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Lactate Dehydrogenase as a Biochemical Marker of Adverse Pregnancy and Fetal Outcome in Preeclampsia: A Comparative Study

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Abstract: *Aims:*

Current study has been done to analyse the serum levels of lactate dehydrogenase (LDH) as a prognostic marker for pre-eclampsia and to substantiate the severity of preeclampsia and adverse pregnancy outcome. In this study serum maternal LDH levels was done after 32 weeks of gestation to evaluate the serum LDH as a predictive biochemical marker for feto-maternal outcome in pre-eclampsia.

Method:

In this study total 80 patients were selected as per the inclusion and exclusion criteria. Out of 80 patients, 40 normotensive patients included in Group 1 which served as control group and other 40 patients with preeclampsia were selected as per aforementioned criteria and categorised as Group 2. In Group 2, 29 patients had mild preeclampsia, 6 developed severe preeclampsia and 5 developed eclampsia.

Results and Discussion:

- *The number of babies with Apgar score (at 1 & 5 minutes) < 7 was significantly more in patients of group 2.*
- *There was significant higher rate of neonatal complications like RDS, sepsis, IVH, early neonatal death and stillbirth among the babies of group 2.*
- *Maternal complications like eclampsia, placental abruption, DIC, HELLP syndrome, ARF and maternal morbidities were significantly more in patients of group 2.*
- *The number of babies with low Apgar score at 5 minutes was significantly more in cases of higher LDH levels.*
- *Neonatal complications were significantly higher in cases with higher LDH values,*
- *Maternal complications were higher in group 2 but when comparison was done in subgroups according to LDH levels there was no significant difference.*

Conclusion:

Serum levels of lactate dehydrogenase can be used to predict the feto-maternal outcome in preeclampsia. It can be used as a biochemical marker of adverse pregnancy and fetal outcome in preeclampsia.

KeyWords: *PREECLAMPSIA, FETO MATERNAL OUTCOME, LACTATE DEHYDROGENASE, BIOMARKER*

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I. Introduction:

Hypertensive disorders of pregnancy are among the most common medical problems in pregnancy with an incidence of between 5-10% [1]. The incidence varies amongst different hospitals, regions and countries. Hypertensive disorders in pregnancy are a major cause of maternal and perinatal morbidity and mortality worldwide [2]. Hypertensive disorders during pregnancy are classified into 4 categories, as recommended by National High Blood Pressure Education Program Working Group On High Blood Pressure in Pregnancy: 1) chronic hypertension, 2) preeclampsia- eclampsia, 3) preeclampsia superimposed on chronic hypertension, and 4) gestational hypertension (transient hypertension of pregnancy or chronic hypertension identified in latter half of pregnancy.[3]

Lactate Dehydrogenase (LDH) is mainly an intracellular enzyme. It is responsible for interconversion of pyruvate and lactate in the cells during the process of glycolysis, Glycolysis is the major energy pathway in the placenta. Hypoxia in PE further enhances glycolysis and increases LDH activity. Studies have shown that

LDH activity & gene expression are higher in placentas of PE than normal pregnancy [4]. In pre-eclampsia patients some authors consider delivery as the definite treatment regardless of gestational age, whereas others recommended prolonging pregnancy until development of maternal and fetal indication for delivery or until lung maturity or 34 weeks of gestation [5]. Lactate dehydrogenase is a biochemical marker that reflects the severity of pre-eclampsia and also adverse maternal and fetal outcome. It is therefore necessary to evaluate of this association with high quality evidence. Preeclampsia is defined as elevated blood pressure after 20 weeks of gestation (≥ 140 mm Hg systolic or ≥ 90 mm Hg diastolic) plus proteinuria (> 0.3 g/24 hours). For this reason the current study has been done to analyse the serum levels of lactate dehydrogenase (LDH) as a prognostic marker for pre-eclampsia and to substantiate the severity of preeclampsia and adverse pregnancy outcome.In this study serum maternal LDH levels was done after 32 weeks of gestation to evaluate the serum LDH as a predictive biochemical marker for feto-maternal outcome in pre-eclampsia.

