

# Estimation Of Serum Ldh And Uric Acid In Hypertensive Versus Normotensive Pregnant Women And Its Correlation With Maternal Outcome In A Tertiary Care Hospital

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**Abstract:** Hypertension is the most common medical problem encountered in pregnancy and remains an important cause of maternal, and fetal, morbidity and mortality. It complicates up to 15% of pregnancies. The study was intended to assess the prognostic significance of the value of serum LDH and uric acid as a marker. Higher serum LDH and uric acid levels associated with increased incidence of maternal complications like abruption placenta, HELLP syndrome, cerebrovascular accidents etc.

**Methods:** Experimental study was conducted in Pushpagiri medical college Thiruvalla. Case group included 35 diagnosed with hypertensive pregnant women. Sample sizes of 65 patients were selected. Concentration of serum LDH and UA were analyzed by using analytical kits in semi-autoanalyzer.

**Results:** The results reveal that the serum LDH level in test was high when compared with the control (test mean  $639.429 \pm 267.0141$  and control mean  $344.367 \pm 118.4164$  ( $p$  value = 0.000)). The mean level of uric acid in test was found to be  $6.043 \pm 1.5563$  which is higher when comparing with control mean  $5.013 \pm 1.1596$  and was statistically significant. **Conclusion:** High serum LDH and uric acid levels have significant association with severity of disease and maternal outcomes in patients of preeclampsia and can be considered as a supportive prognostic tool from early trimester.

**Keywords:** Lactate dehydrogenase, uric acid, Hypertensive disorders, Maternal complications.

## I. INTRODUCTION

Hypertensive disorders in pregnancy is one of the commonest medical disorders in pregnancy and is one of the major causes of maternal and perinatal morbidity and mortality. Gestational Hypertension continues to be responsible for the largest proportion of perinatal deaths resulting from prematurity and IUGR.<sup>1</sup> Hypertensive disorders during pregnancy occur in women with pre-existing primary or secondary chronic hypertension, and in others who develop new-onset hypertension in the second half of pregnancy. If this hypertension is associated with proteinuria and oedema it

is known as preeclampsia. Family history of essential hypertension is a risk factor in development of preeclampsia and there may also be relationship between preeclampsia and metabolic syndrome.<sup>2</sup>

Gestational hypertension is defined as new onset of hypertension having a blood pressure higher than 140/90 measured on two separate occasions, more than 6 hours apart, without the presence of protein in the urine and diagnosed after 20 weeks of gestation.

Pre-eclampsia is gestational hypertension plus proteinuria that is greater than 300mg of protein in a 24-hour urine sample. These are multisystem disorders and lead to a lot of

cellular death. LDH is an intracellular enzyme and its level is increased in these women due to cellular death. So serum LDH levels can be used to assess the extent of cellular death and thereby the severity of disease. This can be further used as help in making decision regarding the management strategies to improve the maternal and fetal outcome.<sup>3</sup>The etiology of preeclampsia is unknown but thought to be occurs in related to hypoxia in the placenta. Preeclampsia and other hypertensive disorders of pregnancy are a leading global cause of maternal and infant illness and death. Preeclampsia, eclampsia and pregnancy induced hypertension becomes apparent at the late stages of pregnancy, usually in the third trimester. Mild preeclampsia occurs in approximately 15% of pregnancies, moderate to severe preeclampsia is about 1% to 2%.<sup>4</sup>Preeclampsia is characterized as mild or severe based on the degree of hypertension and proteinuria and the presence of symptoms resulting from involvement of the kidneys, brain, liver and cardiovascular system.

Uric acid (UA) is an end is product of purine metabolism. It is filtered through glomeruli and almost completely reabsorbed in proximal convoluted tubules (PCT) by both active convoluted tubules (PCT) by both active and passive carrier mediated process. It is also actively secreted in to the tubules. 85% of total excreted uric acid is derived by tubular secretion. Hyperuricemia is found to be one of the earliest laboratory manifestations of preeclampsia. It is likely to be resulted from reduced uric acid clearance from reduced glomerular filtration rate and reduced tubular secretion. Its increased levels shows serious age to kidney functions.<sup>5</sup>Treating the hypertension does not alter the progression of disease.

