



FREQUENCY OF HYPERURICEMIA IN PATIENTS WITH HEART DISEASES

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ABSTRACT

Background: Uric acid is an active chemical compound because it has a biological role in a variety of physiological activities. It's unclear how high blood uric acid levels and cardiovascular disorders are related to one another. Research is needed to identify a potential dual effect in the cardiovascular system between the rising or lowering of serum uric acid and the development of heart diseases.

Objective: To study the frequency of hyperuricemia in patients with Ischemic heart disease and hypertensive heart disease.

Methods: A non-probability convenient selection approach was used to pick 150 patients with heart disorders who were hospitalized in the cardiac unit in multicenter hospitals, based on predetermined inclusion and exclusion criteria for this cross-sectional study. 150 patients who were hospitalized at the tertiary care hospital were included and their serum uric acid was recorded and observed the relation to heart diseases.

Results: The mean age of participants in this study was $59 \pm SD 11.4$ years. In this study, 100 patients were male while 50 were female. The most frequently found heart disease among the subjects was Ischemic Heart Disease (46.2%) while hypertensive heart disease (33%). A total of 25 individuals having Ischemic heart disease had Hyperuricemia while 16 individuals had hypertensive heart disease and four with both observed Hyperuricemia.

Conclusion: Our investigation's results indicate that hyperuricemia is quite common in people with ischemic and hypertensive heart disease.

Keywords: Hyperuricemia, hypertensive heart disease, ischemic heart disease

INTRODUCTION

Purine nucleosides, which originate from dietary and endogenous nucleic acid sources, have been shown to metabolically end up as uric acid. The total quantity of uric acid in the human body varies

depending on gender and can be as high as 1200 mg in males and 600 mg in girls. Nonetheless, this number may increase from 18000 to 30000 mg in those with gout. The gastrointestinal and urinary tracts are the routes by which uric acid is eliminated from the body. [1]

The relationship about the potential association between uric acid and cardiovascular disease (CVD) was initially established around sixty years ago. Since then, it has been shown in several investigations concerning hyperuricemia (HU) and a variety of cardiac conditions, such as heart failure, ischemic and hypertensive heart disease, obesity, diabetes, stroke, and metabolic syndrome. Research has indicated that those with uric acid levels above 7.0 mg/dL are more susceptible to coronary heart disease (CHD). When the uric acid levels are higher than 7.0 mg/dL, the condition is HU [4, 6. This is the point in the human body where uric acid starts to crystallize. [7, 8.]

Uric acid is a powerful antioxidant that may protect against some malignancies and heart conditions. [9]. Due to its antioxidant qualities, uric acid has protected against cardiovascular illnesses; yet, studies have shown links between uric acid and an increased risk of hypertension, ischemic heart disease, and unfavorable cardiovascular risk profiles. [5–14] These detrimental consequences have been demonstrated by meta-analyses of prospective studies, which also support the association between elevated serum uric acid and elevated risk for blood pressure and cardiovascular events. [13, 14].

METHODOLOGY

This study is cross-sectional. It was a multicentral study conducted in tertiary care hospitals. The duration of the study was 1 year, 150 patients who were hospitalized in the cardiac care units of the tertiary care hospital were included in the sample size. The non-probability convenient sampling approach was used for the sampling.

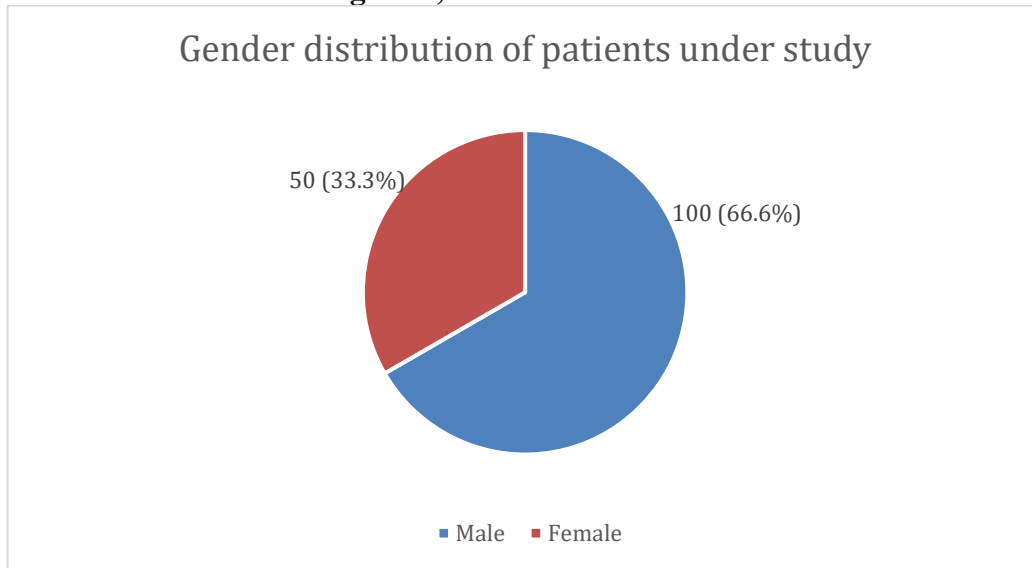
The study's inclusion criteria were those with ischemic or hypertensive heart disease identified and admitted, to a tertiary care facility. All patients gave their approval to be included.