II. Materials And Methods:

This prospective comparative study was conducted at Department of obstetrics and gynaecology; R. G Kar Medical College and Hospital, Kolkata on July 2016 – June 2017**.**

INCLUSION CRITERIA

All Pregnant women ≥20weeks of gestation were enrolled in this study and divided into following groups:

- Group 1—Healthy normotensive (Normal) pregnant women (Controls)
- Group-2—Patients of preeclampsia and eclampsia (Subjects). Subjects will be further subdivided into following subgroups
- Sub group A- Mild Preeclampsia
- Sub group B- Severe Preeclampsia

Sub group A- Mild preeclampsia(7)

Defined as Pregnant female of ≥20 weeks of gestation with blood pressure ≥140/90 mm of Hg &<160/110 mm of Hg noted first time during pregnancy on ≥2 occasions at least 6 hours apart with proteinuria of ≥1+ (≥30mg/dl) by dipstick method in a random urine sample would be considered as having mild preeclampsia after excluding urinary tract infection .

- The two groups & Sub groups were matched according to age, gravidity, parity, maternal weight, trimester, and maternal and perinatal outcomes.
- All women were followed until delivery and early postpartum period and babies till early neonatal period.

Study population was evaluated for serum LDH level two times, one at the time of first observation and second at the time of termination of pregnancy.

Subjects were also divided according to the serum LDH levels into following groups(17)

- (a) < 600 IU/l
- (b) 600–800 IU/l
- (c) > 800 IU/l

EXCLUSION CRITERIA

- Diabetes with pregnancy
- Pregnancy with chronic hypertension.
- Pregnancy with thrombophilia.
- Pregnancy with chronic liver disease.
- Severe anemia, valvular heart disease – any hemodynamic alteration leading to hypoxia.

Statistical Analysis:

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS 24.0. andGraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. A chi-squared test ($\chi 2$ test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.p-value ≤ 0.05 was considered for statistically significant.

III. Result And Analysis:

Total 80 patients were studied and divided into group 1 (n =40) and group 2(n=40). Group 1 included normal pregnantwomen who served as control group. Group 2 included pregnancy with preeclampsia and eclampsia. Out of 40 cases 29 cases hadmild pre-eclampsia, 6 cases had severe preeclampsia and 5 cases developedeclampsia.Corrected Chi – square test showed that there was no significant difference between parity and patients of two groups (p= 0.2636). Hence, the two groups were comparable for their parity.We found in this above table the incidence of preeclampsia was more among primigravida. 70%(28/40) primigravida mothers had preeclampsia.

t-test showed that there was no significant difference between the mean age of the two groups (p= 0.2019). Thus the patients of two groups were age matched.

t- test showed there was no significant difference in mean weight of the patients of the two groups (p= 0.093). Thus the patients were matched for their weights.The mean period of gestation (mean ±s.d) when patients were first observed 33.2 weeks± 1.46 in group 1. The earliest period of gestation was 31.6 weeks and median 33 weeks.

The mean period of gestation (mean ±s.d) when patients were first observed was 33.6 weeks ± 1.32 in group 2. The earliest period of gestation was 32 weeks and median 33.2 weeks.t- test showed there was no significant difference in early period of gestation of patients of two groups (p=.1736).

The meanperiod of gestation at termination(mean ± s.d) was 38.4 weeks ± 1.5 in patients of group 1 with maximum at 40 + 2 weeks and median was 38.3 weeks.The mean period of gestation at termination(mean ± s.d) was 35.6 weeks ± 1.5 in patients of group 1 with maximum at 39 weeks and median was 35 weeks.t-test showed that total period of gestation was significantly shorter in case of patients of Group 2 (p= < 0.0001). Hence patients of Group 2 showed increased incidence of preterm deliveries.

The mean SBP in early period of gestation in Group 1 was 111.5 ± 11.89 with minimum BP 100 mm Hg and maximum BP 156 mm Hg with median BP 110 mm Hg.The mean SBP in early period of gestation in Group 2 was 150.45 ± 12.448 with minimum BP 140 mm Hg and maximum BP 194 mm Hg with median BP 148 mm Hg.t-test showed that SBP-E was significantly higher in patients of Group 2 (p= <0.0001).The mean SBP-L in Group 1 was 118.25 ± 9.4156 with minimum SBP 100 mm Hg , maximum SBP_L 136 mm Hg and median SBP 120 mm Hg.The mean SBP-L in Group 2 was 169.15 ± 19.070 with minimum SBP 140 mm Hg , maximum SBP_L 200 mm Hg and median SBP 160 mm Hg.Mean SBP-L in Group 2 was significantly higher in comparison to patients in Group 1 as per t-test. (p= <0.0001)

