recorded regarding socio_demograohic details of the patients, pertaining to age, gender, height, weight, duration of gout, co-morbidity, smoking, blood pressure.

The following laboratory test result was recorded:

High density lipoprotein cholesterol (HDL-C), triglyceride (TG), fasting blood glucose (FBS), Abdominal, obesity, waist circumference, BMI. Aspartate aminotransferase (AST),Alanine amino transferase(ALT).

Statistical Analysis:

Results were expressed as mean +- SD or percentage where appropriate Statistical analyses were performed using the (SPSS version).Chi-square tests, T_Test were used to determine the relationship between variables. The relationships between serum uric acid levels and other variables were assessed using the Pearson's correlation coefficients.

RESULT SAND DISCUSSION

Out of 70 patients with gout enrolled in our study 62 men and 8 women. The mean age of patients with gout in our study population was 46 + -14.2 years. Among our study population the age range of gout patients was 34 -75 years. The mean duration of gout observed was 4.5+-7.3 years. A minimum duration of developing gout was 2 years and a maximum duration of developing gout was 15 years .The means height and weight of patients 178 + -85 Cm and 85 + -3.2 kg. In our study, the average of BMI in patients with gout was 26kg/m2. Patients with Gout had 8.1 +-2.5 mg/dl uric acid minimum and maximum respectively 3_13. The mean TG of patients with gout in our study was 173+-84 mg/dl minimum and maximum respectively 114 and 312.

Table 1: Distribution of the characteristics of gout patients admitted to hospital from 2015-2016.

	Average	Standard deviation	Scope changes.
Age	46	14.2	34-75
Duration of gout(years)	4.5	7.3	2-15
Height patients(cm)	178	8.5	165-190
Weight patients(kg)	85	3.2	83-101
BMI kg/m2	26	1.6	23-31
AST mg/dl	22	42	8-124
ALT mg/dl	18	31	5-103
TG mg/dl	173	84	114-312
Blood uric acid(mg/dl)	8.1	2.5	3-13

A total of 70 gout patients admitted to hospital in 2015-2016. 9 patients (12.8%) with diabetes type 2. 53 (75.7%) patients had a BMI>24. In our study 37(52.8%) patients had hypertension. 48(68.5%) patients had abdominal obesity.22(31.42%) patients had dyslipidemia (triglycerides greater than 150, HDL<40 in men or HDL <50 in women) 27 (38.5%) patients were current smokers. 26(37.2%) patients had fatty liver

Table 2: Frequency distribution characteristics of gout patients admitted to hospital in the years 2015-2016 the separation criteria metabolic syndrome

Column	Frequency	% frequency
Male	62	88.5
Female	8	11.5
Diabetics	9	12.8
BMI>24	53	75.7
BP>=130/85	37	52.8
Smoking	27	38.5
Fatty liver	26	37.2
Central obesity (waist circumference> 95 cm)	48	68.5
Dyperlipidemia	22	31.4

Based on the metabolic syndrome criteria (ATPIII) ,out of 70 patients enrolled in our study with gout , 3(4.2%) patients had one MS criteria, 8 (11.5%) patients had two MS criteria. 30 (42.8%) patients had three MS criteria and thus the metabolic syndrome were positive in group of patients. A total of 29(41.4%) patients had more than of 3 MS criteria, thus this group of patients had a very high risk to develop cardiovascular disease.

