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Research Article

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Exploring The Association Gout And Comorbidites As Risk Factor

C. Anitha* and Arun Kumar Rai N**
*Assistant Professor, Karnataka State Open University, Mukthagangothri, Mysuru, Karnataka
**Student, Karnataka State Open University, Mukthagangothri, Mysuru, Karnataka
*Corresponding author: *anithaksou@gmail.com*

Abstract

Introduction: The prevalence of patients with gout is increasing worldwide. Gout is primarily attributed to genetic factors, along with lifestyle factors like consuming a purine-rich diet, alcohol and low physical activity. While numerous studies have reported various comorbidities linked to gout, the range of these associations is extensive. Hence the present study was taken with the objective to understand the risk factors associated with Gout.

Methodology: The study was conducted in Mangalore hospital, where patients diagnosed with gout visited the hospital for treatment. 40 subjects visiting the general hospital, Mangalore were both men and women (20 each) in the age group of 55 to 65 years and who gave consent to participate in the study were selected randomly for the study. Gout is often linked with obesity, high blood pressure, high cholesterol, and diabetes. Hence the study population was assessed for their BMI, Fasting blood sugar and lipid profile. The subjects were assessed for their present nutrition status using anthropometric assessment and results of biochemical tests were taken from the medical reports. Dietary information was obtained using 24hr recall method using standardized cups. The obtained results were analysed using appropriate statistics from SPSS software.

Results: The results indicated the study population over weight (10%) and obese (60%). Lipid profile of the subjects showed that 15 % had >200, 20 % of them had >50 mg/dl of HDL, 10% had >150 mg/dl LDL respectively. The study highlighted that 55% of the study population had uric acid level between 7.5 to 8.5, 5 % of them had above 8.5 gm/dl, while 40% of them had <7.5 gm/dl respectively. It was observed that there was a significant correlation between uric acid and BMI with Chi-square value of 10.342 and p value 0.005. This indicates that as the weight increases there is risk of increase in the uric acid levels. The relationship of Uric acid with lipid parameters was studied and the analysis revealed there is positive significant relationship of uric acid with Total cholesterol and LDL and very strong positive relationship with triglycerides.

Conclusion: Thus it can be concluded that associated risk factors management is very important to reduce the inflammation of gout. Intervention through the education and counselling the patients helps them to manage the gout considerably. Weight control, limits on red meat consumption, inclusion of low purine foods, with daily exercise is important lifestyle modification recommendations for patients with gout.

Keywords: Uric acid, Lifestyle, Fasting blood sugar, Lipid profile, Food habit.

Introduction

Gouty arthritis is a significant case commonly associated with inflammatory arthritis and occurs worldwide. Gout occurs when there is an increase in serum urate levels of more than 7 mg/dl or 420 µmol/l, which contributes to the formation of deposits of monosodium urate (MSU) crystals. This disease is distinguished by acute episodes of joint inflammation, which frequently affect a single joint and are preceded by symptom-free periods of varying duration.1, 2. The most common symptom is sudden and severe pain in the joint, along with swelling and redness. The joint of the big toe is commonly affected, but it can develop in any joint. Symptoms develop rapidly and are at their worst point in just 6 to 24 hours. Symptoms usually last for 3 to 10 days (this is sometimes known as a gout attack). After this time, the joint will start to feel and look normal again, and the pain of the attack should disappear completely.[3.4]

The prevalence of gout arthritis is highest in the Oceania region, where the baseline uric acid in the population is high. Globally, the total number of people with gout doubled from 1990 to 2020, and age-standardised prevalence increased by 22•5% from 1990, with increases in most Global Burden of Disease regions. In line with the literature, the burden of gout in 2020 was three times higher in males than in females in all age groups.5 Dietary practices have been shown to lower serum uric and reduces the risk of incident gout. Higher consumption of meat and seafood is associated with an increased incidence of gout in men. Conversely, increased intake of dairy products is associated with decreased incident gout in men.6 Following the Dietary Approaches to Stop Hypertension (DASH) diet has been proven to decrease serum uric acid levels and mitigate the risk of gout.[7, 8]

Gout is associated with health risks, including obesity, hypertension (HTN), chronic kidney disease (CKD), diabetes mellitus (DM), hyperlipidemia (HLD), and metabolic syndrome. A study conducted in Olmsted County, MN, highlighted the increased prevalence of various comorbidities in gout patients compared to the general population. The prevalence of obesity (defined as BMI >35 kg/m2) was 29% in gout patients versus 10% in the general population, HTN was 69% versus 54%, CKD was 28% versus 11%, DM was 25% versus 6%, HLD was 61% versus 21%.[9]