The mean DBP-E(when the patients were observed for the first time) in Group 1 was 73.85 ± 5.7 with minimum DBP 88 mm Hg , maximum DBP_L 136 mm Hg and median DBP 110 mm Hg. The mean DBP-E in Group 2 was 93.8 ± 5.6351 with minimum DBP 84 mm Hg , maximum DBP-E 110 mm Hg and median DBP 92 mm Hg.t-test showed that in patients of Group 2 DBP-E was significantly higher in comparison to patients of Group 1 (p- < 0.0001). The mean DBP-L in Group 1 was 76.60 ± 8.631 with minimum DBP 56 mm Hg , maximum DBP_L 88 mm Hg and median DBP 80 mm Hg. The mean DBP-L in Group 2 was 102.975 ± 7.315 with minimum DBP 90 mm Hg , maximum DBP_L 120 mm Hg and median DBP 100 mm Hg.t-test showed that in patients of Group 2 DBP-L was significantly higher in comparison to patients of Group 1. (p- < 0.0001)

The above table shows that 35% patients underwent LUCS in group 1 while 67.5 % patients in Group 2 underwent LUCS.Percentage of vaginal deliveries was more in patients of Group 1(62.5%) in comparison to Group 2(27.5%).

1 case of Group 1, while 2 patients in Group 2 had stillbirths.

Thus, the above table indicates that there is significantly increased rate LUCS due to pregnancy induced hypertension.t-test showed that there was significant difference in birthweight of the babies of the two groups. (p= <.0001).The mean birthweight of the babies (mean ± s.d) of Group 1 was 2.655 ± 0.2689 with range 2.1 -3.3 kg and the median was 2.7 kg. The mean birthweight of the babies (mean ± s.d) of Group 2 was 2.110 ± 0.354 with range 1.4- 2.6 kg and the median was 2.1750 kg. In the preeclampsia group, we found that preterm deliveries was found in 30/40 (75%) cases. In normal control group the incidence of preterm deliveries was 2.5%.

The above table shows that among the patients of group 2 1 case developed ARF, 1 developed DIC, 2 developed HELLP syndrome, 2 developed pulmonary edema, 2 developed placental abruption and in 2 cases maternal death occurred.Besides preeclampsia related complications, 3 patients of control group developed PPH while 7 of the preeclamptic women developed PPH(Chi square – 1.8286, p-value -1.76296) which was not statistically significant.The above table shows that in group 1 only 3 (7.5%) babies had Apgar score <7, rest 37 (92.5%) babies had Apgar score ≥7. While in case of group 2 , 21 (52.5%) babies had Apgar score ≥7, and 19 (47.5%) babies had Score < 7.

On analysing the data statistically, there was a significant difference in distribution of babies in terms of Apgar score (p value < 0.0001). The above table shows that number of babies with Apgar < 7 in Group 1

was only 1(2.5%) while in patients of Group 2 was 10(25 %). Corrected Chi- square showed significant difference in Apgar score at 5 minutes among the babies of two groups.Corrected Chi- square test showed that there was significant difference in development of neonatal complications among thepatients of two groups.Only 6 babies developed neonatal complications in Group 1 while 21 (52.5%) babies of Group 2 developed neonatal complications.

The above table shows that in Group 1, 2 babies developed sepsis, 2 developed RDS and 2 cases of perinatal death (including 1 stillbirth and 1 early neonatal death).While in Group 2, 5 developed sepsis, 14 developed RDS, 1 had IVH and 6 died including 2 cases of stillbirth & 4 cases of early neonatal death.