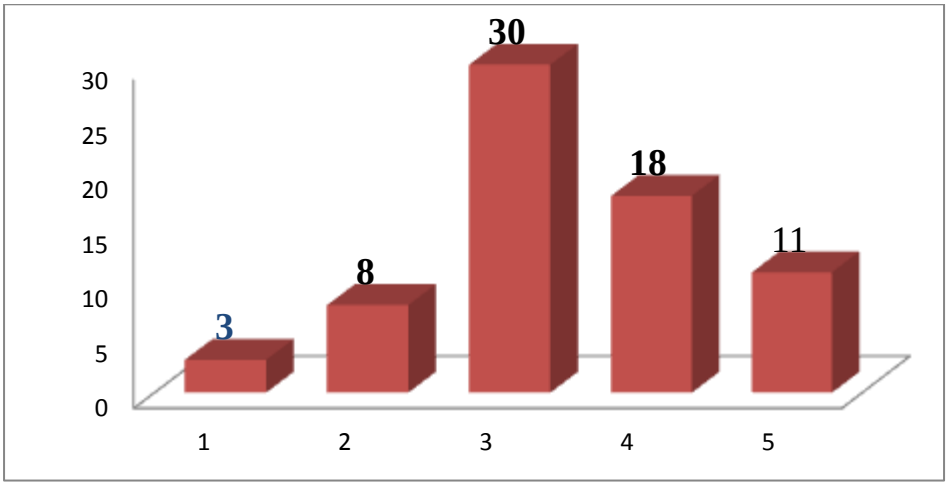

Figure 1: Distribution of the number of criteria of metabolic syndrome in patients with gout

Out of 70 patients enrolled in our study with gout show that Serum uric acid levels had positive correlations with waist circumference, BMI,BP, aspartate aminotransferase, alanine

aminotransferase, triglycerides. Age was negatively correlated with serum uric acid in males, but positively correlated in females.

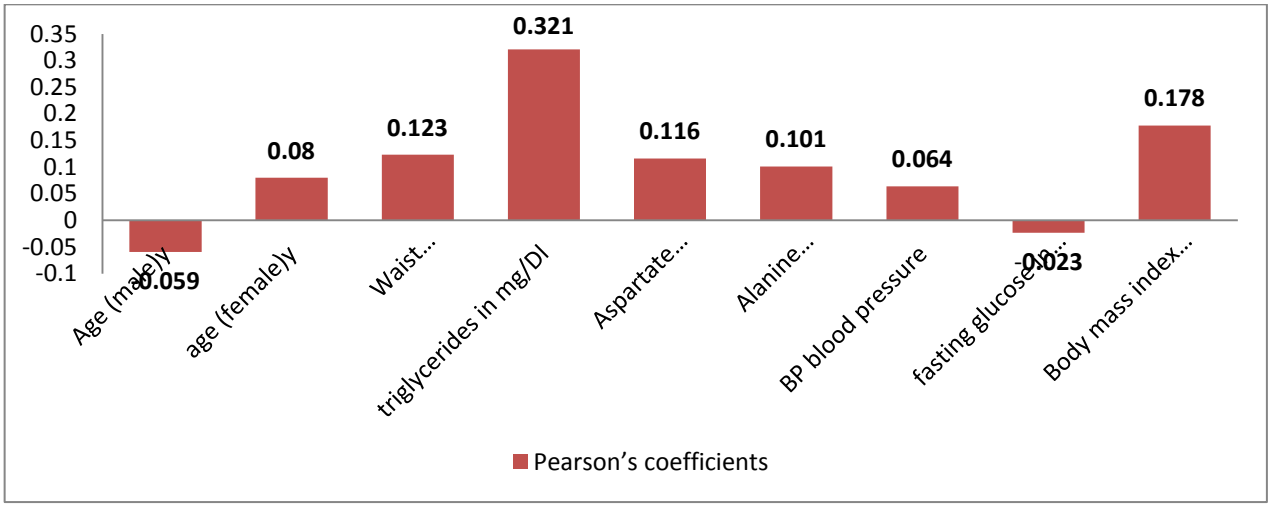

Figure 2: Correlation between serum uric acid and investigated variables

DISCUSSION

It was shown in this study that out of 70 patients with gout 62 (88.57%) male and 8(11.42%) were female (table 2).The mean age of patients with gout in our study population was 46 + -14.2 years (In the range of 34- 75 years). (Table 1). The duration of gout plays an important role in the management of gout. The mean duration of gout observed was 4.5+-7.3 years. In this study the prevalence of metabolic syndrome was 84% (n = 59).The maintenance of a healthy body weight should remain the cornerstone of gout. Body mass index (BMI) was calculated by dividing the weight of the patients in kg by the square of their in meters. Furthermore, the prevalence of metabolic disorders in this group of patients were: BMI>24 (75.7%), abdominal obesity :(68.5%), high blood pressure :(52.8%), dyslipidemia: (31.4%), diabetes :(2.4%), fatty liver :(37.2%). Also, 38.5% patients were smokers, which is one of the risk factors for cardiovascular disease. Out of the total population, the mean BMI of patients with gout in our study population were (26kg/m2).The mean age of patients with gout in our study population was 46 + 14.2 years. This was also similar to the results of the other studies conducted in the world[12]. It should be noted that the prevalence of gout increases with age and the peak incidence age is 55-64 years[12]. In our study a high proportion of gout in male patients (88.5%). As it mentioned the high prevalence of the metabolic syndrome have seen in worldwide. In a study conducted in USA by Ford ES 24% adult patients had metabolic syndrome[13]. In other studies conducted in Europe by B Balkau and Akozsahin 13-33%patients had metabolic syndrome[14,15]. The prevalence of metabolic syndrome increased with age to about 50% in people older than 60 years. In our study The Prevalence of metabolic