Gaining weight during adulthood has been consistently associated with a heightened risk of developing gout.10,11 Studies from the United Kingdom and Germany have revealed associations between gout and various comorbidities, including DM, congestive heart failure (CHF), HTN, myocardial infarction (MI), and obesity. Additionally, the prevalence of comorbidities increased with higher serum uric acid levels.12 Due to increased cell turnover in the epidermis, psoriasis leads to elevated uric acid production. At the same time, patients with CKD experience reduced urate excretion, resulting in hyperuricemia and an increased risk of incident gout.[13.14]

Suboptimal gout control is multifactorial, involving both modifiable and non-modifiable risk factors. Studies have assessed the relationship between gout control, intensity and adherence to urate-lowering therapy (ULT). Apart from pharmacological therapy, demographic and clinical risk factors are potential factors that can influence gout control. Male gender and increased affluence have been associated with gout. Additionally, individuals with chronic kidney disease (CKD) and congestive heart failure (CHF) have a six-fold and four-fold risk of gout, respectively. [15, 16, 17]

Several factors have been suggested as being responsible for the increasing incidence of gout. These include:

- Dietary changes, Alcohol consumption and Medications (Bradna , 2006)
- Dietary changes have been suggested to be associated with the increasing incidence of

gout. Specifically, consuming large amounts of certain foods have been suggested as being associated with increased risk for gout: red meat, fructose and beer. In contrast, high levels of consumption of other substances have been suggested as being associated with lower risk of gout. These include: Coffee, Low-fat dairy products and Vitamin C (Doherty (2009))

Recognizing the factors associated with gout the present study was under taken with the following objectives:.

- To assess the nutritional status of gout patients.
- To study the association of various risk factors for gout

Materials and Methods

A retrospective cohort study was conducted on patients with gout who visited the General Hospital, Mangalore.

Selection of subjects

About 40 subjects visiting the general hospital, Mangalore were both men and women (20 each) in the age group of 55 to 65 years residents of Mangalore and who gave consent to participate in the study were selected randomly.

Data collection: Demographic details of the study population were elicited from them. The subjects were assessed for their present nutrition status using anthropometric assessment. Biochemical tests were taken from the medical reports. Dietary information was obtained using 24hr recall method using standardized cups.

Nutrition Education and counselling was given to the patients when they visited the hospital with regard to the the life style and dietary modification for control and management of gout.

Statistical methods:

Descriptive and inferential statistical analysis has been carried out in the present study. Significance is assessed at 5 % level of significance. Student t test and Chi-square test has been used to find the significance of study parameters Pearson correlation between lipid parameters with uric acid is done.

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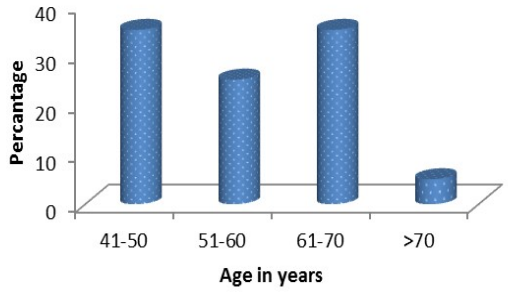
Results and Discussion

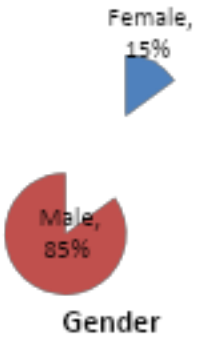
Results obtained were analysed statistically and are presented with the discussion. The subjects selected were above 40 years of age, married males and females

Figure 1: Age distribution of subjects



Mean ± SD: 55.90±11.63

Figure 2: Gender distribution of subjects



The age distribution was from 41 to 85 years. Fourteen subjects belonged to the age group 41-50, fifteen to 51-60, fourteen to 61-70 and two to > 70 years respectively. The mean SD was 55.90±11.63 (Fig 1). 85% of the total population were male and females were 15% in this study (Fig 2). Organ meats are particularly high in purines, which can increase your uric acid levels and spur a gout attack. Red meats in general are higher in purines than white meats, hence a food habit was also considered to be an associated factor for gout. 65% of the study population were non vegetarian and remaining 35% were vegetarian. Higher uric acid was found to have significant association with Non-vegetarians.

