Original Research Paper

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Biochemistry

# "LDH-A BIOCHEMICAL MARKER FOR THE PREDICTION OFADVERSE FETO-MATERNAL OUTCOME IN PREECLAMPSIA AND ECLAMPSIA "

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**ABSTRACT** **Introduction:** Hypertensive disorders of pregnancy and their complications considered as one of the major causeof maternal morbidity and mortality in the world. Preeclampsia is a pregnancy specific multisystem disorder characterized by the new onset of hypertension and proteinuria or the new onset of hypertension and significant end-organ dysfunction with or without proteinuria after 20 weeks of gestation. Elevated levels of LDH are indicative of cellular damage and dysfunction, hence it can be used as a biochemical marker in preeclampsia as it reflects the severity of the disease, occurrence of complications and feto-maternal outcomes. **Material and methods:** Prospective observational study carried out which included 110 pre-eclamptic women at 28-40 weeks of gestation, fulfilling the inclusion and exclusion criteria .The detailed work up of the groups including serum LDH was done. Thereafter they were followed till delivery to determine fetal and maternal outcomes in terms of complications. **Results:** Typically the normal serum value of LDH is 140U/L to 280U/L. It was seen that more than half of the patients had serum LDH levels between 300 to 600 (64, 58.18%) .The levels of serum LDH were higher in the Eclampsia patients compared to the pre-eclampsia patients (758.67 vs 537.59). The difference was significant statistically (P= 0.0091). 31.82% patients in the study experienced one or more adverse maternal outcome in the study. Most common adverse event or complication in the study was PPH (14, 12.73%) followed by APH (10, 9.09%). 46 patients in the studyexperienced adverse fetal outcomes/complications (41.82%). Most common complication seen was pre-term birth (26, 23.64%) followed by low-birth-weight babies (16.36%). **Conclusion:** In this study serum LDH level correlates well with severity of preeclampsia and its complications. Higher the LDH levels, poorer maternal and perinatal outcomes. Thus serum LDH level can be used as a reliable biomarker for the prediction of severity of preeclampsia and its complications. So that early intervention can be taken vigilantly, thus preventing maternal and fetal complications.

**KEYWORDS :** Preeclampsia, Eclampsia, LDH, Feto-maternal complications

## INTRODUCTION

Preeclampsia is a pregnancy specific multisystem disorder characterized by the new onset of hypertension and proteinuria or the new onset of hypertension and significant end-organ dysfunction with or without proteinuria after 20 weeks of gestation [1]. It is estimated to complicate approximately 4.6% of pregnancies worldwide [2]. Both maternal and placental factors are involved in pathophysiology. Abnormal placentation and remodeling of spiral arteries leads to placental hypo- perfusion, hypoxia, ischemia and the release of various antiangiogenic factors into the maternal circulation, causing systemic endothelial dysfunction[3]. In addition, immunological and genetic factors have also been proposed.

Maternal complications includes Postpartum hemorrhage (PPH), abruptio placenta, Hemolysis elevated liver enzymes and low platelets (HELLP) syndrome, Disseminated intravascular coagulation (DIC), liver failure, acute renal failure, retinal detachment. Fetal complications includes fetal growth restriction, sudden intrauterine death. It is estimated that 10-15% of direct maternal deaths are associated with preeclampsia and eclampsia [4]. Therefore, it is essential to estimate the risk of preeclampsia early in pregnancy and identify high risk women who need frequent surveillance [5].

Lactate dehydrogenase (LDH) is a cytoplasmic enzyme that catalyzes the interconversion of pyruvate and lactate and is present in various tissues throughout the body hence ubiquitous enzyme. It is released into circulation following cellular death and tissue injury. Typically the normal serum value of LDH is 140U/L to 280U/L. LDH is a highly sensitive marker for tissue breakdown, however it is nonspecific as it is also elevated in many other clinical conditions, such as pregnancy associated thrombotic thrombocytopenic purpura, liver dysfunction, myocardial infarction, space occupying lesion (tuberculoma, brain tumor) [6,7,8]. Elevated levels of LDH are indicative of cellular damage and dysfunction, hence it can be used as a biochemical marker in preeclampsia as it reflects the severity of the disease, occurrence of complications, and feto- maternal outcome.

**Study Design:** Prospective observational study.

**SAMPLE SIZE and mode of collection** 110 pre- eclamptic women at 28-40 weeks of gestation (IPD and referred patients from peripheries in view of tertiary care facility, ICU and good NICU care) fulfilling the inclusion criteria were considered for my study.

