www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v6i7.10

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Study of Serum Uric Acid Levels in Hypertension in Kanyakumari Government Medical College

Authors
Lakshmi Kumar[1], Jenix Nathan[2], Sivanesan[3], Benitta Mary[4]
[1]Assistant Professor, Department of General Medicine, KGMCH, Asaripallam
[2,3,4]Postgraduate Residents, Department of General Medicine, KGMCH, Asaripallam

Abstract
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.*

Results: *Total of 146 patients were studied with 73 cases and 73 control. Mean serum uric acid levels in cases and control was 6.14 and 4.23 respectively, with a T value of 5.78 in test of siginificance, the P value is <0.00001. The result is statistically significant at p<0.05.*

Conclusion: *Serum uric acid estimation can be used for aiding in the diagnosis of essential hypertension as well as in assessment of the severity.*

Introduction

In 2000, it was estimated 2.5% of world's adult population were Hypertensive and predicted that this would rise to 29% by 2025. By the age of 60, more than one half of adults in most regions of world will be hypertensive. There is doubling risk of stroke and ischemic heart disease mortality for every 20/10mm Hg increase in Blood Pressure.

The small elevations of serum uric acid concentration in patients with cardiovascular disease have led to detection of myocardial and endothelial dysfunction by the production of reactive oxygen species. It is also said to be predictive of hypertension with or without features of metabolic syndrome. Uric acid is reported to be scavenger of reactive oxygen species. Oxygen stress and hyperuricemia may thus be related.

Uric acid has been considered a possible risk factor for hypertension and cardiovascular disease. Uric acid induces acute vasoconstriction by activation of renin–angiotensin system, followed by uric acid uptake into vascular smooth muscle cells leading to cellular proliferation and secondary arteriolosclerosis that impairs pressure natriuresis. This acute hypertension remains uric acid dependent and sodium independent, whereas the chronic hypertension becomes uric acid independent and sodium dependent. However more research is clearly necessary, the available data suggest that uric acid is likely causative in some cases of early onset hypertension.

Materials and Methods

This study is a single centre hospital-based case-control study conducted in patients attending

NCD OP of our institute over a period of 1 year from May 2017 to May 2018.

The study included a total of 146 patients of which 73 were cases (hypertensive) and 73 were controls (non hypertensive).

Inclusion and Exclusion Criteria

- Inclusion Criteria
- ✓ All patients of Hypertension with or without other conditions, with on or off treatment.
- ✓ Age group 25-85 years
- Exclusion Criteria
- ✓ Patients with gout
- ✓ Patients is on uricosuric drug
- ✓ Patients on drugs which increase serum uric acid level e.g salicylates (>2gm/day), diuretics, ethambutol, pyrazinamide, etc other than uricosuricdrug.

Methodology

The study included a total of 146 patients of which 73 were cases (hypertensive) and 73 were controls (non hypertensive). The patients were classified into the various stages of hypertension. Blood pressure has been recorded as the average of 2 or more readings at each of the 2 or more visits after initial screening. All the patients were subjected to relevant clinical examinations and laboratory investigations to look for secondary causes of hypertension. Essential hypertension is diagnosed in the absence of an identifiable cause. Hyperuricemia is defined as the serum uric acid >7.0 mg/dl in adult males, >6.0 mg/dl in adult females Measurement of the serum uric acid was done by a chromatographic autoanalyser which absorbs light in the wavelength of 560 – 640 nm.

Reference Values for Serum Uric Acid levels

• In Males: 3.4 - 7.0 mg/dl, in females: 2.4 – 6.0 mg/dl.

Staging of Blood Pressure

Blood Pressure Staging	Systolic Blood Pressure in mm of HG	Diastolic Blood Pressure in mm of HG
Normal	<120	<80
Pre Hypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	>160	>100
Isolated Systolic Hypertension	>140	<89

Study of Controls

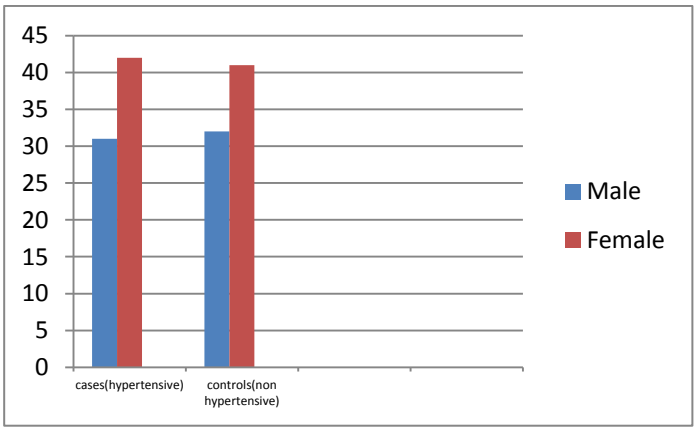
All the above mentioned investigations were also carried out in 73 non hypertensive patients. After applying the inclusion and exclusion criteria they were subject to Serum uric acid Levels.

