



### Original Research Article

## Role of Lactate Dehydrogenase (LDH) as a Earliest Biochemical Marker for the Prediction of Adverse Outcomes in Pre-Eclampsia and Eclampsia in Tertiary Care hospital at S.K.M.C.H. Muzaffarpur, Bihar

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### Abstract

**Objective:** Lactate dehydrogenase is present in all cells of the body but its higher concentrations are found in liver, heart, kidney, skeletal muscle and erythrocytes. Total LDH concentration in serum or plasma is increased in patients with liver disease, renal disease, myocardial infarction, many malignant diseases, progressive muscular dystrophy and almost any cause of hemolysis. On the findings of a single test result clinical diagnosis should not be done, but should integrate both clinical and laboratory tests finding. Aim of present study was to evaluate the role of Serum lactate dehydrogenase as a prediction of adverse foeto-maternal outcomes like severity of disease and occurrence of complications in cases of pre-eclampsia and eclampsia.

**Materials and Methods:** A total of 81 pregnant women (healthy woman as a control n=27, pre-eclamptic n=27 and eclamptic n=27) with age group ranges from 18 to 35 years attending in the Gynecological OPD and IPD with different Pregnancy induced hypertension (PIH) complains were included in the study. After thorough clinical history, all the patients were subjected to proper clinical examination and referred to our department for LDH estimation. LDH estimation was done by IFCC methods on Biosystem. Depending on the values obtained, the cases were divided into three groups. **Group A-** Levels of LDH <600U/L, **Group B-** Levels between 600 U/L to 800 U/L, **Group C -**Levels >800 U/L.

**Results:** **Group A:** LDH level <600 U/L had 11.11 % of pre-eclamptic cases and 25.92 % of eclamptic cases and 88.88 % of normal cases. **Group B:** LDH level 600-800 IU/L had 22.22 % of pre-eclamptic and 81.48 % of eclamptic cases. **Group C:** LDH level >800 U/L had 37.03 % of pre-eclamptic and 66.66 % of eclamptic cases.

**Conclusion:** LDH is the earliest biochemical marker seen in blood during hypoxia and oxidative stress. It is a useful biochemical marker for severity and occurrence of complications of pre-eclampsia and eclampsia, these are preventable if identified at an earlier stage and adequately managed at tertiary care center. So that screening of all cases of Preeclampsia and Eclampsia with LDH levels should be made mandatory.

**Keywords:** Lactate dehydrogenase (LDH), Preeclampsia and Eclampsia, Pregnancy induced hypertension (PIH), NADH, Biochemical marker.

## Introduction

Pregnancy causes profound anatomical, physiological, and metabolic changes in maternal tissues. Well orchestrated changes can go wrong at some stage of pregnancy resulting in various fetomaternal complications. One of the commonest and most dreaded complications is Pregnancy induced hypertension (PIH) or preeclampsia (PE) or gestational hypertension (GHTN) which can further complicate into eclampsia (E). They are still the major killers in developing countries. 10% of all pregnancies are complicated by hypertension. Lactate dehydrogenase (LD or LDH) catalyzes the oxidation of lactate by NAD, to form pyruvate and NADH. The catalytic concentration is determined from the rate of increase of NADH measured at 340 nm.

Lactate dehydrogenase (LDH) is an intracellular enzyme which converts pyruvic acid to lactic acid during the process of glycolysis. Hypoxia induces LDH isoenzyme activity in trophoblasts resulting in higher lactate production. Elevated levels of LDH are indicative the cellular damage and dysfunction, so it can be used as a biochemical marker because it reflects the severity of the disease, occurrence of complications and fetal outcome. Its estimation would prove useful because these complications are preventable. Elevated levels of LDH have also been seen in cases of HELLP syndrome.

## Materials and Methods

Present study was a prospective study conducted in the department of Biochemistry, Sri Krishna

Medical College, Muzaffarpur, Bihar with the help of Obstetrics and Gynecology department **during the period of March 2019 to September 2019**. A total of 81 pregnant women (healthy woman n=27, pre-eclamptic n=27 and eclamptic n=27) with age group ranges from 18 to 35 years attending in the Gynecological OPD and IPD with different Pregnancy induced hypertension (PIH) complains were included in the study. After thorough clinical history, all the patients were subjected to proper clinical examination and referred to our department for LDH estimation.