### Inclusion Criteria

- Singleton pregnancy
- High BP reading at gestation age >20 weeks
- BP reading > 140/90mmHg
- Presence of proteinuria

### Exclusion Criteria

- High BP reading at <20 weeks of gestation
- Preexisting medical conditions like – Diabetes, Thyroid disorders , Renal disease, liver disorders, Chronic lung disease, Cardiac disease, Connective tissue disorders, DIC, Stroke, Seizures
- History of recent fever and infections
- Space occupying lesion in brain like tuberculoma, brain tumor
- Multiple pregnancy, Molar pregnancy

## AIM AND OBJECTIVES

- Estimation of level of serum LDH in patients with preeclampsia-eclampsia .
- Correlation between increased levels of serum LDH and maternal morbidity and pregnancy outcome.
- Correlation between increased levels of serum LDH and fetal morbidity and outcome.

## METHODS

110 consenting patients (IPD and Referred patients from peripheries in view of tertiary care facility, ICU and good NICU care) fulfilling the inclusion criteria were considered for my study. A thorough checkup was done for all patients. Basic investigations were done. Under aseptic precautions, sampling was done by venepuncture, 2 ml of blood was drawn for Serum LDH levels estimated by enzymatic method on autoanalyzer. The detailed work up of the groups comprising of pregnant women with preeclampsia and eclampsia was done. Participants were followed till delivery and fetal and maternal outcomes had been assessed in terms of complications. Association of maternal and perinatal outcomes were assessed in relation to LDH levels.

## RESULTS:

A total of 110 patients with the Pre-eclampsia or Eclampsia were included in the study .

The study had 107 patients with pre-eclampsia (97.27%) and 3 patients with Eclampsia (2.73%).

**Table-1.Frequency distribution of Pre- eclampsia and Eclampsia in study population**

| Pre-Eclampsia And Eclampsia Status | Number | Percentage |
|---|---|---|
| Pre-Eclampsia | 107 | 97.27 |
| Eclampsia | 03 | 2.73 |
| Overall | 110 | 100 |

It was seen that more than half of the patients had serum LDH levels between 300 to 600 (64,58.18%). 25 patients (22.73%) patients had serum LDH levels above 600.

**Table-2.Frequency distribution of Serum LDH categories among the study population**

| Serum LDH category | Number | Percentage |
|---|---|---|
| <300 | 21 | 19.09 |
| 300-600 | 64 | 58.18 |
| >600 | 25 | 22.73 |
| Overall | 110 | 100 |

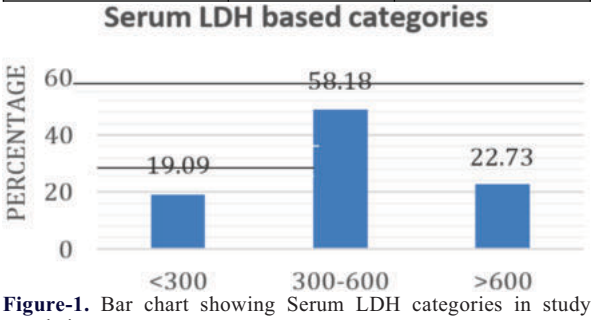


**Figure-1.** Bar chart showing Serum LDH categories in study population

It was seen that most of the adverse maternal outcomes were seen in people with serum LDH greater than 600.

**Table-3. Frequency distribution of serum LDH categories and adverse maternal outcomes**

| LDH and Adverse maternal outcomes | <300 | 300-600 | >600 | Overall |
|---|---|---|---|---|
| Number of patients | 21 | 64 | 25 | 110 |
| Adverse maternal outcome | 2(9.52) | 11 (17.19) | 22 (88) | 35 (31.82) |
| PPH | 1(4.76) | 5(7.81) | 8 (32) | 14 (12.73) |
| HELLP | 0 | 0 | 3 (12) | 3 (2.73) |
| Abruptio/APH | 1(4.76) | 2(3.13) | 7 (28) | 10 (9.09) |
| DIC | 0 | 1(1.56) | 3 (12) | 4 (3.64) |
| MODS | 0 | 0 | 2 (8) | 2 (1.82) |
| Shock | 0 | 1(1.56) | 1 (4) | 2 (1.82) |
| ICU admission | 0 | 2(3.13) | 5(20) | 7 (6.36) |

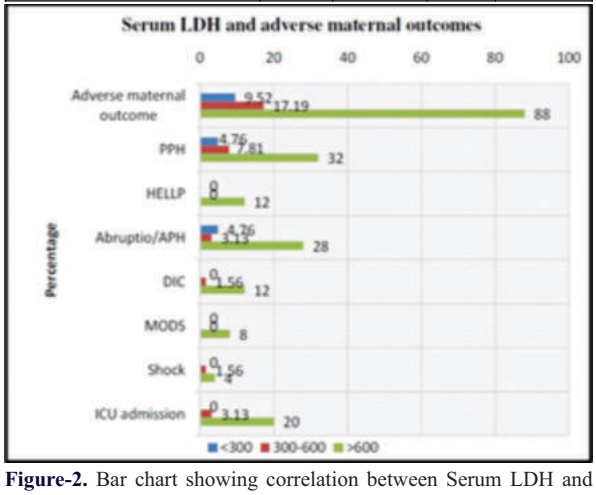


**Figure-2.** Bar chart showing correlation between Serum LDH and adverse maternal outcome in study population

It was observed that most of the adverse fetal outcomes were present in the patients with serum LDH levels more than 600.

