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Original Research Article

Study of prevalence and impact of hyperuricemia in a patient of hypertension

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ABSTRACT

Background: The association of raised serum uric acid levels with various cardiovascular risk factors has often led to the debate of whether raised serum uric acid levels could be an independent risk factor in essential hypertension. Hence we carried out a study to examine the possibility of hyperuricemia causing hypertension, to see if there is a relationship between the serum uric acid levels and severity and duration of hypertension.
Methods: The study was carried out in Smt. SCL Hospital, Saraspur, Ahmedabad, India, the study period from September 2012 to June 2014, a total of 100 patients were studied. The patients were included if they satisfied the JNC VII criteria for hypertension. They were excluded if they were having any other condition known to cause raised serum uric acid levels and secondary hypertension.
Results: With the result based on the study carried out we concluded that there can be a direct relation between hyperuricemia and hypertension. Also the study showed that the SUA levels were significantly increased in patient with stage 2 hypertension in comparasion with those with stage 1 hypertension, showing that the severity of hypertension also related to the SUA levels.
Conclusions: Based on the study carried out we concluded that SUA can be used as an early biochemical marker to determine the severity and duration of hypertension.

Keywords: Hyperuricemia, Hypertension, JNC VII, Serum uric acid

INTRODUCTION

Hypertension is the third leading killer disease in the world and is responsible for 1 in every 8 deaths. About 1 billion peoples are affected by hypertension worldwide.[1] Hypertension is a major public health problem in India and other countries as well.

There is strong positive and continuous correlation between BP and the risk of cardiovascular disease (myocardial infarction and heart failure), renal disease, stroke and mortality. This correlation is more robust with systolic than with diastolic BP.[2] Hyperuricemia predicts mortality in patients with heart failure or coronary heart disease, cerebrovascular events in individuals with diabetes and cardiac ischemia in hypertension.[3]

Serum uric acid was first noted to be associated with increased BP by Frederick Mohamed in the 1870s.[4] The mechanism(s) by which UA may engender organ damage is still incompletely understood, but there is increasing evidence that endothelial dysfunction is a fundamental mechanism whereby this substance may affect cardiovascular and renal function and structure.[5] The aim of the study was to assess serum uric acid levels in hypertensive patients, to associate changes in serum uric

acid with clinical prognosis, to study relation between severity of hypertension to serum uric acid level.

METHODS

100 patients of age more than 25 years who were diagnosed as hypertension with or without other conditions as outdoor and indoor of Shardaben Hospital, Ahmedabad, India during year 2012-2014 were studied.

Some of them are not on treatment, and rest are on regular treatment. Serum uric acid level of all patients were measured.

Inclusion criteria

- All patients of Hypertension with or without other conditions, with on or off treatment.
- Age group 25-85 years.

Exclusion criteria

- Patients with gout.
- Patients is on uricosuric drug.
- Patients on drugs which increase serum uric acid level e.g salicylates (>2gm/day), diuretics, ethambutol, pyrazinamide, etc other than uricosuric drug.

All 100 Hypertensive patients were were categorized into Stage 1 or Stage 2 Hypertension (based on JNC VII classification).[6,7] Some of them are not on treatment, and rests are on regular treatment. Serum uric acid level of all patients were measured.

RESULT

Serum uric acid levels were measured in 100 patients both outdoor and indoor attending Shardaben Hospital, Ahmedabad, India.

Incidence of HTN increased with age. The maximum number of patients in this study are 41-55 years. Incidence of HTN is higher in men (51%) than in female (49%). Smoking, alcoholism, sedantary life style, obesity were major modifiable risk factor present in 35%, 30%, 40% and 65% respectively.

Table 1: Age distribution in the study group.

Age group	Numbers	Percentage
25-40 years	15	15%
41-55 yearss	45	45%
56-70 years	31	31%
≥71 years	9	9%
Total	**100**	**100%**

Among 100 cases of Hypertension, the maximum 45 (45%) were in 41-55 years of age group, the youngest patient in this study was 27 year old, while the oldest patient was 83 year old. From above table, it was clear that hypertension is more common in 4th-7th decade.

Table 2: Sex distribution in the study group.

Gender	Numbers	Percentage
Male	51	51%
Female	49	49%
Total	**100**	**100%**

This table shows that among 100 cases of hypertension in the study, 51 (51%) were male and 49 (49%) were female. This suggests that hypertension is little bit more common in males.

Table 3: Evaluation of serum uric acid levels in HTN.

Result	Values	Percentage
Normal	35	35%
Increased	65	65%

35% of patients included in this study had an normal serum uric acid level, while 65% of patients had high serum uric acid level.

Table 4: Serum uric acid level based on stage of HTN (JNC 7).

Stage of HTN	No. of patient
Stage 1	28
Stage 2	72

Table 5: Relationship between serum uric acid level and severity of hypertension.

Stage of hypertension	SUA Level		P value (χ^2 Test)
	Increased	Normal	
Stage 1	21	07	0.28
Stage 2	44	28	

In this study 28 no of patient are in stage 1 HTN out of which 21 no (75%) of pts having elevated SUA level, while 72 no of pts are in stage 2 HTN out of which 44 no (6.1.%) of pts having elevated SUA level. There was no significant statistical difference was found between serum uric acid level and severity of hypertension (p >0.05).

Among 100 patients 65% of patients having high SUA level. Among 100 patients 72 number of pts are in stage 2 HTN while 28 are in stage 1 HTN. In stage 1 HTN out of 28 pts, 21 pts have high SUA level, while in stage 2 HTN out of 72 pts, 44 pts have high SUA level.

With the result based on the study carried out we concluded that there can be a direct relation between

hyperuricemia and hypertension. Also the study showed that the SUA levels were significantly increased in patient with stage 2 hypertension in comparasion with those with stage 1 hypertension, showing that the severity of hypertension also related to the SUA levels.

DISCUSSION

Elevated SUA levels have been associated with an increased risk for cardiovascular disease. The potential mechanisms by which SUA may directly affect cardiovascular risk include enhanced platelet aggregation and inflammatory activation of the endothelium.[12] Because elevated serum uric acid is correlated with several risk factors including renal dysfunction, hypertension, insulin resistance, hyper-homocystenemia and hyperlipidemia, it is debated whether SUA is an independent cardiovascular risk factor.

Various other studies have also shown that increased SUA levels were seen in hypertensive patients. Kinsey (1961) in his study with 400 hypertensive patients reported a 46% incidence of hyperuricemia in hypertensives.[13] Kolbe (1965) in his study of 46 hypertensive patients found 26 to be having increased SUA levels (56 %).[14] In a study by Bulpitt CJ, 48 % male hypertensives and 40 % female hypertensives had their SUA level in the hyperuricemic range.[15]

Ramsay et al in his study of 73 men with untreated hypertension had 18 with raised serum uric acid levels (25%).[16] Messerli et al had an incidence of 72% raised SUA in their study population of 39 established hypertensives. Messerli et al hypothesized that the frequent presence of hyperuricemia in hypertensive patients reflects underlying renal dysfunction or reduced renal perfusion.[17]

CONCLUSION

There is definite relationship between SUA and hypertensive patients and SUA levels have direct relation to the duration and severity of hypertension. Based on the study carried out it is concluded that SUA can be used as an biochemical marker to determine the severity and duration of hypertension.

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