Data Collection Procedure:/Methods Once the hospital research participant was identified, permission was obtained and blood was drawn while the patient was aseptic. The Hitachi 902 analyzer was used to determine the serum uric acid level. For both genders, the reference ranges for serum uric acid were 2.5 to 7.2. The automated technique employed the Uricase approach in a single run.

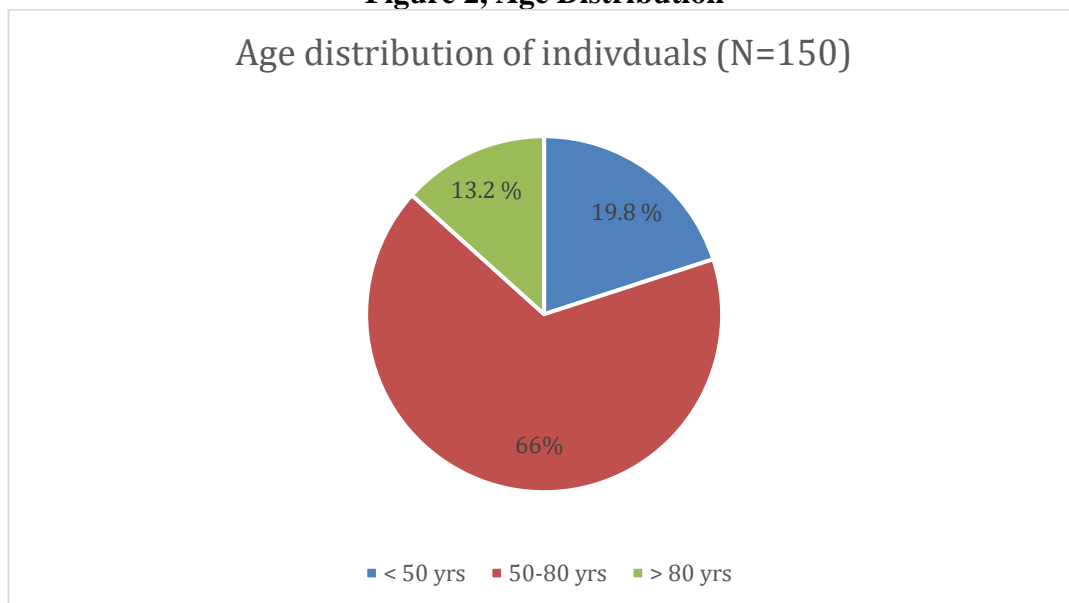
It is predicated on the idea that when the enzyme Uricase is present, uric acid is oxidized to produce hydrogen peroxide and allantoin. Next, using catalase-peroxidase linked reactions, the hydrogen peroxide was determined. SPSS version 23.0 was used to record and evaluate the acquired data. Gender was one of the categorical variables for which mean + SD was computed. Tables and graphs were used to display all of the results.

RESULTS

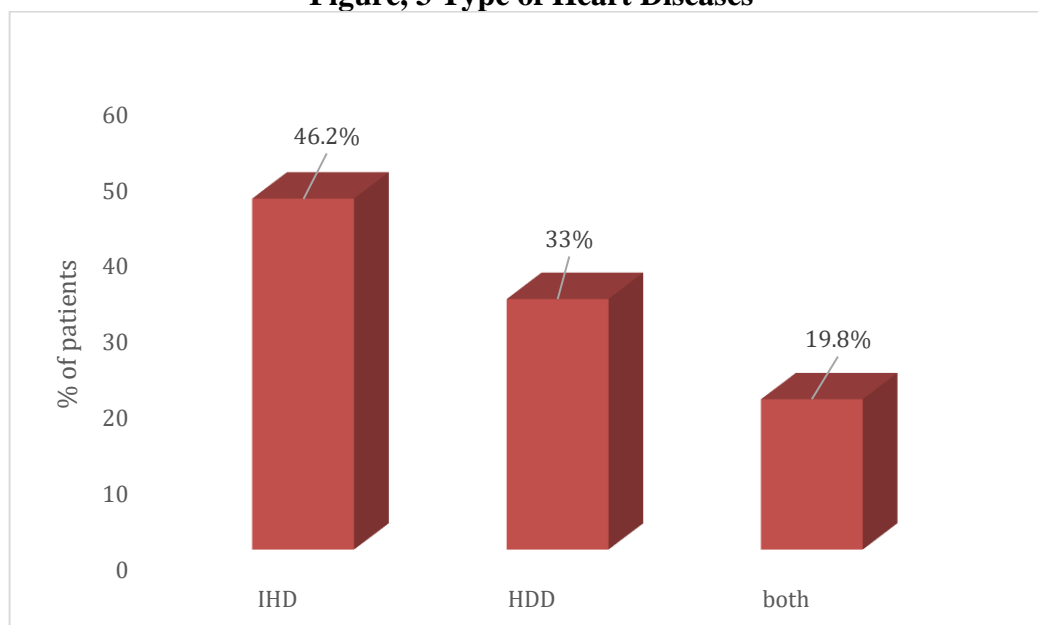
The mean age of participants in this study was 59 years with a standard deviation of 11.4. In this study, the majority of the patient were male i.e. 100 while the number of female patients was 50. (Fig 1).