Corrected Chi – square test showed that there was significant association in NICU stay of babies post-delivery and patients of the two groups.(p=< .0001)

Only 12.5% babies were sent to NICU post-delivery in Group 1 while 60% babies were sent to NICU in case of Group 2.

t-test showed significant association of NICU stay of babies in group 2(p value- <0.0001) The mean duration of NICU stay in Group 2 was 5.520 ± 6.5 with range 0-25 days, median 5 days, while in group 1 mean NICU STAY duration was less than 1 day

IV. Discussion:

Preeclampsia is an idiopathic multisystem disorder that complicates 5-8% of all human pregnancies. It is a clinical diagnosis characterised by heterogeneous clinical and laboratory findings. The clinical findings manifest as maternal syndrome or fetalsyndrome or both with subsequent increase in the perinatal and maternal morbidity and mortality.[6-8]

In a study ofY. Umasatyasri1, I.Vani et al similar result was found.According to them level of LDH correlated with severity of systolic and diastolic BP ($P < 0.001$)[9].VinithaPadmini Mary, et al study There were no significant differences between the different subgroups of severe pre-eclampsia according to the levels of LDH in terms of mode of delivery.[10]In S.P Jaiswer et al study it was found that in cases with LDH levels <600 IU/l, the mean baby weight was 2.426 ± 0.791 kg in the group with LDH levels 600–800 IU/l, the mean baby weight was 1.992 ± 0.618 kg. The mean weight in the third group i.e., with LDH levels >800 IU/l was 1.979 ± 0.787 kg. This observation indicates that there is reduction in the average weight of babies with higher level of LDH ($P = 0.019$)[11].

S.P Jaiswer et al study observed that the mean Apgar scores at 1 min ($P < 0.001$) and 5 min ($P = 0.001$) was found to be significantly low in patients with higher LDH levels [11].

There was statistically significant increase inmaternal complications with increasing LDHlevels ($P < 0.001$) as per the results of Y. Umasatyasri1, I.Vani et al study.[9]In S.P Jaiswer et al study it was found that there was statistically significant increase in maternal complications with increasing LDH levels ($P < 0.001$).[11]

The mean LDH-E(mean ± s.d) in patients of Group 1 was 283.4 ± 98.0993 with range of 213- 612 units, median value 260 units.The mean LDH-E(mean ± s.d) in patients of Group 1 was 561 ± 185.939 with range of 400- 1100 units, median value 480 units.t-test showed significant difference of LDH-E in two group (p< .0001).The mean LDH-L (mean ± s.d) in patients of Group 1 was 310.350 ± 109.905 with range of 214-670 units, median value 260 units. The mean LDH-L (mean ± s.d) in patients of Group 2 was 641.125± 232.209 with range of 420- 1258 units, median value 564 units.Corrected Chi-square showed that there is significant difference of LDH status of patients of two groups. In Group 1, 87.5% patients had LDH status 1 (< 600units) , 5 % had LDH status 2 (600-800 units) and 7.5% patients had status 3 LDH (> 800 units).In Group 2, none had LDH status 1 (< 600units) ,65 % had LDH status 2 (600-800 units) and 35% patients had status 3 LDH (> 800 units) . t- test showed no significant difference in mean Hb of two groups. (p= 0.0605). Difference of mean Urea in two groups was statistically significant (p=0.0008). t-test showed there was significant difference in mean creatinine values of two groups. (p= .0046).Corrected Chi- square test showed that there was significant difference in presence of 24 hour protein >300 mg/dl and patients of the two groups in both early and late pregnancies. Association between 24 hrpr Lin two groups was statistically significant (p<0.0001).

In Group 2 out of 40 patients, 26 patients had LDH status 2 (600-800 units) whose mean SBP -L was 164.3077± 18.43208 , range 140- 200 mm Hg.14 patients had LDH status 3 (>800 units) , whose mean SBP- L was 178.1429 ± 17.426 with range 150-200 mm of Hg.t-test showed significant difference in SBP-L as per the LDH status of the patients.

The mean DBP-L of 26 patients of Group 2 with LDH status 2 was 101.262 ± 7.16 with range 90- 120 mm Hg. The mean DBP-L of other 14 patients with LDH status 3 was 106.857 ± 6.54 with range 96- 120 mm of Hg.t-test showed significant difference in DBP-L according to LDH status of the patients.(p=.0202).The above table shows that in case of patients with LDH levels < 600 IU/l only 3(8.6%) babies had Apgar score(at 1 minute) <7, while in mothers with LDH in range of 600-800 IU/l 11(39%) babies had Apgar score >7. Among

those with LDH >800 IU/l , 8 (47%) babies had Apgar score < 7. Analyzing statistically, it is demonstrated that higher LDH levels were associated with poor Apgar scores(p value- 0.0032)

