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ESSENTIAL HYPERTENSION;
HYPERURICEMIA IN PATIENTS

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ABSTRACT… Objectives: To determine the frequency of hyperuricemia in patients with essential hypertension. **Study Design:** Cross sectional descriptive. **Period:** Six months study. **Setting:** Liaquat University Hospital Hyderabad. **Patients and Methods:** All the patients with essential hypertension visited at cardiac OPD / admitted in the ward were further evaluated for serum uric acid level. The data was analyzed in SPSS 16 and the frequency and percentage was calculated. **Results:** During six months study period, total one hundred and eighty (180) patients with essential hypertension were recruited and study for uric acid level. The mean age ±SD for overall population was 52.84±8.72 whereas it was 55.83±7.93 and 50.75±8.95 in male and female population respectively. The mean ± SD of systolic and diastolic blood pressure (mmHg) in overall population was 160.50 ± 12.74 and 100.70±5.95 respectively. The mean ±SD serum uric acid level in overall population was 13.74±4.83 while it was 11.74±6.44 and 14.43±4.31 in male and female population respectively). The male population was predominant in relation to age (p=0.02), the hyperuricemia was identified in 117/180 (65%) patients and it is statistically significant in context to age (p<0.01) and gender (p<0.05) whereas mean ±SD of systolic and diastolic blood pressure was also significant in relation to hyperuricemia. **Conclusion:** There is a relationship between hyperuricemia and hypertension and shown that the serum uric acid level was significantly increased in patients with essential hypertension.

Key words: Hypertension, uric acid and hyperuricemia

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INTRODUCTION

Uric acid is the product of purine metabolism abnormally raised in patients with gout and displayed a relationship between hyperuricemia and gouty arthritis.[1, 2] The interaction between hypertension and hyperuricemia was rising the question about increase the serum uric acid in subjects with hypertension.[3]

Elevated uric acid has been observed to be associated with increase risk of vascular and heart disease and also reported in cases with essential hypertension formerly infact untreated hypertension and diabetes are also related with coronary cardiac disease.[4-7] It is unknown either raised serum uric acid related with hypertension independently or associated with known risk components i.e. age, alcoholism, obesity and physical activity.[8] High uric acid level leads to increase Na+ reabsorption in the kidney and it has been observed that metabolic imbalance may also had adverse effects on hypertension.[9, 10]

The present study was conducted at Liaquat University Hospital Hyderabad, Sindh. The present study observed the serum uric acid level in subjects with essential hypertension. Early detection and management of serum uric acid and hypertension can prevent the subjects to acquire various life threatening complications.

PATIENTS AND METHODS

The six months cross sectional study was planned in department of Cardiology at Liaquat University Hospital Hyderabad. All the patients of ≥18 years of age, either sex labelled as hypertension according to the JNC VII were enrolled and entered in the study while the cases with secondary hypertension, gout and diabetes mellitus, on thiazide diuretics, history of alcoholism, pre-eclampsic, renal disease

and psoriasis were placed in exclusion criteria. By taking the informed consent for study the proforma was designed to note the data. The brief history was taken and physical examination was performed i.e. measurement of blood pressure and anthropometric parameters. The relevant investigations i.e. blood complete picture, serum urea and creatinine, ECG, chest radiograph, urine DR and lipid profile were also advised when necessary. After ten minute rest, blood pressure was measured twice in the sitting position by giving a break of 5 minutes on 03 different occasions with mercury sphygmomanometer. Hypertension was lebelled according to the JNC VII classification[11] i.e. the subjects with systolic 140 - 159 mm hg or diastolic of 90 - 99 mm hg considered in hypertension stage 1 and the cases with systolic ≥160 or diastolic ≥100 mm hg were considered as hypertension stage 3 while the pre-hypertensive component of JNC VII was also excluded. Thereafter, all hypertensive individuals were evaluated for serum uric acid by taking venous blood sample and sent to laboratory for analysis. The serum uric acid ≥7 mg/dl was considered as hyperuricemia. The data was saved and analyzed in SPSS 16. The frequency and percentage (%) was calculated while the mean ±SD was computed for numerical variables. The stratification was done for age and gender, the categorical variables were analyzed thru chi-square test and numerical by independent sample t-test at 95% confidence interval and the level of significance was p-value ≤0.05.

RESULTS

Total one hundred and eighty (180) patients with essential hypertension were recruited and observed for uric acid level. The mean age ±SD for whole individuals was 52.84±8.72 whereas in male and female gender it was 55.83±7.93 and 50.75±8.95 respectively. The systolic and diastolic blood pressure (mmHg) in whole population was 160.50±12.74 and 100.70±5.95. The serum uric acid level in whole study population was 13.74±4.83 while in male and female gender it was 11.74±6.44 and 14.43±4.31. The age in relation to sex and hyperuricemia is presented in Table-I and II while the sex distribution in context to hyperuricemia is displayed in Table-III. The mean ± SD of systolic blood and diastolic blood pressure in context to hyperuricemia and normal uric acid level are presented in Table IV and V.