Antihypertensive medications are mainly used to prevent or treat severe hypertension, to prolong pregnancy for as long as safely possible thereby maximizing the gestational age of the infant, and to minimize fetal exposure to medications that may have adverse effects.<sup>6</sup>The present study was designed to compare the serum LDH and UA among women with hypertension during pregnancy and normal pregnancy and to study their correlation with the maternal outcomes, to identify the complications associated with pregnancy induced hypertension and to study the most commonly prescribed drugs for the management of gestational hypertension.

## II. MATERIAL AND METHODS

A prospective comparative study was conducted over a period of six months in the Department of Obstetrics and Gynecology, Pushpagiri medical college Thiruvalla. All Pregnant women attending the antenatal clinic were screened for hypertension and patient diagnosed as hypertensive disorder of pregnancy were taken for primary evaluation. In the present study, the subjects were divided into two groups, case group and control group. Case group included 35 diagnosed with hypertensive pregnant women. Control group included 30 healthy normotensive pregnant women with more than 20 weeks of gestation. The data regarding demographic details, presenting complaints, gestational age, obstetrics history, diagnosis, blood pressure monitoring,

current medications, anti hypertensive drugs prescribed were gathered from medical record files.

### INCLUSION CRITERIA

- ✓ Gestational age >20 weeks.
- ✓ Primi / Multigravida
- ✓ Pregnant women of age 20-45 years.
- ✓ All pregnant women normotensive as well as hypertensive, which do not fall under exclusion criteria.

### EXCLUSION CRITERIA

- ✓ Patients with all maternal abnormalities, known renal disease, diabetes, hepatic dysfunction, alcoholism, dyslipidaemia.
- ✓ Preexisting hypertension before pregnancy except pregnancy induced hypertension.

About 3ml of blood was drawn from aseptically from selected subjects in a plain vial for serum. Serum was separated by centrifugation and used for estimation of serum LDH and Uric acid levels. Concentration of serum LDH and UA were analyzed by using analytical kits from Chemelex in semi-autoanalyzer. Mean ± standard deviation of different parameters were compared to determine the difference between two groups by using Mann-Whitney U Test. The significant level were determined by p value. P value less than < 0.05 was considered as significant.

## III. RESULTS

AGE	TEST		CONTROL	
	NO	PERCENTAGE	NO	PERCENTAGE
<20 yrs	0	0	2	6.66%
20-24yrs	4	11.42%	3	10%
25-29yrs	16	45.7%	19	63.3%
30-34 yrs	9	25.7%	5	16.6%
>35yrs	6	17.1%	1	3.33%
<u>GRAVIDITY</u>	20	57.1%	16	53.3%
PRIMIGRAVIDA	15	42.8%	14	46.6%
MULTIGRAVIDA				
<u>SOCIO ECONOMIC STATUS</u>	4	11.4%	5	16.6%
HIGH	27	77.1%	25	83.3%
MEDIUM	4	11.4%	0	0
LOW				
<u>OCCUPATION</u>	22	62.85%	17	56.6%
EMPLOYED	13	37.1%	13	43.3%
UNEMPLOYED				

Table 1: Demographic distribution of patients

		TEST	CONTROL	P VALUE
AGE	MEAN ± SD	29.429 ± 5.2034	26.367 ± 3.8281	.010
PERIOD OF GESTATION	MEAN ± SD	34.400 ± 3.8972	36.167 ± 1.2617	.454
SYSTOLIC BLOOD PRESSURE	MEAN ± SD	158.114 ± 19.6555	120.667 ± 8.6834	.000
DIASTOLIC BLOOD PRESSURE	MEAN ± SD	103.31 ± 9.749	79.00 ± 8.449	.000
SERUM LDH	MEAN ± SD	639.429 ± 267.0141	344.367 ± 118.4164	.000
SERUM URIC ACID	MEAN ± SD	6.043 ± 1.5563	5.013 ± 1.1596	.000

Table 2: Comparison Of Parameters Among Study Groups

The study sample included 35 pregnant women with hypertension as cases and 30 pregnant women who were normotensive as controls. Table 2 indicates Mean age of pregnant women among test was  $29.429 \pm 5.203$  and control was  $26.367 \pm 3.8281$  with a p value of .010 which was significant. Mean diastolic blood pressure among test was  $103.31 \pm 9.749$  and control was  $79.00 \pm 8.449$  with a p value of .000 which is less than 0.05 and was statistically significant.