Among patients with LDH levels < 600 IU/l only 1(2.9%) baby had Apgar score at 5 minutes < 7, while in mothers with LDH in range of 600-800 IU/l, 4(14.3%) babies had Apgar score <7 and in case of those with LDH > 800 IU/l , 6(35.3%) babies had score < 7. Chi- square test showed that there was significant difference in Apgar score of babies according to the LDH values of the mothers of two groups.Among patients with LDH < 600IU/l, 25(71.4%) patients had vaginal deliveries while only 10(28.6%) underwent LUCS. In case of patients with LDH 600- 800 IU/l 11 (39.3%) had vaginal deliveries while 17 (60.8%) underwent LUCS. on the other hand in cases with LDH > 800 IU/l only 3(17.6%) mothers had vaginal deliveries while rest 14(82.4%) mothers underwent LUCS. The above table shows that with rising LDH levels the no of babies with birth weight less than 2.5 kg increases. Statistically there was significant difference (p value - <0.0001) in birth weight of babies when compared according to the LDH levels of mother.The above table shows that among 35 patients with LDH levels < 600IU/l, 5 babies developed neonatal complications out of which 2 babies developed RDS, 2 developed sepsis and 1 was stillborn.

In case of patients with LDH levels in the range of 600- 800 IU/l, 6 babies developed RDS, 2 had sepsis, 1 developed both RDS and sepsis, 1 developed RDS along with IVH ,meconium aspiration syndrome seen in 1and unfortunately one died in early neonatal phase due to RDS.

On the other hand in case of patients with LDH > 800 IU/l, 2 babies developed RDS, sepsis was seen in 1, 1 developed both RDS and sepsis, 2 were stillborn and 4 babies died in early neonatal phase.On analysing statistically with higher levels of LDH there was significant increase in development of perinatal complications (p value - 0.00281).The above table shows development of maternal complications was related to the LDH levels, though it was not statistically significant.In case of mothers with LDH levels < 600 IU/l none developed any sort of complications.While out of 28 patients with LDH levels in the range of 600-800 IU/l, 1 developed eclampsia, 2 developed placental abruption, 1 developed HELLP syndrome, DIC reported in 1 and one developed pulmonary edema.On the other hand among 17 patients with LDH levels above 800 IU/l , 4 developed eclampsia ,1 had both placental abruption and DIC, 1 had HELLP syndrome, 1 developed pulmonary edema, ARF reported in 1 and unfortunately 2 mothers died despite several attempts to save them.On analysing statistically incidence of maternal complications was significantly higher in patients with higher LDH values (P value- 0.011061).

V. Conclusion:

Preeclampsia remains a significant cause of maternal and perinatal mortality and morbidity. High serum LDH levels correlate well with the severity of the disease. Serum levels of lactate dehydrogenase can be used to predict the feto-maternal outcome in preeclampsia. It can be used as a biochemical marker of adverse pregnancy and fetal outcome in preeclampsia.

References

[1]. Report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy. Am J ObstetGynecol 2000; 183:S1-S22.
[2]. Sibai BM: Diagnosis and management of gestational hypertension and preeclampsia. Obstet Gynecol. 2003; 102(1):181-1921
[3]. Tsoi SCM, Zheng J, Xu F, et al. Differential expression of lactate dehydrogenase isozymes (LDH) in human placenta with high expression of LDH-A4 isozyme in the endothelial cells of preeclampsia villi. Placenta. 2001;22(317):22.
[4]. Kay HH, Zhu S, Tsoi S. Hypoxia and lactate production in trophoblast cells. Placenta. 2007;28(8-9):854–60.
[5]. Burd LI, SimmonsMA,Makowski EL, et al. Placental production and foetal utilization of lactate and pyruvate. Nature. 1975;254:710–1.
[6]. Catanzerite VA, Steinberg SM, Mosley CA, et al. Severe preeclampsia with fulminant and extreme elevation of aspartate aminotransferase and lactate dehydrogenase levels. Am J Perinatol., 1995; 12: 310–313.
[7]. Demir SC, Evruke C, Ozgunen FT, et al. Factors that influence morbidity, and mortality in severe preeclampsia, eclampsia and HELLP syndrome. Saudi Med J., 2006; 27: 1015–1018.
[8]. Hall DR, Odendaal HJ, Kirsten GF, et al. Expectant management of early onset, severe preeclampsia perinatal outcome. BJOG, 2000; 107: 1258–1264.
[9]. Y. Umasatyasri, I.Vani, P. Shamita. Role of LDH (Lactate dehydrogenase) in preeclampsia marker: An observational study. IAIM, 2015;2(9) 88-93.
[10]. Vinitha PM et al. Int J ReprodContraceptObstet Gynecol. 2017 Feb;6(2):595-598.
[11]. Jaiswar S.P., Gupta Amrit, SachanRekha, Natu S.N, Shaili Mohan. Lactic Dehydrogenase: A biochemical marker for preeclampsia-eclampsia. JOGI, 2011; 61(6): 645-648.

