ORIGINAL RESEARCH

Serum uric acid levels in patients with essential hypertension

Dr. Rohith P Reddy

Associate Professor, Department of Cardiology, NRI Medical College & General Hospital, Guntur, Andhra Pradesh, India

Corresponding author
Dr. Rohith P Reddy
Associate Professor, Department of Cardiology, NRI Medical College & General Hospital, Guntur, Andhra Pradesh, India

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ABSTRACT

Background: A significant, escalating medical and public health issue is hypertension. The present study was conducted to assess serum uric acid levels in essential hypertension. **Materials & Methods:** 54 cases of essential hypertension of both genders were selected. Patients were divided into 2 groups. Group I had cases and group II had healthy subjects. Parameter such as body weight, height, body mass index, waist circumference, pulse rate, systolic and diastolic blood pressure, serum uric acid was recorded. **Results:** Age group <40 years had 22 in group I and 20 in group II, 41-60 years had 16 in group I and 18 in group II and >60 years had 16 in group I and 16 in group II.The mean serum uric acid in group I was 6.27 mg/dl and in group II was 5.10 mg/dl. The difference was significant (P< 0.05). **Conclusion:** There was high serum uric acid level in essential hypertension patients.

Key words: blood pressure, uric acid, essential hypertension

INTRODUCTION

A significant, escalating medical and public health issue is hypertension. Up to 1 billion people may have hypertension according to estimates, and the condition may be responsible for 7.1 million deaths annually.1 According to the WHO, ischemic heart disease accounts for 49% of all ischemic heart disease and 62% of cerebrovascular illness in people with suboptimal blood pressure (>115 mm Hg systolic BP). Additionally, in the entire world, having inadequate blood pressure is the leading cause of death from myocardial infarction, stroke, congestive heart failure, peripheral vascular disease, and end-stage renal disease.

Hyperuricemia has been found in 26% to 33% of patients with untreated mild essential hypertension. It has been related to obesity, aging, alcohol abuse, and vascular disease, each of which is commonly associated with high blood pressure. The abnormality has been ascribed to various disturbances including altered uric acid metabolism, erythrocyte disorders, impaired renal function and drugs. Renal urate clearance has been reported to be inappropriately low with regard to glomerular filtration rate in patients with essential hypertension. The present study was conducted to assess serum uric acid levels in essential hypertension.

MATERIALS &METHODS

The present study consisted of 54 cases of essential hypertension of both genders. Patients consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Group I had cases and group II had healthy subjects. Parameter such as body weight, height, body mass index, waist circumference, pulse rate, systolic and diastolic blood pressure, serum uric acid was recorded. The results were compiled and subjected for statistical analysis. P value less than 0.05 was set significant.

RESULTS

Table I Distribution of patient

Age group (years)	Group I (54)	Group II
<40	22	20
41-60	16	18
>60	16	16

Table I shows that age group <40 years had 22 in group I and 20 in group II, 41-60 years had 16 in group I and 18 in group II and >60 years had 16 in group I and 16 in group II.

Table II Assessment of serum uric acid in both groups

Groups	Uric acid (mean)	P value
Group I	6.27	0.05
Group II	5.10	

Table II shows that the mean serum uric acid in group I was 6.27 mg/dl and in group II was 5.10 mg/dl. The difference was significant (P< 0.05).

DISCUSSION

Hypertension is the emerging public health problem of adult population across the globe, affecting one in every four individuals.[8] The etiological factors associated with hypertension is difficult to predict because hypertension results from a complex interaction of genes and environmental factors.[9]

The activation of the renin-angiotensin system and effect of uric acid on the glomerular apparatus, increased insulin resistance and hyperinsulinaemia, decreased excretion of uric acid, sodium, and potassium from renal tubules, and uric acid action in proliferation of vascular smooth muscleendothelial dysfunction with decreased nitric acid production are among the plausible mechanisms for the development of hypertension in hyperuricemia.[10] However, there are many other factors that contribute to the relationship between hyperuricemia and hypertension, such as metabolic syndrome, diabetes mellitus, chronic renal disease, obesity, alcohol use, salt intake, fluid volume status, etc.[11] Adults with prehypertension frequently have hyperuricemia, particularly when microalbuminuria is present. The finding that hyperuricemia occurs before the onset of hypertension suggests that it is not just a side effect of hypertension.[12]

The mechanisms causing the rise in SUA and its potential prognostic consequences in patients with essential hypertension is not well understood. A byproduct of purine metabolism, uric acid is 99% reabsorbed in the proximal tubule, 5% attached to plasma proteins, freely filtered at the glomerulus as a function of renal blood flow, released by the distal tubule, and prone to significant post-secretory reabsorption.[13] Uric acid is secreted in fractions of 7% to 10%. In patients with essential hypertension, a direct correlation between SUA and renal vascular resistance is present.Additionally, frequently linked to hypertension is uric acid. It is prevalent in >75% of patients with malignant hypertension, 25% of untreated hypertensive patients, and 50% of patients using diuretics.[14] The present study assessed serum uric acid levels in essential hypertension.

We found thatage group <40 years had 22 in group I and 20 in group II, 41-60 years had 16 in group I and 18 in group II and >60 years had 16 in group I and 16 in group II.Messerli FHet al[15]measured glomerular filtration rate, renal and systemic hemodynamics, and intravascular volume in normotensive subjects and in borderline and established essential hypertensive patients classified according to serum uric acid level. Renal blood flow was lower and renal vascular and total peripheral resistances were increased in patients with high uric acid levels ($p < 0.02$). Serum uric acid concentration correlated inversely with renal blood flow/m2 body surface area ($r = -0.45$, $p < 0.001$) and directly with renal vascular ($r = 0.41$, $p < 0.001$) and total ($r = 0.38$, $p < 0.001$) resistance. Cardiac output, heart rate, and intravascular volume as well as glomerular filtration rate showed no uric-acid-department pattern. Mild asymptomatic hyperuricemia, therefore, was associated with decreased renal blood flow without affecting glomerular filtration rate. Increased renal vascular and total peripheral resistances reflecting renal and systemic hypertensive vascular disease paralleled the rising serum uric acid levels. These data suggest that heretofore unexplained hyperuricemia in patients with essential hypertension most likely reflects early renal vascular involvement, specially, nephrosclerosis.

We observed that the mean serum uric acid in group I was 6.27 mg/dl and in group II was 5.10 mg/dl. Feig and Johnson[16] observed that the mean serum uric acid level was nearly identical in control subjects and children with white coat hypertension, but slightly higher in secondary hypertension (4.3 1.4 mg/dl, respectively; P = 0.80), but very high in children with primary hypertension (6.7 1.3 mg/dl; P = 0.004). In individuals who were referred for examination of hypertension, there was a close, linear connection between the serum uric acid levels and the systolic and diastolic blood pressure (r = 0.8 for systolic BP and r = 0.6 for diastolic BP). A serum uric acid level exhibited an 89% negative predictive value for essential hypertension among individuals who were referred for evaluation of hypertension, compared to a serum uric acid level.

CONCLUSION

Authors found that there was high serum uric acid level in essential hypertension patients.

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