Figure 1, Gender Distribution

The individuals were divided into three age groups that are less than 50 years consisting of 30 (19.8%) subjects while the majority of subjects were in the age group of 50 to 80 years which contains 100 (66%) subjects. The smallest number of subjects that is 20 (13.2 %) were in the age group of above 80 years (Fig 2)

Figure 2, Age Distribution

The most frequently found heart disease among the subjects was Ischemic Heart Disease (46.2%) while hypertensive heart disease was (33%) There were (19.8%) individuals who suffered from both of the diseases (Fig 3).

Figure, 3 Type of Heart Diseases

IHD = Ischemic Heart Diseases HDD = Hypertensive Heart Diseases

A total of 28 males and 17 females have serum uric acid levels of more than 7.22mg/dl. Majority of the male (72) and females (33) the serum uric acid level was in the range of 7.22 – 2.5 mg/dl. No patient has a serum uric acid level of less than 2.5 mg/dl. Table 1 shows these results.

Table 1: Serum Uric Acid level of male and female

Gender	Serum uric acid level			Total
	More than 7.22 mg/dl	7.22 – 2.5 mg /dl	Less than 2.5 mg/dl	
Male	28 (28%)	72 (72%)	---	100 (66.6%)
Female	17 (34%)	33(66%)	---	50 (33.3%)
Total	45 (30.7%)	105 (69.3%)	--	150 (100%)

Hyperuricemia was observed in 45 (30.7 %) patients 28 were male and 17 were female. A total of 25 individuals having Ischemic heart disease had Hyperuricemia while 16 individuals had hypertensive heart disease and four with both observed Hyperuricemia (Table 2).

Table 2: serum uric acid level in heart diseases

Diseases	Serum uric acid level			Total
	More than 7.22 mg/dl (hyperuricemia)	7.22 – 2.5 mg /dl	Less than 2.5 mg/dl	
Ischemic heart diseases	25	51	--	71
Hypertensive heart disease	16	31	--	47
Both	04	27	--	31
Total	45 (30.7%)	105 (69.3%)	--	150 (100%)

DISCUSSION

The idea that elevated serum urate is a unique risk factor for ischemic heart disease has gained attention recently, with various opinions expressed in some editorials and reviews. [17–19]. Due to its potential to act as an antioxidant and prevent lipid peroxidation, a rise in serum urate may be protective against the progression of atherosclerosis, which explains the association between

hyperuricemia and myocardial infarction. [20, 21] Conversely, research indicates that serum urate can increase lipid peroxidation as well as low-density lipoprotein and cholesterol oxygenation. Due to alterations in the surface receptor and cell adhesion molecule expression in cardiac cells, hyperuricemia can cause endothelial damage and increase the risk of myocardial infarction by forming and releasing free radicals. It is necessary to research to determine the true purpose of elevated serum urate in this context and if it can aid in the identification of individuals who are susceptible to myocardial infarction.

Since elevated serum uric acid indicates the general population's progression of hypertension, it has emerged as the primary risk factor for individuals with high blood pressure. [22] Numerous observational, clinical, and epidemiological investigations have found a strong correlation between raised blood pressure in cardiac patients and high serum uric acid levels. This link is independent of renal function, hypertension medication, or increased weight. [23] In 25% of hypertensive individuals, hyperuricemia has been reported; in cardiac patients with malignant hypertension, it can approach 75%. [24]

Research using animal models, such as rats given uricase inhibitors, demonstrated the causative relationship between elevated serum uric acid levels and hypertension. After ingesting a uricase inhibitor for three weeks, hypertension appeared in these rats, but not in the rats in the control group. [25, 26], and when experimental rats were given antihypertensive medications such as enalapril, the induced hypertension in them was reversed. Because serum uric acid level is an inexpensive and readily

A simple, affordable, and adaptable test, serum uric acid levels can be used to determine whether a patient has hyperuricemia, which may lead to more heart disease research. It is noteworthy that individuals with normal blood pressure who have hyperuricemia may take more preventative measures to avoid developing hypertension later on. While previous observational studies [5–12] and meta-analyses of prospective studies [13, 14] have demonstrated a positive correlation between hyperuricemia and ischemic/hypertensive heart illnesses, the current study suggests that hyperuricemia may play a role in the pathophysiology of cardiac diseases.[28, 27]

Therefore, it is crucial to create programs to educate individuals about the significance of changing their eating habits and adopting active lifestyles rather than sedentary ones, with a focus on waist size measurements. [29, 30]

CONCLUSION

According to the findings of our investigation, individuals with ischemic and hypertensive heart disease have a very high incidence of hyperuricemia. This suggests that more investigation in this field is necessary to establish a connection between hyperuricemia and cardiac disorders.

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