		Gender		Total
		Male	Female	
AGE	20-29	2	2	4
		1.9%	2.8%	2.2%
	30-39	18	16	34
		16.7%	22.2%	18.9%
	40-49	23	15	38
		21.3%	20.8%	21.1%
	50-59	21	26	47
		19.4%	36.1%	26.1%
	60-69	27	8	35
		25.0%	11.1%	19.4%
	70 +	17	5	22
		15.7%	6.9%	12.2%
Total		108	72	180
		100.0%	100.0%	100.0%

Table-I. The Age In Relation To Gender
**p-value = 0.02*

		Hyperuricemia		Total
		Yes	No	
AGE	20-29	1	3	4
		.9%	4.8%	2.2%
	30-39	16	18	34
		13.7%	28.6%	18.9%
	40-49	20	18	38
		17.1%	28.6%	21.1%
	50-59	37	10	47
		31.6%	15.9%	26.1%
	60-69	25	10	35
		21.4%	15.9%	19.4%
	70 +	18	4	22
		15.4%	6.3%	12.2%
Total		117	63	180
		100.0%	100.0%	100.0%

Table-II. The age in relation to hyperuricemia
p-value <0.01

		Hyperuricemia		Total
		Yes	No	
GENDER	Male	76	32	108
		65.0%	50.8%	60.0%
	Female	41	31	72
		35.0%	49.2%	40.0%
Total		117	63	180
		100.0%	100.0%	100.0%

Table-III. The gender in relation to hyperuricemia
**p-value 0.05*

Hyperuricemia	n = 180	Systolic blood pressure	P-value
Yes	117 (65%)	153.15 ± 20.10	0.04*
No	63 (35%)	159.20 ±18.41	

Table-IV. The mean ±sd of systolic blood pressure in relation to uric acid

Hyperuricemia	n = 180	Diastolic blood pressure	P-value
Yes	117 (65%)	115.68 ±11.13	<0.01*
No	63 (35%)	122.74 ±21.00	

Table-V. The Mean ±Sd of Diastolic Blood Pressure In Relation To Uric Acid

DISCUSSION

Hyperurecemia have been considered a risk factor for CV disorders. The platelet aggregation & inflammatory effect of the endothelium are potential mechanisms behind the pathology.[12] In former literature, the relationship between serum uric acid and CV disorders was uncertain but with time the association became significant.[13, 14]

In present study the hyperuricemia was observed in 65% subjects with essential hypertension. Former studies were also reported hyperurecemia in hypertensive individuals. Kinsey D, et al observed hypertensive subjects and detected 46% prevalence of hyperuricemia.[15] Kolbe studied hypertensive cases and identified 26% prevalence of hyperuricemia with male predominence.[16] A study by Breckenridge A, observed 58% hypertensive subjects had elevated uric acid level.[17] A study by Bulpitt CJ, reported hyperurecemia in 48% and 40% hypertensive males and females respectively.[18] Messerli FH, et al reported prevalence of hyperurecemia in 72% hypertensive individuals and concluded an underlying renal dysfunction.[19]

The uric acid is a maker of impaired renal perfusion than creatinine and linked to production of free radicals and oxidative stress.[20, 21] The free radicals might play a major role in the pathophysiology of hypertension and hyperurecemia.[22] inhibition of endothelium by free radical mediated inhibition causes vasodilation whereas antioxidant deficiency causes hyperuricemia and also have a role in hypertension etiology.[23] The study by Tykarski A, observed uric acid secretion at nephron tubule was low in hypertensive subjects as compared with non hypertensive individuals and concluded that impaired renal function play an important role in the development of hyperuricemia in essential hypertension.[24]

Three possibilities must concerned are either hypertension due to increase uric acid or hypertension causes hyperurecemia or severity and duration of hypertension is linked to hyperurecemia.[25] In the study by Breckenridge the hypertensive individuals had low excretion of uric acid than the normal population and reported renal tubular abnormality.[17] Messerli FH, et al showed reported renal vascular involvement and nephrosclerosis.[19] Tubular is the main site of regulation of uric acid and Tykarski in his study observed hyperurecemia in hypertension is because of tubular dysfunction.[24]

In current series the hyperuricemia in individuals with stage I hypertension was 25%% and 40% with stage II hypertension. Kinskey identified that hyperuricemia is directly proportional to grades of hypertension while the study by Tykarski et al reported positive correlation between hyperurecemia and severity of hypertension.[15, 24]

The present study identified the association between serum uric acid level and hypertension in context to the duration and severity of hypertension. Therefore the production of free radicals and oxidative stress leads to hypertension that causes impaired renal function which results in raising the serum uric acid level.

CONCLUSION

There is a relationship between hyperuricemia and hypertension especially in stage II hypertension. The severity and duration of hypertension is significantly related to raise the serum uric acid level. Therefore uric acid can be considered as an initial biochemical marker to evaluate the severity and duration of hypertension.

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"Do yourself a favor. Don't be afraid to stand for what you believe in, even if that means standing alone. "

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Mashooq Ali Danti	Contributions to conception and design, acquisition of data, analysis and interpretaiton of data	
2	Dr. Syed Fasih Ahmed Hashmi	Drafting of article and shares its expert research and expenence in inalizing the manuscript	
3	Dr. Niasr AHmed Shah	Contributed in conception and interpretation of data and give his expert view for manuscript designing	
4	Dr. Syed Saad Hussain	Collection and acquisition of data	
5	Dr. Munaza Gohar	Analysis and interpretation of data contributed in conception and shares its expert research opinion	
6	Dr. Zul Farah	Collection and acquisition of data	
7	Dr. Syed Zulfiqar Ali Shah	Data analysis and interpretation