

## Study of Serum Uric Acid Level in Hypertension

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### Abstract:

**Introduction:** HTN is a sustained elevation of systemic arterial pressure. Elevated blood pressure is defined as systolic blood pressure >140mmHg and/or diastolic blood pressure >90 mmHg.

**Method:** We studied 100 patients of age more than 25 years who were diagnosed as Hypertension with or without other conditions as outdoor and indoor of Hospital.

**Result: Incidence Of HTN Increased With Age.**

1. Incidence of HTN is higher in men (51%) than in female (49%).
2. Among 100 patients 65% of patients having high SUA level.
3. In stage 1 HTN out of 28 patients, 21 patients have high SUA level, while in stage 2 HTN out of 72 patients, 44 patients have high SUA level.

**Conclusion:** With the result based on the study carried out we concluded that there can be a direct relation between hyperuricemia and hypertension

**Key Words:** hypertension, Hyperurecemia

### I. Introduction

HTN is a sustained elevation of systemic arterial pressure. Elevated blood pressure is defined as systolic blood pressure >140mmHg and/or diastolic blood pressure >90 mmHg. In the primary (essential) hypertension no cause can be established. Recently, elevation of serum uric acid has been found to be associated with subsequent morbidity and mortality in the general population among patients with congestive heart failure, diabetics and hypertensive patients. Overproduction of uric acid and extreme hyperuricemia may also lead to a rapidly progressive form of renal insufficiency. Patients with less severe but more prolonged form of hyperuricemia are predisposed to a more chronic tubulointerstitial disorder, often referred to as gouty nephropathy. Hyperuricemia leading to hyperuric aciduria may also result in increased prevalence of nephrolithiasis.

### II. Aims And Objectives

1. To assess serum uric acid levels in Hypertensive patients.
2. To associate changes in serum uric acid with clinical prognosis.
3. To study relation between severity of Hypertension to serum uric acid level.

### III. Review Of Literature

The clinical features, pathogenesis, diagnosis and treatment of HTN has been well understood since long. Recently, new bio-markers for diagnosis and prognosis of HTN are under development. In recent studies, Serum uric acid has been proposed as a risk factor for hypertension and it also considered as a prognostic marker for short term prognosis.

### Classification of Blood Pressure

Based on the seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC 7 report) BP is classified into the following stages —

Classification Of BP For Adults >18 years OLD (Table-i) Classification of BP	Systolic BP mm hg	Diastolic BP mm hg
Normal	< 120	< 80
Pre-hypertension	120 – 139	80 – 89
Stage 1 hypertension	140 – 159	90 – 00
Stage 2 hypertension	≥ 160	≥ 100

**Symptoms and Signs**

Uncomplicated hypertension is almost always asymptomatic, so that patient may be unaware of the consequent progressive cardiovascular damage for as long as 10 to 20 years.

Symptoms often attributed to hypertension-Headache, tinnitus, dizziness and fainting - may be observed just as commonly in the normotensive population.

When symptoms do bring the patient to the Physician, they fall into three categories. They are related to (1) the elevated pressure itself (2) the hypertensive vascular disease and (3) the underlying disease, in the case of secondary hypertension.

**Serum uric acid and hypertension**

Hypertension and increased SUA additionally complicate the controversies of uric acid role in cardiovascular events and the factors involved in pathogenesis of atherosclerotic consequences

In animal models it has been shown that induced mild hyperuricemia may contribute to endothelial dysfunction and reduction of nitric oxide (NO) levels<sup>69</sup>. Uric acid cause hypertension in rat model through the activation of the renin-angiotensin system, down regulation of nitric oxide, and induction of endothelial dysfunction and vascular smooth muscle proliferation<sup>64</sup>. It is well known how the impaired kidney function is involved in mechanisms of hypertension. The elimination of urate also depends on kidney function.

**IV. Materials And Methods**

**Study population**

- We studied 100 patients of age more than 25 years who were diagnosed as Hypertension with or without other conditions as outdoor and indoor of SMIMER, Hospital – Surat during year 2015.
- Some of them are not on treatment, and rest are on regular treatment.
- Serum uric acid level of all patients were measured.

**Inclusion criteria**

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

**Exclusion criteria**

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

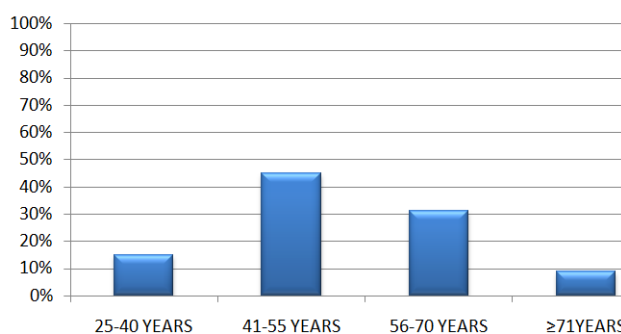
**a. Observation**

Here we tabulated the various observation of our study below.

