



## EVALUATION OF STATUS OF SERUM URIC ACID AND LIPID PROFILE IN ESSENTIAL HYPERTENSION

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**ABSTRACT** Uric acid is a byproduct of purine metabolism, has been recently considered as a risk factor for hypertension, metabolic syndrome, cardiovascular disease. Hypertension and dyslipidemia are major risk factors for cardiovascular disease. The present study was undertaken to evaluate the association of uric acid and lipid profile with hypertension. The study was conducted by taking 50 hypertensive patients and 50 healthy subjects. The uric acid and lipid profile were measured in both the groups. It was revealed that mean serum uric acid was significantly increased in hypertensive patients as compared to controls. Mean serum total-cholesterol, LDL-cholesterol, VLDL-cholesterol and triglycerides were significantly increased in cases as compared to controls. Mean serum HDL-cholesterol was significantly decreased in cases as compared to controls. The study shows that both serum uric acid and lipid profile are associated with hypertension. Therefore hypertensive patients should undergo regular measurement of both these parameters to prevent cardiovascular disease.

**KEYWORDS :** LDL-cholesterol – Low density lipoprotein cholesterol, HDL-cholesterol- High density lipoprotein cholesterol, VLDL-cholesterol- Very Low density lipoprotein cholesterol

**Introduction**

Uric acid is a byproduct of purine metabolism produced in blood from endogenous purine (2/3) substances or from diet (1/3). Its normal level in the blood is < 7mg/dl in men and < 6 mg/dl in women based on the limits of solubility of the monosodium urate in serum at a temperature of 36.8° c.<sup>1</sup> Substantial evidence suggests that chronic hyperuricemia is an independent risk factor for hypertension, metabolic syndrome, chronic kidney disease and cardiovascular diseases. Hypertension and dyslipidemia are major risk factors for coronary artery disease and account for 80% of deaths and disability in the low and middle income countries.<sup>(2,3)</sup> The co-existence of the two risk factors has more than an additive adverse impact on the vascular endothelium, which results in enhanced atherosclerosis leading to coronary artery disease.<sup>4</sup>

**Aim and Objectives**

1. To establish the association between uric acid and Hypertension.
2. To compare the level of lipid parameters between hypertensive patients and healthy subjects.

**Materials and methods**

The study was conducted in Hi-Tech medical college, Bhubaneswar after taking ethical committee clearance. Two groups were included in the study (cases and controls). Informed consent was taken from all the patients. 50 hypertensive patients were taken for the study who attended the department of general medicine with the age group 30-70 years and 50 healthy subjects (controls) were selected from the staff members of the same college.

**Inclusion Criteria**

Selection of subjects was done on basis of recently established hypertensive patients.

**Exclusion Criteria**

Secondary hypertensive cases, history of any other clinical complication, taking any drug therapy, pregnant and lactating women. Blood pressure was measured in all subjects. Blood was drawn from all the subjects after overnight fast of 10-12 hours, serum was separated and following parameters estimated.

1. Uric acid- By uricase/PAP method (Coral)
2. Total Cholesterol- By Cholesterol oxidase-peroxidase method
3. Triglycerides- By glycerol phosphate oxidase/peroxidase
4. HDL-Cholesterol- By homogenous enzymatic direct assay
5. LDL-Cholesterol- By Friedwald calculation
6. VLDL-Cholesterol- Triglycerides/5

**Results**

Statistical analysis was done by student t test. The degree of significance was found out by p value

**TABLE-1- Comparison of Systolic Blood Pressure (B.P.) and Diastolic Blood Pressure (B.P.) in controls and cases**

Group	Systolic B.P. (mm Hg) Mean ±SD	Diastolic B.P. (mm Hg) Mean ±SD	P value
controls	118.40± 5.45	76.80±1.02	
cases	171.2±16.02	95.2±18.12	<0.001

From table-1, it was observed that both Systolic B.P. and Diastolic B.P. were significantly increased in hypertensive patients as compared to controls. (P<0.001)

**TABLE-2- Comparison of serum uric acid and lipid profile in controls and cases**

Parameters	Controls Mean±SD	Cases Mean±SD	p-value
Uric acid (mg/dl)	4.3±0.89	7.23±1.23	<0.001
Total Cholesterol (mg/dl)	151.3±10.13	256.9±8.58	<0.001
Triglycerides (mg/dl)	135.6±12.36	195.2±14.25	<0.001
HDL-Cholesterol (mg/dl)	48.6±5.46	40.6±6.52	<0.05
LDL-Cholesterol (mg/dl)	105.9±7.56	155.6±6.57	<0.001
VLDL-Cholesterol (mg/dl)	22.3±3.65	38.4±5.68	<0.001

From table-2, it was observed that uric acid was significantly increased in cases as compared to controls. It was shown that serum total cholesterol, triglycerides, LDL-Cholesterol, VLDL-Cholesterol were significantly increased in hypertensive patients as compared to controls. It was found that HDL-Cholesterol was significantly decreased in cases as compared to controls.

**Discussion**

The present study revealed that both systolic and diastolic blood pressure was significantly increased in hypertension as shown in table-1 (p<0.001).

There is significantly increased concentration of serum uric acid found in cases as compared to controls (p<0.001). Uric acid is thought to play a pathogenic role in hypertension mediated by several mechanisms such as inflammation, vascular smooth muscle cell proliferation in renal microcirculation, endothelial dysfunction and activation of rennin-angiotensin-aldosterone system.<sup>(5,6,7,8)</sup> The same finding was shown by Richard J Johnson et al<sup>9</sup>, Johan Sundstrom et al<sup>10</sup>, Borghi claudio et al<sup>11</sup>, Bombelli et al<sup>12</sup>, Marcelo Heinig et al<sup>13</sup>.

From the present study it is found that there is significantly increased level of serum total cholesterol (p<0.001), LDL cholesterol (p<0.001), VLDL cholesterol (p<0.001), triglycerides (p<0.001) in cases as compared to controls. There is significantly decreased level of serum HDL-cholesterol (p<0.05) in hypertensive patients as compared to controls. The same result was shown by Kamrun Nahar choudhry et al<sup>14</sup>

, Kumari Rekha et al<sup>15</sup>, Jen-chen Tsai et al<sup>16</sup>. Our results suggest that elevated B.P. may predict certain disturbances in lipoprotein metabolism.

Some study suggest some significant correlation between uric acid and Triglycerides. Triglycerides have been linked to insulin resistance which promotes Hypertension through renal tubular sodium reabsorption, augmentation of the sympathetic nervous system reactivity and activation of the rennin-angiotensin system.<sup>17</sup>

### Conclusion

The present study demonstrate that serum uric acid level is closely associated with hypertension. Elevated uric acid may turn out to be one of the more important remediable risk factor for metabolic and cardiovascular diseases. The study also shows dyslipidemia is seen in Hypertension. Therefore hypertensive patients need measurement of blood pressure, uric acid and lipid profile at regular intervals throughout their primary health care to prevent cardiovascular disease and stroke.

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