

EVALUATION OF SERUM URIC ACID AND ITS CORRELATION IN YOUNG NEWLY DIAGNOSED ESSENTIAL HYPERTENSIVES

General Medicine

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ABSTRACT

Background: Hypertension is a major public health challenge and is the third leading killer in the World. The serum uric acid has shown some prognostic importance in essential hypertension

Methodology: A case control study was undertaken in a tertiary care hospital in Gurugram. Seventy five cases of hypertension and equal number of controls were studied for the hypertension and serum uric acid levels.

Results: This study had shown that, majority of the cases and controls were aged 31 – 40 years and females. The blood pressures were significantly more in the cases than controls. Serum uric acid levels were also significantly higher in cases than controls. There was no statistically significant difference in serum uric acid levels between different stages of hypertension.

Conclusion: The serum uric acid levels were significantly higher in cases of hypertension than controls.

KEYWORDS

Serum Uric acid, Essential hypertension, Age, Sex, Stages of hypertension

INTRODUCTION

The literature shows that, hypertension affects 1 billion people worldwide and is leading killer around the world. It is affecting one in four individuals and responsible for 1 in every 8 deaths.¹ Life style related diseases including hypertension are often affected by hyperurecemia.² Serum uric acid acts as an independent predictor of incidence and progression of hypertension. The risk is present in 25 – 60% of the individuals with the untreated primary hypertension and nearly 90% in adolescent with essential hypertension of recent onset.³

Uric acid induced activation of rennin – angiotensin system and its action on glomerular apparatus, insulin resistance and hyperinsulinemia decreases excretion of uric acid, sodium, potassium from renal tubules explains the mechanism of development of hypertension in hyperurecemia.^{4,5}

The reports suggests that the raised uric acid is associated with raised risk of coronary heart disease and commonly observed in essential hypertension, even untreated hypertension and type 2 diabetes, which are in turn associated heart disease. But the literature is lacking to observe that raised serum uric acid increases the risk of hypertension and type 2 diabetes independently of known risk factors such as age, obesity, alcohol consumption and physical activity.⁶

The assessment of the independent prognostic value of SUA is clinically relevant in the specific setting of essential hypertension, in which hyperuricemia is frequent and cardiovascular risk stratification is of utmost importance.

MATERIAL AND METHODS

A case control study was conducted in the Outpatient and Inpatient department of General Medicine, SGT Medical College, Hospital and research institute, Gurugram between October, 2019 to September 2020. Clearance from institution ethics committee was obtained before the study was started and informed consent was taken from all the patients before they were included in to the study. A convenience sample of 75 newly diagnosed cases of essential hypertension and equal number of controls were included in to the study. The cases aged between aged between 18 – 40 years and newly detected patients with essential hypertension were included and patients with Leukemias, Polycythemia, Lymphoma, Carcinoma, Anti-Cancer Therapy, Psoriasis, Renal Failure, End Stage Renal Disease, Endocrine Disorder, Patients on treatment with drugs altering uric acid levels such as thiazides, loop diuretics, pyrazinamide and allopurinol and pregnancy induced hypertension was excluded from the study.

All the patients were subjected for a complete medical history and

physical examination. The hypertension was defined as blood pressure of $\geq 140/90$ mm of Hg. The patients were resting for at least 20 min before the blood pressure was measured as per WHO and JNC recommendations. Blood pressure measurement was done using aneroid sphygmomanometer with cuff of adequate size. Information was obtained from detailed history with special emphasis on duration and treatment of hypertension, vital signs, complete general physical examination including height and weight and systemic examination including ophthalmoscopic examination of fundus were recorded. Serum uric acid is measured by collecting the blood samples, patients were advised to proceed on overnight fast of 12 hrs.

The data was compiled and analyzed using Statistical Package for social services (SPSS vs 20). Statistical significance was considered when $p < 0.05$.

RESULTS

Table 1. Demographic characteristics of the study groups

Characteristics		Cases N (%)	Controls N (%)	χ^2 Value
Age group	Less than 20 years	8 (10.7)	2 (2.7)	4.525
	21 – 30 years	34 (45.3)	32 (42.7)	
	31 – 40 years	33 (44.0)	41 (54.7)	
Sex	Male	32 (42.7)	37 (49.3)	0.671
	Female	43 (57.3)	38 (50.7)	
Duration of hypertension	Less than 5 years	47 (62.7)		
	More than 5 years	28 (37.3)		

Majority of the patients in this study were aged between 31 – 40 years. More than half of the study subjects in both case and controls were females. The hypertension was diagnosed less than 5 years in 62.7% of the cases.