Gout is often linked with obesity, high blood pressure, high cholesterol, and diabetes. Hence the study population was assessed for their BMI, Fasting blood sugar and lipid profile. The reports are presented as follows:

Figure 3: BMI classification of subjects

The subjects were classified according to BMI. Figure-3 shows that all the subjects were overweight (10%), obese grade –I (60%) and obese –II (30%). No subjects were having normal body mass index.

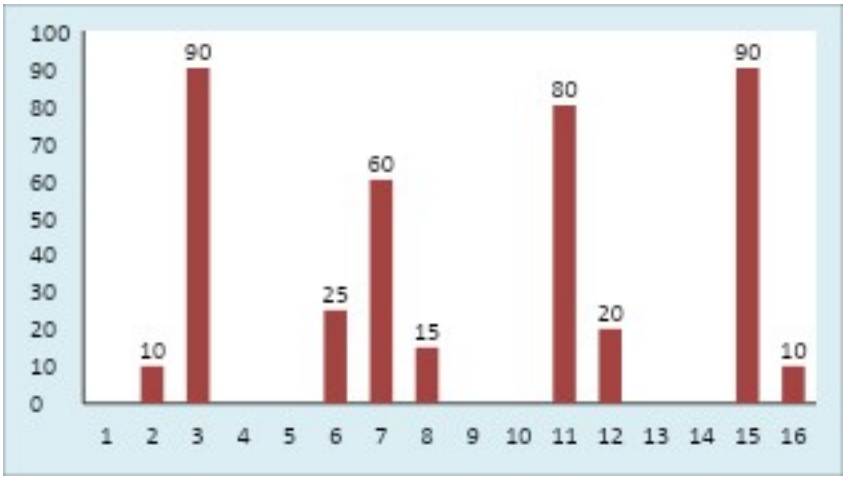
Table 1: FBS levels in subjects studied

FBS(mg/dl)	No. of patients	%
<70	0	0.0
70-110	14	35.0
>110	26	65.0
Total	40	100.0

Mean ± SD: 122.00±14.91

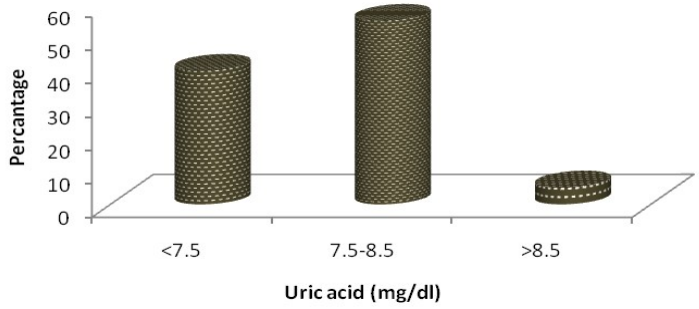
Biochemical analyses of the subjects taken from the medical records are presented here. Fasting Blood sugar values of the subjects revealed that 14 of them were having FBS levels between 70 mg/dl to 110 mg/dl and 26 of the subjects had more than 110 mg/dl was irrespective of gender (Table -1).

Figure 4: Lipid Profile of the study subjects



Lipid profiles of the study subjects were studied. The number of patients under different levels of Lipid parameters i.e Total Cholesterol, TGL, HDL, LDL is given in figure-4. Total cholesterol of the subjects showed that 90 percent of them had 200-250 mg/dl while remaining 10 percent had <200 mg/dl of cholesterol (Table-2). Further 60 percent of the subjects had Triglyceride level between 150-200mg/dl, 25 percent them had less than 150 mg/dl and remaining 15 percent had >200 respectively. High Density Lipoprotein (HDL) is often referred to as "Good" cholesterol which helps to remove excess cholesterol from the body. It was noted that 80 percent of the subjects had HDL between 35-50 mg/dl, while only 20 percent of them had >50 mg/dl of HDL. Low density lipoprotein (LDL) cholesterol also known as "Bad" cholesterol is a type of lipoprotein that carries cholesterol in the blood and can be at risk of plaque formation in the arteries, which in turn can increase the risk of heart disease and stroke.

