



## A STUDY ON SERUM URIC ACID AND SERUM LACTATE DEHYDROGENASE LEVELS IN HYPERTENSION

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### ABSTRACT

Hypertension or it also known as high blood pressure influences a huge number of individuals. Hypertension is characterized as BP  $\geq 140/90$  millimeters of mercury (mmHg). Most of the individuals don't get any attention about just because hypertension does not have any specific symptom so the most of the person those who are having this condition don't aware of it and this study is aimed to see biomarkers of hypertension. Uric acid is a heterocyclic compound and its levels are elevated in cases of renal abnormalities and tumor (Increase cells turnover). Secondly, we have Lactate dehydrogenase, it also shows their abnormalities in the myocardial infarction, pregnant ladies and different types of anemia. So, this study is aimed to find out the serum levels of uric acid and lactate dehydrogenase in hypertensive and non-hypertensive individuals. Material and methods: Levels of Uric acid and Lactate dehydrogenase were estimated in 30 hypertensive cases and 30 normotensive apparently healthy subjects in age group of 18-40 years. Observations: It was observed that serum uric acid and lactate dehydrogenase elevated in hypertensive cases group. We also found there was no correlation in between uric acid and lactate dehydrogenase on this selected sample size. Result: Finding were, the mean serum values for uric acid was increased in hypertensive group in comparison of healthy controls. Lactate dehydrogenase was also found increased in hypertensive case group. Conclusion: This study has shown that the level of serum uric acid and serum LDH is significantly increased in hypertensive patients when compared to healthy subjects. This finding corroborates with the results of other studies in this field of research According to Karl Pearson's correlation, there is a negative correlation between serum uric acid and serum LDH.

**KEYWORDS :** Hypertension, Serum Uric Acid and Serum Lactate dehydrogenase

### INTRODUCTION

Hypertension (HTN), high blood pressure (BP), influences a huge number of individuals. Hypertension is characterized as BP  $\geq 140/90$  millimeters of mercury (mmHg). Roughly 77.9 million American grown-ups (1 out of 3 individuals) and around 970 million individuals worldwide have high BP. It is assessed that by 2025, 1.56 billion grown-ups will live with HTN.<sup>(1-6)</sup>

Hypertension is given this name due to a man not having any perceptible manifestations; a man can have hypertension for a considerable length of time without knowing it.<sup>(7)</sup> Blood weight is the measure of power connected by the blood within the corridors as the blood is pumped all through the circulatory framework. Each time the heart muscle contracts, blood is squeezed against the dividers of the corridors and is estimated as systolic blood pressure (top number). At the point when the heart muscle unwinds between thumps, the weight on the conduit divider facilitates estimated as diastolic blood pressure (base number).<sup>(7)</sup>

As per National Institute for Health and Clinical Excellence (2011), it has been assessed that the expense of hypertension treatment in the UK is roughly £1 billion. Hypertension is a noteworthy hazard factor for myocardial dead tissue, heart disappointment, stroke, fringe blood vessel infection, aortic aneurysm and is a reason for ceaseless kidney illness (CKD).

The BHS (British Hypertension Society) grouped hypertension into three classes; mellow, direct and serious. BP esteems increment with age, and HTN is exceptionally basic with the elderly. The lifetime danger of creating HTN among those 55 years old and more seasoned who right now have typical BP is 90%.<sup>(8)</sup>

Uric acid is a heterocyclic compound of carbon, nitrogen, oxygen, and hydrogen and it's a final result of purine

digestion. It is filtrated through the glomeruli and completely reabsorbed in the proximal convoluted tubules by both dynamic and aloof transporter interceded forms. 10% of cases indicate uric acid overproduction in conditions with high cell turnover, hereditary blunders and tumor lysis disorder. Rest of cases (90%) demonstrates debilitated uric acid discharges which happen in renal inadequacy of any reason. By and large Male have a more serious danger of creating hyperuricemia than female in all age gatherings, in spite of the fact that the sex proportion has a tendency to even out with expanding age.<sup>(9)</sup> Hoisted levels of serum uric acid is firmly connected with advancement and movement of hypertension and renal maladies, however whether uric acid assumes a causal job or whether it basically goes about as a marker in patients in danger for these conditions remains controversial.<sup>(9)</sup>