Samples were collected by standard procedures. Serum or plasma separated from the clot as soon as possible. Hemolysed samples were not used. Due to the high lactate dehydrogenase concentration in red cells Hemolysis interferes. Lipemic sample (triglycerides < 10 g/L) and bilirubin level < 20 mg/dL do not interfere the test result. Lactate dehydrogenase in serum or plasma is stable for 2 days at room temperature and for 24 hours at 2-8°C. We use heparin as an anticoagulant.

LDH estimation was done by IFCC methods on Biosystem and use the Biochemistry Control Serum level I and II to verify the performance of the measurement procedure. Our laboratory has own internal Quality Control scheme and procedures for corrective action if controls do not recover within the acceptable tolerances

Lactate dehydrogenase levels were done for all cases, depending on the values obtained, the cases were divided into three groups. **Group A-** Levels of LDH <600U/L, **Group B-** Levels between 600 U/L to 800 U/L, **Group C** -Levels >800 U/L

## Results

**Table-1:** Shows LDH Level in Pre-eclamptic, Eclamptic and Normal healthy Woman

Group	pre-eclampsia (n=27)		Eclampsia (n=27)		Normal healthy cases (n=27) Control	
	Total no. of cases	Percentage	Total no. of cases	Percentage	Total no. of cases	Percentage
<b>Group A</b> Levels of LDH <600U/L	3	11.11	7	25.92	24	88.88
<b>Group B</b> LDH Levels between 600 U/L to 800 U/L	6	22.22	22	81.48	0	0
<b>Group C</b> LDH Levels >800 U/L	10	37.03	18	66.66	0	0

**Group A:** LDH level <600 U/L had 11.11 % of pre-eclamptic cases and 25.92 % of eclamptic cases and 88.88 % of normal cases.

**Group B:** LDH level 600-800 IU/L had 22.22 % of pre-eclamptic and 81.48 % of eclamptic cases.

**Group C:** LDH level >800 U/L had 37.03 % of pre-eclamptic and 66.66 % of eclamptic cases.

All normal or cases taken as control had levels of LDH <600 U/L. In **Group C** LDH >800 had majority of eclamptic cases. Therefore, it is clearly seen that there is a significant rise in LDH levels with increasing severity of disease. perinatal outcome according to LDH levels were markedly affected from healthy baby to sick and required admission in neonatal intensive care unit, and may be intrauterine death.

However, more research is required in this field. It would be more specific to estimate levels of LDH-A isoenzyme activity in cases of pre-eclampsia. Other test like liver function test in addition would help in better prediction.

### Discussion

The incidence of severe pre-eclampsia is 1.2 % and is eclampsia 2.7 %, pre-eclampsia and eclampsia patients were significantly younger, with low gravidity and parity. They had significantly increased systolic and diastolic pressure, liver enzymes, uric acid, urine albumin, and LDH levels. The clinical symptoms and complications of pre-eclampsia along with perinatal mortality were markedly increased in patients with LDH >800 U/L compared with those who had lower levels. Complications like retinopathy, acute renal failure, abruptio placenta, disseminated intravascular coagulation, central venous accident, maturity onset diabetes mellitus, Shock were also associated with high level of serum LDH >800 U/L. Low birth weight of babies was also associated with high level of serum LDH levels in pre-eclampsia and eclampsia patients. The incidence of poor perinatal outcome was higher in pre-eclampsia and eclampsia patients with high serum LDH level (>600 U/L).

We found that in complicated cases of pre-eclampsia and eclampsia, LDH level was significantly higher. LDH is a biochemical marker predicting adverse pregnancy outcomes in severe pre-eclampsia patients.

### Conclusion

During hypoxia and oxidative stress LDH is the earliest biochemical marker seen in the blood. It is a useful and earliest biochemical marker that reflects the severity of and the occurrence of complications of pre-eclampsia and eclampsia, these are preventable if identified at an earlier stage and adequately managed at a tertiary care centers. Test is easily available, so screening of all cases of pre-eclampsia and eclampsia with LDH levels must be made mandatory. Detection of high-risk patients with increased levels of LDH mandates close monitoring, prompt and correct management to decrease both maternal and fetal morbidity and mortality. Therefore, we conclude from this study that screening of all cases of Preeclampsia and Eclampsia with LDH levels should be made mandatory.

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