The mean POG of pregnant women among test was  $34.400 \pm 3.8972$  and control was  $36.167 \pm 1.2617$  with a p value of 0.454 and was not statistically significant.

The mean systolic blood pressure was found to be  $158.114 \pm 19.6555$  in test and  $120.667 \pm 8.6834$  with a p value of .000 which is less than 0.05 which is statistically significant.

In this study the serum LDH level in test was high when compared with the control (test mean  $639.429 \pm 267.0141$  and control mean  $344.367 \pm 118.4164$  (p value = 0.000). The mean level of uric acid in test was found to be  $6.043 \pm 1.5563$  which is higher when comparing with control mean  $5.013 \pm 1.1596$  and was statistically significant.

MATERNAL COMPLICATIONS	TEST	
	NO (n=35)	PERCENTAGE
ECLAMPSIA	5	14.2%
PLACENTAL ABRUPTION	3	8.57%
HELLP SYNDROME	2	5.71%

Table 3: Maternal Outcomes

The value of LDH and Uric acid was statistically significant in eclampsia group with a p value of .001 and .002. The significant level is less than .05. Placental abruption was found to be 8.57% in test group and HELLP syndrome was found to be 5.71%.

SYMPTOMS	NO(65)	PERCENTAGE
PERIPHERAL EDEMA	15	23.07%

LOSS OF CONSCIOUSNESS	5	7.69%
BLURRING VISION	6	9.2%
PROTEINURIA	8	12.3%
SEVERE HEADACHE	12	18.46%

Table 4: Symptoms

Out of 65 patients 15 patients (23.07%) had peripheral edema, 5(7.69%) had loss of consciousness, 6(9.2%) had blurring vision, 8(12.3%) had proteinuria and 12(18.46%) had severe headache.

	TEST	%	CONTROL	%
CALCIUM SUPPLEMENT	33	52.4%	30	47.6%
H2 BLOCKER	27	60%	18	40%
ANALGESICS AND ANTI INFLAMMATORY	29	65.9%	15	34.1%
NUTRITIONAL SUPPLEMENTS (Protein powder)	15	48.4%	16	51.6%
IRON SUPPLEMENTS	32	55.2%	26	44.8%
FOLIC ACID SUPPLEMENT	30	54.5%	25	45.5%
MULTIVITAMIN SUPPLEMENT	32	53.3%	28	46.75%

Table 5: Drugs Used

Table 5 shows that out of 65 patients 33(52.4%) were prescribed with calcium supplements, 27(60%) with H2 blocker, 29(65.9%) with analgesics and anti-inflammatory, 15(48.4%) with nutritional supplements, 32(55.2%) with iron supplements, 30(54.5%) with folic acid supplement and 32(53.3%) with multivitamin supplements test group.