**1. Age Distribution In The Study Group**

Sr. no.	Age group	No. of patients	Percentage
1	25-40 YEARS	15	15%
2	41-55 YEARS	45	45%
3	56-70 YEARS	31	31%
4	≥71 YEARS	09	09%
<b>Total</b>		100	100%

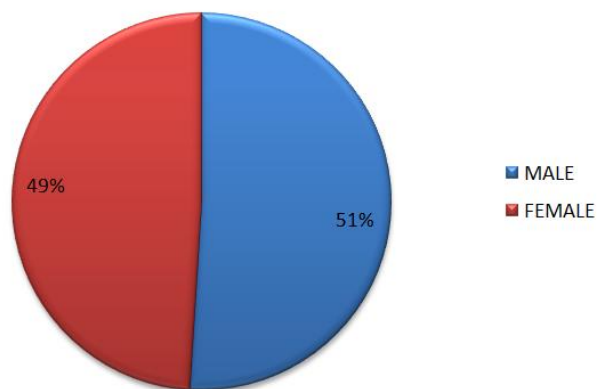
**AGE DISTRIBUTION**



**2. Sex Distribution In The Study Group**

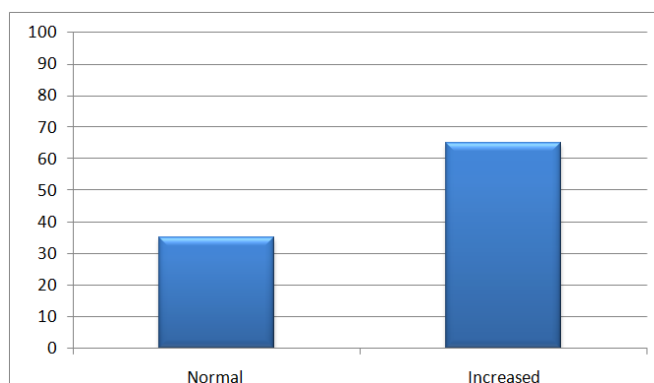
Sr. No.	Gender	No. of patients	Percentage
1	MALE	51	51%
2	FEMALE	49	49%
<b>Total</b>		100	100%

**FIGURE NO. 2 SEX DISTRIBUTION**



**4. Evaluation Of Serum Uric Acid Levels In Htn.**

Result	No. of patients	Percentage
Normal	35	35%
Increased	65	65%

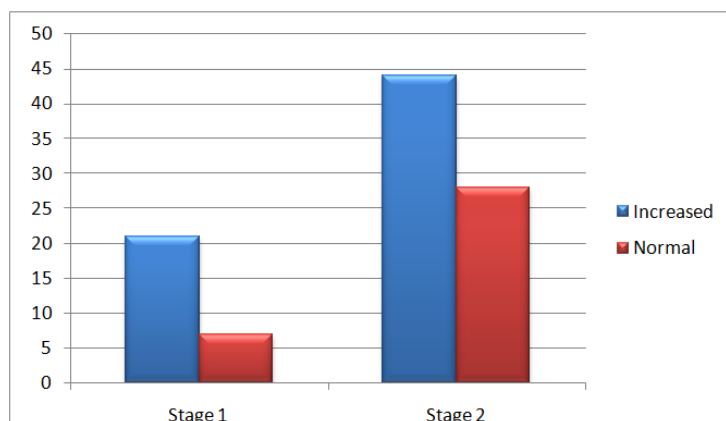


35% of patients included in this study had normal serum uric acid level, while 65% of patients had high serum uric acid level.

**5. Serum Uric Acid Level Based On Stage Of Htn (Jnc 7)**

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

Stage of HTN	SUA level	No. of patients	Percentage (%)
Stage 1	Increased	21	75%
	Normal	07	25%
Stage 2	Increased	44	61.111%
	Normal	28	38.889%



In this study 28 number of patient are in stage 1 HTN out of which 21 number (75%) of patients having elevated SUA level, while 72 number of patients are in stage 2 HTN out of which 44 numberof (6.1.%) of patients having elevated SUA level.

### V. 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<sup>42</sup>.

In few studies, the association of SUA with cardiovascular disease was uncertain after multivariate adjustment as in the Framingham Heart Study (1985) and the ARIC study (1996), but in others the association remained certain and significant.

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<sup>43</sup>. Kolbe (1965) in his study of 46 hypertensive patients found 26 to be having increased SUA levels

In our study we found that there is definite relation in SUA levels between hypertensive patients and normotensive patients and there is a directly proportional relation in the levels of SUA in relation to the duration and severity of hypertension. Hence the possibility of serum uric acid acting by the production of free radicals and causing oxidative stress leading to hypertension and whether the duration and severity of hypertension lead to renal dysfunction in the form of nephrosclerosis leading to higher levels of serum uric acid has to be considered as various other studies have also show to have a positive relation in the SUA levels and hypertension.

### VI. Summary And Conclusion

#### Summary

Serum uric acid levels were measured in 100 patients both outdoor and indoor attending SMIMER, Hospital – Surat.

1. Incidence of HTN increased with age. The maximum number of patients in this study are 41-55 years.
2. Incidence of HTN is higher in men (51%) than in female (49%).
3. Smoking, alcoholism, sedentary life style, obesity were major modifiable risk factor present in 35%, 30%, 40% and 65% respectively.
4. Among 100 patients 65% of patients having high SUA level.
5. Among 100 patients 72 number of patients are in stage 2 HTN while 28 are in stage 1 HIN.
6. In stage 1 HTN out of 28 patients, 21 patients have high SUA level, while in stage 2 HTN out of 72 patients, 44 patients have high SUA level.

#### VII. Conclusion

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 comparison with those with stage 1 hypertension, showing that the severity of hypertension also related to the SUA levels.

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