Table 2. Blood pressure levels of the study groups

Blood pressure (Mean $\pm$ SD)	Cases	Controls	T value	P value
Systolic BP	146.5 $\pm$ 6.28	119.84 $\pm$ 10.39	19.002	0.000
Diastolic BP	100.3 $\pm$ 5.59	79.39 $\pm$ 5.9	22.284	0.000

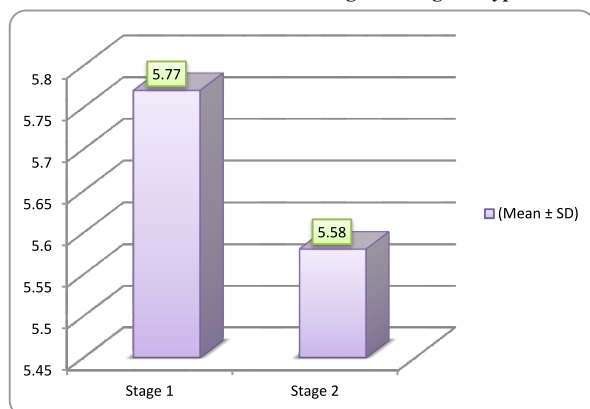
Mean systolic blood press was significantly higher in cases than controls. Mean diastolic pressure was also higher in cases than controls.

Table 3. Serum uric acid levels of the study groups

Serum Uric acid (Mean $\pm$ SD)	Cases	Controls	T value	P value
	5.7 $\pm$ 1.36	4.13 $\pm$ 0.45	9.425	0.000

Mean serum uric acid level in cases was 5.7 mg/dl in cases and 4.13 mg/dl in controls. This difference in mean serum uric acid levels was statistically significant between the two groups.

Chart 1. Serum Uric acid levels according to the stages of hypertension



Mean serum uric acid level in stage 1 hypertension was 5.77 mg/dl and stage 2 hypertension was 5.58 mg/dl. This difference was not statistically significant between the two groups.

DISCUSSION

Raised serum uric acid level is shown to be a strong predictor of development of hypertension in due course. The reports suggests that the raised uric acid is associated with raised risk of coronary heart disease and commonly observed in essential hypertension, even untreated hypertension and type 2 diabetes, which are in turn associated heart disease. This was the main reason to take up this study.

This study had shown that, most of the study subjects were young and aged between 31 – 40 years and females. Majority of the cases had hypertension since five years. In a study by Shrivastav et al, the mean age of the hypertensives was 40.25 years and control was 37.46 years. Females outnumbered males. Hypertension increases with increase in age.

Mean systolic blood press was significantly higher in cases than controls. Mean diastolic pressure was also higher in cases than controls. In a study by Shrivastav et al, the mean systolic blood pressure was 114.06 mm of Hg, pre hypertensive group was 134 mm of Hg and hypertensive group was 160.04 mm of Hg. The diastolic blood pressure was 74.66 mm of Hg, 86.45 in prehypertensive group and 92.0 mm of Hg in hypertensive groups.⁷ In a study by Poudel et al, the mean systolic blood pressure of cases was 143.99 mm of Hg and controls was 113.5 mm of Hg. The mean diastolic blood pressure was 96.61 mm of Hg and controls was 74.44 mm of Hg.⁸ In a study by Chowdeshwari et al, the mean SBP among males was 152 mm of Hg, male controls was 120 mm of Hg, female cases was 160 mm of Hg and female controls was 110 mm of Hg. The mean diastolic blood pressure was 99 mm of Hg among male cases, 80 mm of Hg among male controls, 102 mm of Hg among females and 75 mm of Hg among the female controls.⁹

Mean serum uric acid level in cases was 5.7 mg/dl in cases and 4.13 mg/dl in controls which was statistically significant. In study by Shrivastav et al, the mean uric acid levels among the controls was 4.91 mg/dl, prehypertensive group was 5.89 mg/dl and 6.56 mg/dl in the hypertensive students.⁷ In a study by Poudel et al, the mean uric acid level was 290.05 μ mol/L and among controls was 245.24 μ mol/L.⁸ In a study by Chwodeshwari et al, the mean serum uric acid was 476 μ mol/l among male cases, 321 μ mol/l among male controls, 442 μ mol/l among females and 286 μ mol/l among female controls.⁹

Mean serum uric acid level in stage 1 hypertension was 5.77 mg/dl and stage 2 hypertension was 5.58 mg/dl. This difference was not statistically significant between the two groups. The uric acid may be earlier and more sensitive marker of decreased renal blood flow than serum creatinine. Serum uric acid plays role in formation of the free radicals and oxidative stress, the increased risk of hypertension in subjects with raised serum uric acid levels might be associated with this. The reports show that, the concept of free radical mediated inhibition of endothelium dependent vasodilatation. The deficiency of

antioxidants in diet which produces hyperurecemia, contributes to the etiology of hypertension and the antioxidant drugs also shows a blood pressure lowering effect in diabetic and hypertensive patients.

The reports suggests that the raised uric acid is associated with raised risk of coronary heart disease and commonly observed in essential hypertension, even untreated hypertension and type 2 diabetes, which are in turn associated heart disease.

CONCLUSION

This study had shown that there was significant association of hypertension with the serum uric acid. But the serum uric acid levels were not associated with the stages of hypertension.

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