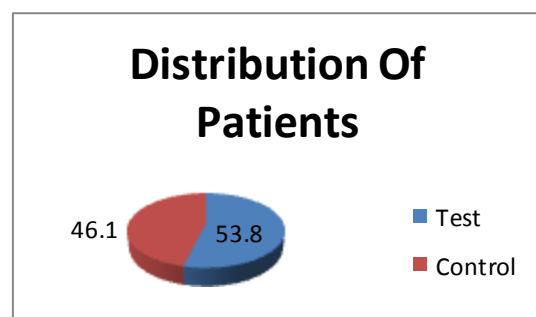


Figure 1

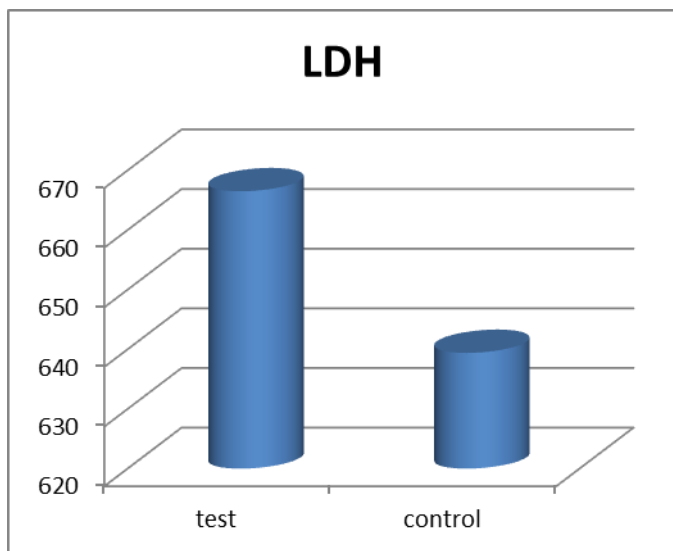


Figure 3: Comparison Of Serum LDH Between Test And Control

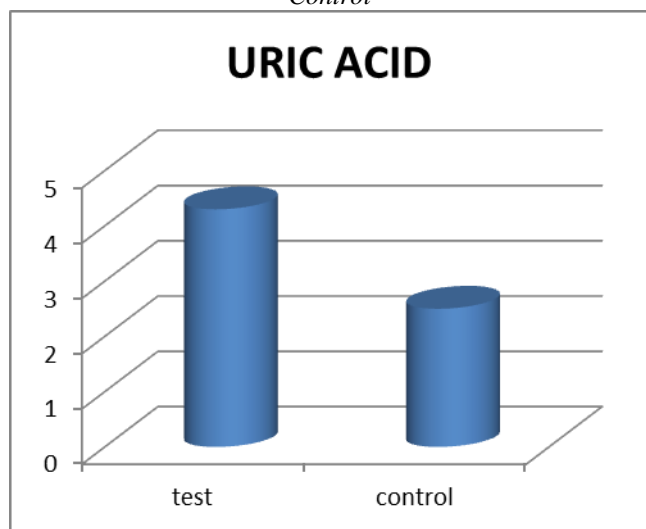


Figure 3: Comparison Of Serum Uric Acid Between Test And Control

#### IV. DISCUSSION

Pre-eclampsia complicates approximately 4 to 5% of pregnancies and it is a major cause of maternal and perinatal mortality and morbidity, world wide particularly in developing countries. Pre-eclampsia leads to increased morbidity of the mother, the fetus and the neonates as well as long-term consequences of its subsequent life.<sup>7</sup>In this study, serum LDH level in case group was high compared to control group which was significant. Amit D. Sonagra (5) also found a significant increase in serum LDH in women with preeclampsia and gestational hypertension compared with controls. LDH is mainly an intracellular enzyme. It is responsible for interconversion of pyruvate and lactate in the cells. Its levels are several times greater inside the cells than in the plasma. So its levels are increased in increased cell leakiness, hemolysis and cell death. serum Uric acid level in case group was high compared to control group which was significant. Rajalaxmi Kamath K etal(8) found a significant increase in moderate to

severe preeclampsia (5.57mg/dl) and eclampsia (6.47mg/dl) than mild preeclampsia and control group. The mean serum uric acid levels increases proportionately with the severity of disease. In both controls and test, the maximum number were seen in the age group of 25-29yrs. Out of 30 controls, maximum 16(53.3%) were primigravida. Out of 35 cases, 20(27.1%) were primigravidae and 15(42.85%) were multigravidae. Dr. D. P. Meshram made similar studies(1). The value of LDH and Uric acid was statistically significant in eclampsia group with a p value of .001 and .002. The significant level is less than .05. Placental abruption was found to be 8.57% in test group and HELLP syndrome was found to be 5.71%. Severely pre-eclamptic women with LDH levels of 800IU/L showed a significant increase in complications in terms of eclampsia, placental abruption and other complications compared to women who had lower serum LDH levels (3). In these three groups LDH and UA levels were found to be high when compared to other patients in test.

There was statistically significant increase in maternal complications with increasing LDH and Uric acid levels. In our study, calcium supplements iron preparations, folic acid, vitamin supplements, H2blocker are frequently used drugs. Out of the total prescriptions studied in these patients the most commonly prescribed antihypertensive was Niacardia followed by Labetalol, Aldomet, and Magnesium sulphate were the other drugs prescribed. Tirthankar Deb etal conducted a study(9), there methyl dopa were found to be the most common antihypertensive prescribed followed by Labetalol. The majority of drugs used were from category Band C.

#### V. CONCLUSION

In this study serum LDH and Uric acid levels were high in test group than control. Monitoring of serum LDH and Uric acid in early pregnancy may helpful in preventing fetal growth retardation, maternal morbidity and maternal mortality

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