Table 1: Distribution of PREG BP STATUS in two groups

	GROUP		
PREG BP STATUS	**Group-1**	**Group-2**	**TOTAL**
Normal	40	0	40
Row %	100.0	0.0	100.0
Col %	100.0	0.0	50.0
Preeclampsia	0	35	35
Row %	0.0	100.0	100.0
Col %	0.0	87.5	43.8
Eclampsia	0	5	5
Row %	0.0	100.0	100.0
Col %	0.0	12.5	6.3
TOTAL	40	40	80
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0

Table 2: Distribution of Gravida, Mode of delivery, APGAR score at 1minute, APGAR sore at 5 minutes, NICU Stay and LDH status in two groups

		Group-1	**Group-2**	**Chi-square value**	**p-value**
Gravida	1	21	28	2.6667	0.2636
	Col %	52.5	70.0		
	2	15	10		
	Col %	37.5	25.0		
	3	4	2		
	Col %	10.0	5.0		
	LUCS	14	27	9.8997	0.0071
	Col %	35.0	67.5		
	NVD	25	11		
	Col %	62.5	27.5		
	Still birth	1	2		
	Col %	2.5	5.0		
APGAR score at 1minute	≥ 7	37	21	16.0502	16.0502
	Col %	92.5	52.5		
	< 7	3	19		
	Col %	7.5	47.5		
APGAR sore at 5 minutes	<7	1	10	8.5375	0.0034
	Col %	2.5	25.0		
	≥7	39	30		
	Col %	97.5	75.0		
NICU Stay	NO	35	16	19.283	<0.0001
	Col %	87.5	40.0		
	YES	5	24		
	Col %	12.5	60.0		
LDH status	1 (< 600 IU/l)	35	0	62.6891	<0.00001
	Col %	87.5	0.0		
	2(600-800 IU/l)	2	26		
	Col %	5.0	65.0		
	3(>800 IU/l)	3	14		
	Col %	7.5	35.0		

Table 3: Distribution of clinical and biochemical parameters in two groups

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Age	Group-1	40	25.4000	3.8150	20.0000	35.0000	25.0000	0.2019
	Group-2	40	24.3250	3.6542	19.0000	34.0000	24.0000	
MAT WT (KG)	Group-1	40	59.9500	5.6702	50.0000	75.0000	58.0000	0.0934
	Group-2	40	62.1500	5.9120	54.0000	90.0000	62.0000	
POGE	Group-1	40	33.2	1.459013	31.6000	38.0000	33.0	0.1736
	Group-2	40	33.6	1.321613	32.0000	38.0000	33.2	
POG-L	Group-1	40	38.3925	1.5321	33.0000	40.2000	38.3000	<0.00001
	Group-2	40	35.5425	1.7596	33.0000	39.0000	35.0000	
SBP-E	Group-1	40	111.5000	11.8948	100.0000	156.0000	110.0000	<0.00001
	Group-2	40	150.4500	12.4488	140.0000	194.0000	148.0000	
SBP-L	Group-1	40	118.2500	9.4156	100.0000	136.0000	120.0000	<0.00001
	Group-2	40	169.1500	19.0701	140.0000	200.0000	160.0000	
DBP-E	Group-1	40	73.8500	5.7000	60.0000	88.0000	70.0000	<0.00001

