International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 01 Issue 10 December 2016, ISSN No. – 2455-8737
Available online at - www.ijirms.in

Open Access Journal | Research Article | ISSN - 2455-8737

Evaluation of Serum Uric Acid Levels in Essential Hypertensive Patients

Supriya Shete*, H. N. Khan, A. M. Siddiqui**, A. R. Shinde*****

Resident*, Associate Professor**, Assistant Professor***
Department of Biochemistry, Dr. S. C. Government Medical College, Vishnupuri, Nanded

Abstract:

Elevated serum uric acid concentration has been reported to be associated with an increased risk of coronary heart disease and is commonly encountered with essential hypertension, including untreated hypertension and type 2 diabetes mellitus, which are in turn associated with coronary heart disease.

Aim: *To estimate serum uric acid levels in hypertensive patients and normal control by kit method on ERBA XL-640 Fully Automated Analyser.*

Material and Methods: *This case control study was conducted at Dr.Shankarrao Chavan Government Medical College, Nanded. A total of 100 patients were studied of which 50 essential hypertensive patients were cases and 50 were controls who were patients without hypertension.*

Result: *It was observed that the value of mean serum uric acid was 6.1mg% significantly more in cases than that was in control group 4.4%. This value rises with the duration and the severity of hypertension. It is evident in the form of 5.1mg% and 6.3mg% respectively in cases of stage1 and stage 2 hypertension and 4.6mg% and 6.9mg% in <5 years and >5 years after diagnosis of hypertension.*

Conclusion: *Serum uric acid can be used as an biochemical marker to determine the severity and duration of hypertension.*

Keywords: ***- Serum uric acid, hypertension, ERBA XL- 640 Fully Automated Analyser.***

INTRODUCTION:-

Hypertension is the third leading killer disease in the world. Hyperuricemia predicts mortality in patients with heart failure or coronary heart disease, cerebrovascular events in individuals with diabetes and cardiac ischemia in hypertension[(1)].

The mechanism(s) by which Uric acid may endanger organ damage is incompletely understood, but there is increasing evidence that endothelial dysfunction is a fundamental mechanism whereby this substance may affect cardiovascular and renal function and structure [(2)].

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 VII report) BP is classified into the following stages [(3)].

Table-1 Classification of Blood Pressure for adults > 18 years

BLOOD PRESSURE STAGING	SYSTOLIC BLOOD PRESSURE IN MM OF HG	DIASTOLIC BLOOD PRESSURE IN MM OF HG
NORMAL PREHYPERTENSION	<120	AND<80
STAGE 1 HYPERTENSION	120-139	OR 80-89
STAGE 2 HYPERTENSION	140-159	OR 90-99
	>160	OR >100
ISOLATED SYSTOLIC HYPERTENSION	>140	AND <89