Serum lactate dehydrogenase present in plasma and it changes over pyruvate to lactate. Lactate is last result of glycolysis in anaerobic conditions. LDH is for the most part estimated to assess the nearness of tissue harm. The compound LDH is essentially found in many body tissues particularly in liver, kidney, skeletal muscle, mind, platelets, and lungs LDH is brought up in number of obsessive conditions like hematological issue, intense myocardial localized necrosis, liver sicknesses and a few respiratory infections. Fundamental components for expanded serum LDH incorporate tissue damage, irritation, hypoxia, rot, hemolysis or malignancies.<sup>(10)</sup>

### MATERIAL & METHODS

This was a case control study among the hypersensitive and normotensive subjects on their serum uric acid and serum lactate dehydrogenase. The estimation methods for the estimation for uric acid and LDH were uricase/pap method and UV kinetic methods respectively. The machine which we were using for the estimation was semi-automatic analyzer

(Chem7). In Department of Biochemistry, Central Research lab and Central clinical Lab of Integral institute of medical sciences and research, Lucknow. The established cases of hypertensive patients were selected from those attending IIMS&R OPD with following inclusion and exclusion criteria within period of January 2018-June 2018(6 Months). The Inclusion criteria for cases were decided to take an age group of 18-65 year with their signed consent forms. We excluded patient's history of diabetes mellitus, Gout, cardiovascular, kidney disease, pregnant females.

**Statistical Analysis**

Unpaired t-test was used to compare the study parameters between the cases and controls. Carl Pearson correlation coefficient was calculated among the study parameters and the considerable significant p value was <0.05.

All the statistical analysis was done the Statistical Package for Social Sciences (SPSS).

**Observations and Results**

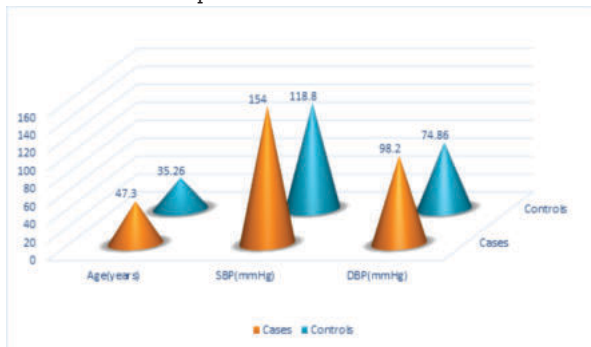
In this case control study, we see a common age and we also carried out a mean blood pressure for all those hypertensive and normotensive individuals (Fig.1). As we analysis of the data of cases and control group for the uric acid and those numerical facts (Table.2) show a significant elevation in the case group and value were settle down in control group (Fig.2). The same thing will happen to the group of lactate dehydrogenase as their case group show a mild elevation when compare to the controls (Fig.2).

**Table1:** Table shows the mean Age, Systolic blood pressure (SBP) and Diastolic blood pressure (DBP) variables settled in form of Mean± SD. P-values are obtained from student's unpair t-test in comparison between the case and control groups.

|            | Case         | Control       | P valve  |
|------------|--------------|---------------|----------|
| AGE(Years) | 47.3 ± 12.99 | 35.26 ± 12.14 | <0.0005* |
| SBP (mmHg) | 154 ± 17.7   | 118.8 ± 4.46  | <0.0001* |
| DBP (mmHg) | 98.2 ± 8.08  | 74.86 ± 7.13  | <0.0001* |

p=Probability (exact level of significance)

**Figure-1:** Graphical representation of Age, blood pressure and Diastolic blood pressure between cases and controls.



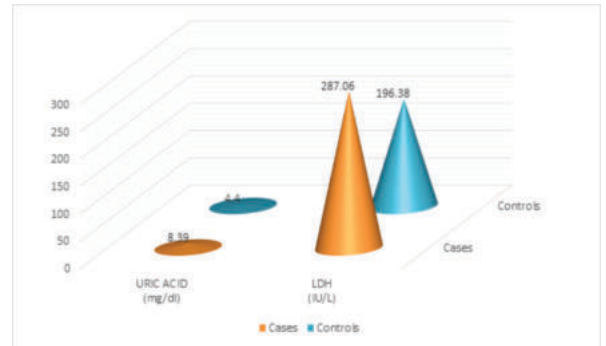
**Table 2:** Table represents the mean, standard deviation and p-value values of Uric acid and Lactate dehydrogenase in between the cases and controls groups.