	Group-2	40	93.8000	5.6351	84.0000	110.0000	92.0000	
DBP-L	Group-1	40	76.6000	8.6315	56.0000	88.0000	80.0000	<0.00001
	Group-2	40	102.9750	7.3152	90.0000	120.0000	100.0000	
BIRTHWT	Group-1	40	2.6550	.2689	2.1000	3.3000	2.7000	<0.00001
	Group-2	40	2.1103	.3540	1.4000	2.6000	2.1750	
NICU STAY	Group-1	40	.5500	1.6633	0.0000	7.0000	0.0000	<0.00001
	Group-2	40	5.5250	6.5554	0.0000	25.0000	5.0000	
LDH-E	Group-1	40	283.4000	98.0993	213.0000	612.0000	260.0000	<0.00001
	Group-2	40	561.0000	185.9393	400.0000	1100.0000	480.0000	
LDH-L	Group-1	40	310.3500	109.9059	214.0000	670.0000	280.0000	<0.00001
	Group-2	40	641.1250	232.2097	420.0000	1258.0000	564.0000	
Hb	Group-1	40	10.9900	1.0914	9.0000	13.0000	11.0000	0.0605
	Group-2	40	10.6125	.6161	9.6000	12.0000	10.5000	
Urea	Group-1	40	32.9250	2.9386	26.0000	38.0000	33.0000	0.0008
	Group-2	40	36.4500	5.6612	30.0000	55.0000	34.5000	
Cr	Group-1	40	.9300	.0939	0.7000	1.1000	0.9500	0.0046
	Group-2	40	1.0600	.2658	0.8000	1.9000	1.0000	

Table 4– Maternal complication and Neonatal complication in two groups

	Type of complication	**GROUP 1**	**GROUP 2**	**TOTAL**
Maternal complication	**ECLAMPSIA**	nil	05	05
	PLACENTAL ABRUPTION	nil	02	02
	DIC	nil	02	02
	ARF	nil	01	01
	HELLP SYNDROME	nil	02	02
	PULMONARY EDEMA	nil	02	02
	MATERNAL DEATH	nil	02	02
Neonatal complication	**SEPSIS**	02	05	07
	RDS	02	14	16
	IVH	nil	01	01
	MECONIUM ASPIRATION SYNDROME	nil	01	01
	PERINATAL DEATH	02	06	08

TABLE 5–DISTRIBUTION OF APGAR SCORE AT 1 MINUTE, APGAR SCORE AT 5 MINUTE, MODE OF DELIVERY, BIRTH WEIGHT, DEVELOPMENT OF NEONATAL COMPLICATIONS AND TYPE OF MATERNAL COMPLICATION ACCORDING TO LDH STATUS

		LDH STATUS 1 n=35	**LDH STATUS 2 n=28**	**LDH STATUS 3 N=17**	**P value**
APGAR SCORE AT 1 MINUTE	**≥ 7**	32(91.4%)	17(60.7%)	09(52.9%)	**0.0032**
	< 7	03(8.6%)	11(39.3%)	08(47.1%)	
APGAR SCORE AT 5 MINUTES	<7	1(2.9%)	4(14.3%)	6(35.3%)	0.006214
	≥7	34(97.1%)	24(85.7%)	11(64.7%)	
MODE OF DELIVERY	VAGINAL DELIVERY	25(71.4%)	11(39.3%)	3(17.6%)	0.000614
	LUCS	10(28.6%)	17(60.8%)	14(82.4%)	
BIRTH WEIGHT	<2.5KG	02(5.7%)	07(25%)	12(70.6%)	<0.0001
	≥2.5KG	33(94.3%)	21(75%)	05(29.4%)	
DEVELOPMENT OF NEONATAL COMPLICATIONS	YES	5	12	10	0.00281
	NO	30	16	7	
TYPE OF MATERNAL COMPLICATION	Eclampsia	0	1	4	0.011061
	Placental abruption	0	2	1	
	DIC	0	1	1	
	HELLP syndrome	0	1	1	
	Pulmonary edema	0	1	1	
	ARF	0	0	1	
	Maternal death	0	0	2	

DR. NAMRATA PARIDA 1" Lactate Dehydrogenase as a Biochemical Marker of Adverse Pregnancy and Fetal Outcome in Preeclampsia: A Comparative Study."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 8, 2018, pp 84-90.