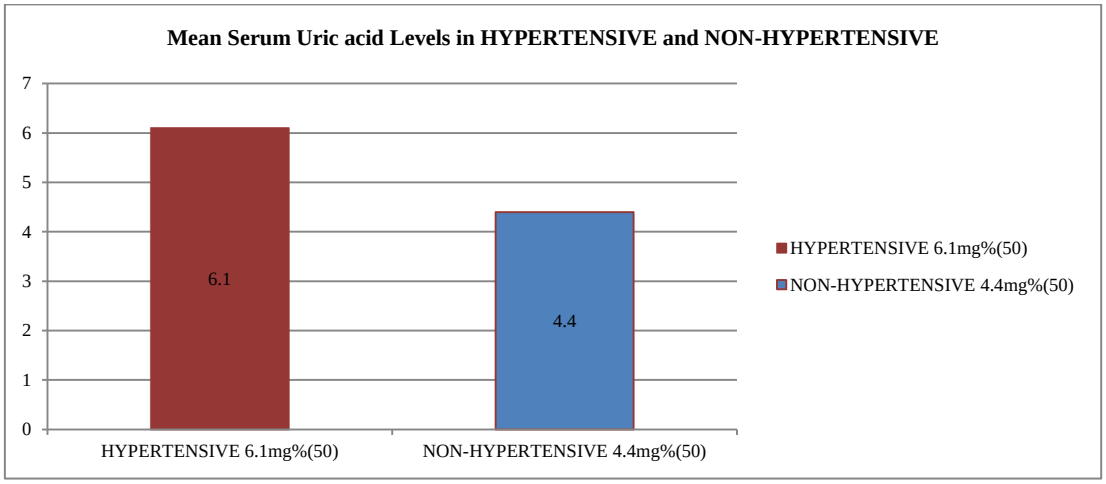
MATERIAL AND METHODS:-

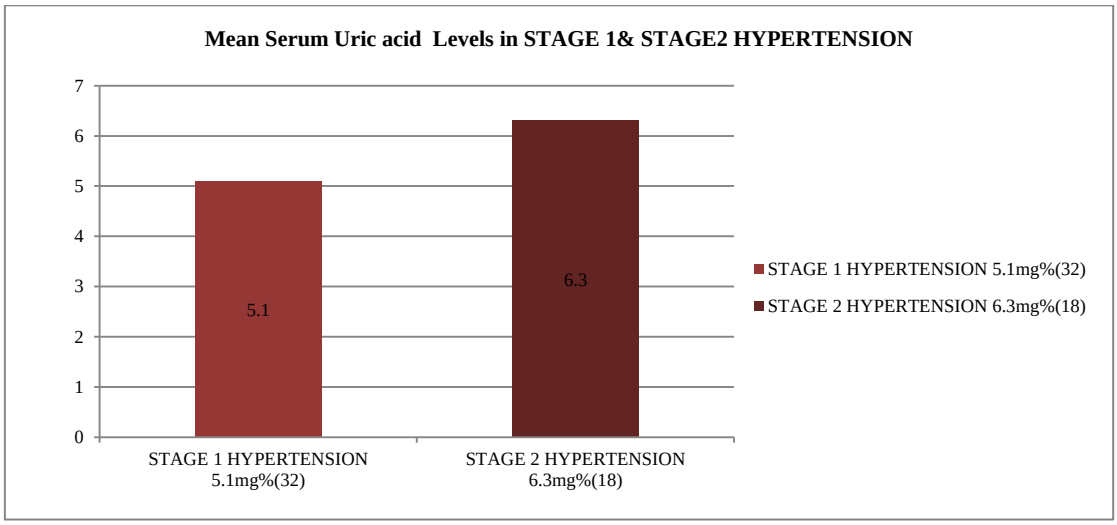
This case control study was conducted in Dr. Shankarao Chavan Government Medical College and Hospital, Nanded .100 patients were studied of which 50 essential hypertensive patients were cases that were categorized into Stage 1 or Stage 2 hypertension (base on JNC VII classification) and 50 were controls without hypertension. All the patients were subjected to relevant clinical

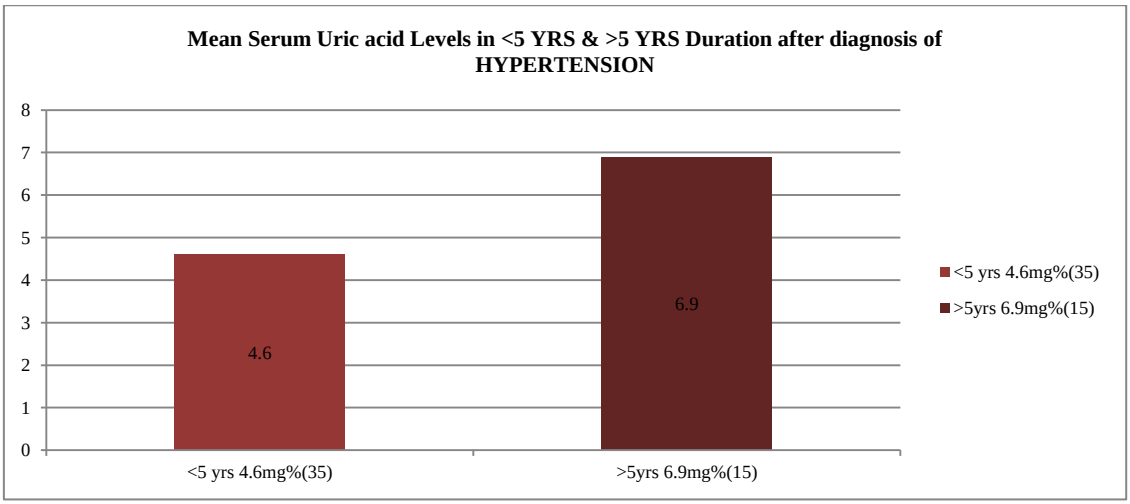
 Corresponding Author - Supriya shete

examinations and laboratory investigations to look for secondary causes of hypertension. Patients with secondary hypertension, CCF, renal failure, conditions known to cause raised serum uric acid levels were not included in the study. Institutional ethical committee clearance was obtained.

RESULTS:-







DISCUSSION:-

Elevated serum uric acid levels have been associated with an increased risk for cardiovascular disease. The potential mechanisms by which serum uric acid may directly affect cardiovascular risk include enhanced platelet aggregation and inflammatory activation of the endothelium[4].

Increased serum uric acid levels correlates with several risk factors including renal dysfunction, hypertension, insulin resistance, hyper-homocystenemia and hyperlipidemia, it is debated whether serum uric acid is an independent cardiovascular risk factor(5-7). It certainly is possible that uric acid may be an earlier and more sensitive maker of decreased renal blood flow than serum creatinine. It has been recently suggested that since uric acid may play a role in the formation of free radicals and oxidative stress, the increased risk of hypertension in subjects with raised serum uric acid levels might be associated with this increased generation of free radicals.

Several observations support this concept of free radical mediated inhibition of endothelium dependent vasodilation. An antioxidant deficiency in diet which produces hyperuricemia, contributes to the etiology of hypertension, and the antioxidant drugs also show a blood pressure lowering effect in both diabetic and hypertensive patients[(8)]. The PIUMA study demonstrates a strong independent association between serum uric acid levels and cardiovascular risk in initially untreated and asymptomatic adult subjects with essential hypertension, but it is unable to answer the question of whether serum uric acid exerts direct toxic effects. As extensively reviewed by Puig and Ruilope, [(9)] both uric acid and superoxide radicals are produced for the effect of xanthine oxidase in the late phase of purine metabolism. Superoxide radicals, which may cause tissue and vascular damage, [(10)] are increased in subjects with essential hypertension.[(11)] It would be important to clarify whether such increase is due, at least in part, to enhanced xanthine oxidase activity and whether inhibition of this enzyme by allopurinol may reduce cardiovascular risk .[(12)]

The present study revealed that the incidence and severity of hyperuricemia between cases and controls correlated significantly with the severity and duration of hypertension.

CONCLUSION:

Based on the study carried out it is concluded that there is definite relation in Serum uric acid between hypertensive and non hypertensive and serum uric acid levels have direct relation to the duration and severity of hypertension so serum uric acid can be used as an biochemical marker to determine the severity and duration of hypertension.

ACKNOWLEDGEMENTS:

I would like to acknowledge the outstanding support made by Dr. M.Yugesh, my colleagues, and laboratory staff for their valuable contributions.

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 Corresponding Author - Supriya shete