Figure 5: Uric acid (mg/dl) in subjects studied



Gout occurs when urate crystals accumulate in your joint, causing the inflammation and intense pain of a gout attack. Urate crystals can form when you have high levels of uric acid in our blood. Normal Uric acid levels are 2.5–7.0 milligrams per deciliter (mg/dl) in males and 1.5–6.0 mg/dl in females. High levels can lead to gout, kidney disease, and other health issues. The study highlighted that 55 percent of the study population had uric acid level between 7.5 to 8.5, 5 percent of them had above 8.5 gm/dl, while 40 percent of them had <7.5 gm/dl respectively (Figure 5). It was observed that there was a significant correlation between uric acid and BMI with Chi-square value of 10.342 and p value 0.005. This indicates that as the weight increases

there is risk of increase in the uric acid levels. Associated factors linked to gout and hyperuricemia include older age, male sex, obesity, a purine-rich diet, alcohol, certain medications, comorbid diseases, and genetic predisposition. Hence it was considered to understand the significant correlation with associated factors and gout.

Table 2: Comparison of study variables according to age

Variables	Age in years		Total	P value
	<50 years	>50 years		
FBS (mg/dl)	125.71±11.34	120.00±16.60	122.00±14.91	0.496
Total cholesterol(mg/dl)	217.57±17.56	223.23±12.93	221.25±14.51	0.158
TGL(mg/dl)	200.57±81.41	153.92±26.64	170.25±55.34	0.071+
HDL(mg/dl)	42.29±4.46	44.92±7.11	44.00±6.32	0.388
LDL(mg/dl)	130.06±13.08	135.94±13.9	133.88±13.58	0.370
Uric acid (mg/dl)	7.60±0.36	7.84±0.80	7.760±0.68	0.467

The different variables viz. FBS, Total Cholesterol, TGL, HDL, LDL and uric acid as compared to age was analysed and given in Table 2. There was no significant correlation between the age of the subjects with the biochemical makers of gout. However weak correlation was observed with Triglycerides (TGL) and age. Similar observation was reported in other studies also.[15, 18]

Different variables as per gender was analysed and the study showed that there is no significant relationship between gender and other variables. This study showed that higher uric acid is associated with Non-vegetarians with P=0.127. Correlations indicate weak relationships for most metrics, with TGL showing a stronger correlation with food habits.

Table 3: Pearson correlation of Uric acid with Lipid parameters

Pair	Pearson correlation	P value
Uric acid(mg/dl) vs Total cholesterol(mg/dl)	0.505	0.023*
Uric acid(mg/dl) vs TGL(mg/dl)	0.865	<0.001**
Uric acid(mg/dl) vs HDL(mg/dl)	-0.240	0.308
Uric acid(mg/dl) vs LDL(mg/dl)	0.547	0.013*

The relationship of Uric acid with lipid parameters was studied and presented in Table 3. The analysis revealed there is positive significant relationship of uric acid with Total cholesterol and LDL and very strong positive relationship with triglycerides. The relationship of uric acid with FBS and age in years was studied and it is found that there is no significant relationship. Baliarsingh and Sharma (2012) reported that Uric acid has been associated with dyslipidemia, most importantly hypertriglyceridemia. But studies on the relation between uric acid and lipid parameters in the Indian population have been minimal. Further they concluded that serum uric acid levels in the normal range might be a good indicator of the level of triglycerides and very low density lipoprotein cholesterol in men encompassing a wide age range but of total

cholesterol and low density lipoprotein cholesterol only in men less than 45 years in age.

Intervention through the education and counselling to the patients helps them to manage the gout considerably by consuming low purine diet and regular exercise. Weight control, limits on red meat consumption with daily exercise is important lifestyle modification recommendations for patients with gout. Daily consumption of nuts and legumes may also provide important health benefits without increasing the risk for gout. These lifestyle modifications are inexpensive and safe and, when combined with drug therapy, may result in better control of gout.

Summary

Uric acid forms because of purine being metabolized from cellular degeneration and recycling of the cell's genetic material. When uric acid level exceeds normal range, a substance called monosodium urate crystals accumulates in joints, tendons and kidneys, causing gout. Forty subjects included in the study were assessed for their nutritional status through anthropometric assessment, biochemical assessment and dietary assessments. The results indicated that as the weight increases there is risk of increase in the uric acid levels. Higher uric acid was found to have significant association with Non-vegetarians. The relationship of Uric acid with lipid parameters revealed there is positive significant relationship of uric acid with total cholesterol and LDL and very strong positive relationship with triglycerides.

Conclusion

Thus it can be concluded that associated risk factors management is very important to reduce the inflammation of gout. Intervention through the education and counselling the patients helps them to manage the gout considerably. Weight control, limits on red meat consumption, inclusion of low purine foods, with daily exercise is important lifestyle modification recommendations for patients with gout.

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