**Table-4. Frequency distribution of serum LDH categories and adverse fetal outcomes**

| LDH and Adverse foetal outcomes | <300 | 300-600 | >600 | Overall |
|---|---|---|---|---|
| Number of patients | 21 | 64 | 25 | 110 |
| Adverse foetal outcome | 6 (28.57) | 20(31.25) | 20 (80) | 46 (41.82) |
| Foetal death/Still birth | 0 | 2(3.13) | 5 (20) | 7(6.36) |
| Low birth weight | 1 (4.76) | 5(7.81) | 12 (48) | 18(16.36) |
| Preterm birth | 1 (4.76) | 9(14.06) | 16 (64) | 26(23.64) |
| Low APGAR score (1 min) | 0 | 4(6.25) | 16 (64) | 20(18.18) |
| Low APGAR score (5 min) | 0 | 4(6.25) | 8 (32) | 12(10.91) |
| NICU Admission | 4 (19.04) | 7(10.93) | 20 (80) | 31(28.18) |

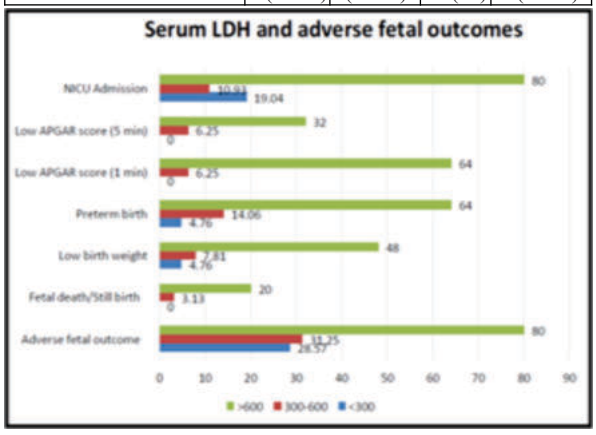


**Figure-3.** Bar chart showing correlation between Serum LDH and adverse fetal outcome in study population

The levels of serum LDH were higher in the Eclampsia patients compared to the pre- eclampsia patients (758.67 vs 537.59). The difference was significant statistically (P= 0.0091).

**Table-5. Frequency distribution of Serum LDH and Pre-eclampsia/Eclampsia in study population**

| Serum LDH and PE/E | PE | Eclampsia | Overall | P Value |
|---|---|---|---|---|
| Number of patients | 107 | 3 | 110 | |
| Mean | 537.59 | 758.67 | 550.29 | 0.0091 |
| Std dev | 174.84 | 207.35 | 192.25 | |
| Minimum | 250.00 | 540.00 | 250.00 | |
| Maximum | 794.00 | 968.00 | 968.00 | |

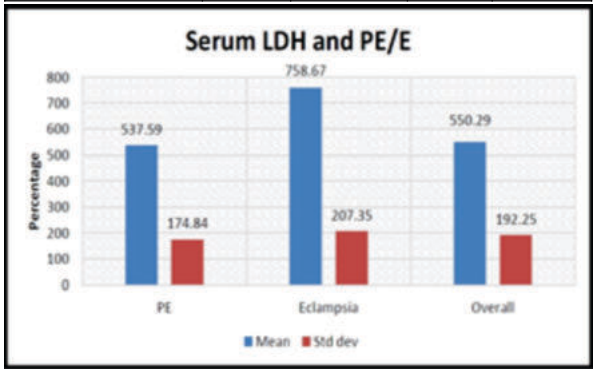


**Figure-4.** Bar chart showing correlation between Serum LDH and Pre-eclampsia and Eclampsia in study population

## CONCLUSIONS

The study contributes to the existing literature around serum LDH and its significant role in early identification of preeclampsia and its complications. The study concluded that serum LDH is an effective marker for early prognostication of the high-risk preeclampsia patients. The levels were seen to increase as the severity increased from preeclampsia to eclampsia.

Serum LDH levels were effective in identification of adverse feto-maternal outcomes in pre eclampsia patients as suggested by the higher

levels seen in these patients. Also, the accuracy of serum LDH was high for adverse outcomes.

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