syndrome in patients with gout was 84%. This was also similar to the results of a study conducted In Mexico by Mellado,et al, where it was found that the prevalence of metabolic syndrome in patients with gout was 82%.[16]which was comparable to a study conducted by Chol. khyon in USA the prevalence metabolic syndrome in patients with gout was 62.5%[17] . However a study conducted in Spain by Cuevas,et al. Where it was found that In 90%, the first attack of gout preceded the diagnosis of the features of metabolic syndrome[18]. Most probably racial differences and the special diet are cause to reduce prevalence of metabolic syndrome in Japan by Inokuchi T[19] and Spain by Fraile M J[20] in less than of these values (respectively 36% and 51%).The prevalence of metabolic syndrome in South Korea is very similar to Japan.Probably this is due to a close race between the Japanese and the Koreans. As a result, the difference in the prevalence of metabolic syndrome in patients with gout due to differences in sample size and methods sometimes slight differences in the study populations and definitions of metabolic syndrome.The study found that the prevalence of metabolic syndrome in patients with gout is veryhigh that can confirm the relation between these two pathologies. In this study, 12.4% of diabetic patients had abnormal. As we know, high insulin levels can reduce the renal excretion of urate[21-23]. For example, it has been shown that exogenous insulin reduces excretion of urate in healthy subjects and patients with high blood pressure[24]. Maybe insulin increases the reabsorption of urate in the proximal tubule. In a study conducted in the USA[17] 50% patients had the prevalence of impaired fasting glucose (FBS>100 mg/dl), which is much higher than on our results. The same situation is even among the control group who did not develop gout was 27%. Most probably High-calorie diet is responsible for Pre-diabetes. In a study conducted in Mexican it was found that out of population enrolled in the study , 20% patients had ischemic heart disease with (FBS=129)[16]. This rate reflects that the American population is on a high level of risk. Because the prevalence of abnormal FBS in American was equal to the Mexican population with gout and lipid disorder. In the gout patients obesity can be observed in the form of either higher BMI or central obesity. Most probably urate and leptin together will be increased[25-26]. Some researchers have suggested that leptin may affect the renal reabsorption of urate. We should not forget that obesity and insulin resistance are associated with each other's. However, insulin resistance syndrome disrupts the Oxidative phosphorylation cycle and increases the levels of adenosine in the blood. This would eventually cause retention of water, sodium and aurat in the body. In studies conducted on Obesity in the patients with gout were as follows: America 63%, Spain 50%, British 28%, South Korea 53%. In our study, 52.8% of patients had blood pressure greater than 130/85. The prevalence of high blood pressure in other studies was as follows: America 70%, Mexico 67%, Spain 73%, and

South Korea 47%. Hypertension is high risk factors for heart disease - cardiovascular mortality and morbidity. In our study, approximately 38.5% of them were smokers. In a study conducted in South Korea[27] about 70% of patients taking a high and medium amount of alcohol. In our study, abnormal TG had a stronger association with increasing serum UA level than all the other components are commonly seen in association with individual cardiovascular risk factors .This finding is in agreement with studies conducted in the Indian Ocean by D Conen ,in the Japan by Nakanishi N, in the Italy by Bonora E[28,29,30] which have consistently found that TG correlates independently with UA level. The mechanism for the strong association between TG and UA concentrations has not been elucidated. Although genetic factors are associated with the concurrence of gout and hypertriglyceridemia,[31,32] investigators have generally concluded that hyperuricemia and hypertriglyceridemia reflect the lifestyle of the patient more than genetic factors because obesity is also associated with these characteristics.[33]

CONCLUSION

The prevalence of metabolic syndrome among patients with gout is so high. Efforts should be aimed at decreasing the cardiovascular risk factors among these patients

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