| Parameters        | Groups   | n  | Mean ± SD       | Significance |
|-------------------|----------|----|-----------------|--------------|
| URIC ACID (mg/dl) | Cases    | 30 | 8.39 ± 2.48     | p<0.0001     |
|                   | Controls | 30 | 4.40 ± 1.34     |              |
| LDH (IU/L)        | Cases    | 30 | 287.06 ± 50.06  | p<0.0001     |
|                   | Controls | 30 | 196.38 ± 5 0.72 |              |

n= Number of cases,  
p=Probability (exact level of significance)  
SD= Standard Deviation

**Figure-1:** Graph represents the mean and standard deviation

values of Uric acid and Lactate dehydrogenase in between the cases and controls groups.



**DISCUSSION**

We discovered essentially hoisted levels of serum uric acid in both male cases and female cases as compared to their individual control gathering. Late epidemiological investigations have other conclusion that uric acid is a noteworthy and autonomous hazard factor for the improvement of cardiovascular issue and assume a critical job being developed of hypertension and renal disease.<sup>(11,12)</sup>

Test contemplates have exhibited that expanded uric acid instigates fundamental hypertension and renal damage by means of actuation of the renin angiotensin framework. Uric acid enters specifically into both endothelial and vascular smooth muscle cells and causes nearby hindrance of endothelial nitric oxide levels. It is in charge of incitement of vascular smooth muscle cell multiplication, and incitement of vasoactive and incendiary middle people, bringing about choking of vessels and hypertension.<sup>(13,18)</sup>

This builds purine oxidation, which prompts expanded receptive oxygen species, resulting vascular damage, decreased nitric oxide level taken after by vasoconstriction and lifted circulatory strain. In the present examination it is demonstrated that serum uric acid levels are expanded relatively when the systolic and diastolic pulse is expanded. Some ongoing examination like Dr. Madole M. B. et al 2016 indicated significant (p=0.001) levels of serum uric acid when it is contrasted and cases with sound controls. In this examination we found the levels of serum LDH in cases and controls. Our examination is the second investigation of its own kind to see the relationship of serum LDH and hypertension. Like aftereffects of pregnancy actuated hypertension, we discovered altogether expanded levels of serum LDH hypertension and like Dr. Madole M. B. et al 2016 found that non-critical relationship of serum LDH with systolic and diastolic circulatory strain in male and female cases.<sup>(14)</sup>

We likewise discovered critical ascent in serum LDH in one investigation of idiopathic aspiratory blood vessel hypertension.<sup>(15)</sup> Serum LDH is intra cytoplasmic catalyst present in every one of the tissues of the body. It is additionally considered as one of the cardiovascular markers for intense myocardial localized necrosis and its level is expanded in tissue damage, aggravation, hypoxia, ischemia and malignancy.<sup>(16)</sup> It was recommended that hypertension produces renal smaller scale vascular sickness and neighborhood tissue hypoxia which prompts expanded movement of LDH and expanded levels of serum lactate. Lactate would be anticipated that would diminish the tubular emission of uric acid; bringing about expanded levels of serum uric acid. Parallel to disease, anaerobic glycolysis is an overwhelming vascular feature in hypertension which prompts the expanded action of LDH and lactate production.<sup>(17)</sup>

<sup>16)</sup> Our investigation demonstrates that serum LDH levels are sure connection among cases and control and there is no factually relationship between them.

## CONCLUSION

The present study was designated to evaluate Serum Uric acid and Serum Lactate dehydrogenase levels in Hypertensive patients and Normotensive controls. This study is also including Age, Systolic and Diastolic blood pressure of hypertensive cases and controls. This study has shown that the level of serum uric acid and serum LDH is significantly increased in hypertensive patients when compared to healthy subjects. This finding corroborates with the results of other studies in this field of research According to Karl Pearson's correlation, there is a negative correlation between serum uric acid and serum LDH.

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