Observation and Analysis

Demographic Characteristics

A total of 146 patients were studied during the period of 1 year from May 2017 to May 2018. This included 73 cases (hypertensive) and 73 controls (non hypertensive).

- Out of the 73 cases (hypertensive) 31 were males and 42 were females.
- Out of the 73 controls (non hypertensive) 32 were males and 41 were females.



Age Distribution

	control	cases
20-30	5	3
31-40	10	8
41-50	25	17
51-60	17	26
>60	16	19

Distribution of Uric Acid

The range of the serum uric acid in cases was 2.00 to 11.80mg/dl. In hypertensive males it was found to be from 2.20 to 11.80 mg/dl and in hypertensive females it was found to be from 2.0 to 11.20 mg/dl.

The range of the serum uric acid in controls was 2.00 to 8.30 mg/dl. In Non-hypertensive males it was found to be from 2.00 to 6.80 mg/dl and in Non-hypertensive females it was found to be from 2.60 to 8.30 mg/dl.

Mean Serum Uric Acid Level

The mean serum uric acid level in cases was 6.14 mg/dl. Mean serum uric Acid level in control was 4.23 mg/dl.

Mean Serum Uric Acid Levels in Different Stages of Hypertension among Cases

The mean serum uric acid levels in cases in stage I hypertension was 5.8 and 5.2 respectively in males and females. The mean serum uric acid levels in cases in stage II hypertension was 7.3 and 7.6 respectively in males and females.

Stage of Hypertension	Male	Female
Stage 1 Hypertension	5.8	5.2
Stage 2 Hypertension	7.3	7.6

Evaluation of Serum Uric Acid

Group	Mean	Median	Mode	Variance	Standard Deviation
Cases	6.13	6.4	2	6.02379	2.45439
Control	4.23	4.25	2	1.97569	1.40559

Results

Total of 146 patients were studied with 73 cases and 73 control. Mean serum uric acid levels in cases and control was 6.14 and 4.23 respectively, with a T value of 5.78 in test of siginificance, the P value is <0.00001. The result is statistically significant at $p<0.05$.

Conclusion

Serum uric acid is significantly elevated in hypertensive as compared to normotensive individuals. Serum uric acid can be used probably as an early biochemical marker to determine the severity of hypertension as stage 2 hypertensive had more elevation in serum uric acid levels as compared to other hypertensive. Thus serum uric acid estimation can be used for aiding in the diagnosis of essential hypertension as well as in assessment of the severity.

References

1. Earl S. Ford,, Chaoyang Li ,Stephen Cook, Hyon K.Choi; Serum Concentrations of Uric Acid and the Metabolic Syndrome Among US Children and Adolescents ; jounal of circulation; American Heart Association
2. John P. Forman**,** Hyon Choi**,** Gary C. Curhan**;** Plasma Uric Acid Level and Risk for Incident Hypertension Among Men; Journal of the American Society of NephrologyJ*anuary 2007 vol. 18 no. 1 287-292*
3. Jules Clement Nguedia Assob1*, Marcelin Ngowe Ngowe2, Dickson Shey Nsagha3, Anna Longdoh Njunda1, Yvonne Waidim1, Dieudonné Njimoh Lemuh4 and Elroy Patrick Weledji2; The Relationship between Uric Acid and Hypertension in Adults in Fako Division, SW Region Cameroon ; J Nutr Food Sci 2014, 4:1
4. Norman M.Kaplan , Ronald G.Victor ; ; p.no.131 Kaplan's Clinical Hypertension 10th edition; Lippincott Williams & Wilkins
5. Peter C Grayson, MD, Seo Young Kim, MD, Michael P LaValley, PhD; Independent Impact of Hyperuricemia on the Future Risk of Hypertension: A Systematic Review and Meta-Analysis
6. Theodre A. Kotchen ;Hypertensive vascular disease ch.247;p.no.2042 ;Harrison's principles of Internal Medicine; 18th edition; Mc Graw Hill.