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Lactate Dedrogenase as a Biochemical Marker in Cases of Pre-Eclampsia and Eclampsia and Its Relationship with Maternal Factors in Predicting the Outcome

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Abstract:
Background: Preeclampsia complicates 2-8% of pregnancies. FOGSI and other studies show the incidence of pre-eclampsia in India ranges between 11-13%. It accounts for approximately a quarter of all antenatal admissions. It is one of the top five causes of maternal mortality.
MATERIALS AND METHODS: The cases were studied in the following groups.
Group A (Mild pre-eclampsia)
Group B (Severe pre-eclampsia)
Group C (Eclampsia)
Group D (Normal control group)
All groups Consist of 25 pregnant women in each.
The Subjects were also divided according to the serum LDH levels
Results:*The study shows that the mean gestational age decreased with increased LDH levels. Also, serum LDH levels have significant relationship with age, gravidity blood pressure and maternal outcome.*
Key words:*preeclampsia, eclampsia, serum LDH, maternal outcome*

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I. Introduction

Hypertensive disorders of pregnancy and their complications rank as one of the major causes of maternal mortality and morbidity in the world. 5-10% of women have hypertensive disorders during pregnancy. In addition, as it is strongly associated with fetal growth retardation and prematurity, it also contributes largely to perinatal mortality and morbidity.

Preeclampsia, concern with high blood pressure (BP ≥140/90 mmHg) and increased mother's urinary protein (urinary albumin protein ≥ 300 mg/24 h) is a dangerous complication of pregnancy, condition that typically begins after 20th week of pregnancy.[1,2.]

It is suggested that pregnancy is a screening test for later hypertension and diabetes.Delivery is the only cure for pre-eclampsia.Eclampsia is the occurrence of convulsions in association with the signs and symptoms of pre-eclampsia. It is traditionally considered a more severe form of pre-eclampsia and complicates nearly one in 2000 pregnancies.

Lactate Dehydrogenase (LDH) is mainly an intracellular enzyme. It is responsible for inter-conversion 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 the scenario of increased cell leakiness, hemolysis and cell death. Preeclampsia and eclampsia are multisystem disorders and lead to a lot of endothelial vascular damage and cellular death. [3,4,5,6.]

So, serum LDH levels can be used to assess the extent of cellular death and thereby the severity of disease.Hence serum LDH Levels can be further used as help in making decision, regarding the management strategies to improve maternal and fetal outcome. It has been studied in recent times that pre-eclamptic patients with higher levels of LDH are susceptible to have poor maternal and fetaloutcome.[6,7,8,9,10,11,12]

This study aims to compare serum LDH levels in normal pregnant women and women with preeclampsia and eclampsia and also to correlate the maternal factors and severity of the disease with serum LDH levels to improve the outcome.

II. Material And Methods

The study has been conducted with the main objective of estimating the level of serum lactic dehydrogenase in patients of preeclampsia and eclampsia and normal patients taken as controls.

The study was conducted on 100 patients.25 patients with mild preeclampsia, 25 patients with severe preeclampsia, 25 patients with eclampsia and 25 healthy pregnant women were selected from outpatient department and labour room emergency. All women were in their 3rd trimester of pregnancy.

The cases were studied in the following groups.

Group A (Mild pre-eclampsia)
Group B (Severe pre-eclampsia)
Group C (Eclampsia)
Group D (Normal control group)

All groups Consist of 25 pregnant women in each.

The Subjects were also divided according to the serum LDH levels into following groups

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

NORMAL SERUM LDH VALUES

Non pregnant women	115 to 211 IU/L
First Trimester	78 to 433 IU/L
Second Trimester	80 to 447 IU/L
Third Trimester	82 to 524 IU/L

Serum LDH value above the reference range is taken as raised.

Exclusion criteria

1.Medical disorders of liver disorders, diabetes, renal disease, chronic hypertension, cardiovascular illness, epilepsy, thyroid disorders, haemolytic diseases, Urinary tract infections.

2.Obstetric complications e.g. Twin pregnancy.

After selecting the patients for the study following schedule was adopted in each case.

III. Result

TABLE 1. Distribution of cases according to age group

Group	**18-21 yrs.**		**22-25 yrs.**		**26-29 yrs.**		**30-33 yrs.**	
	cases	%age	cases	%age	cases	%age	cases	%age
A	6	24	6	24	7	28	6	24
B	9	36	6	24	5	20	5	20
C	10	40	6	24	3	12	6	24
D	5	20	7	28	7	28	6	24

TABLE 2 distribution of cases according to gravidity

GROUP	**G1**	**G2**	**G3**	**>G3**
A	7(28%)	6(24%)	6(24%)	6(24%)
B	10(40%)	4(16%)	5(20%)	6(24%)
C	12(48%)	4(16%)	4(16%)	5(20%)
Dl	6(24%)	7(28%)	6(24%)	6(24%)

TABLE 3distribution according to mean gestational age at the time of delivery

	29-32wks	**33-36wks**	**37-40wks**
A	1(8%)	3(12%)	21(84%)
B	7(28%)	10(40%)	8(32%)
C	7(28%)	11(44%)	6(24%)
D	0	0	25(100%)

TABLE 5 distribution according to mean LDH levels

GROUP	**Mean SS.LDH levels in various groups (IU/L)**	**Standard deviation (SD)**
A	600.3	±151.69
B	1074.0	±303.79
C	1154.2	±430.96
D	292.2	±54.18

TABLE 7. showing relation between blood pressure and serum LDH

Group	Mean systolic BP (mmHg) with SD	Mean diastolic BP (mmHg)with SD	Serum LDH (IU) with SD
A	147.9 (±4.67)	98.8 (±4.36)	600.3 (±151.69)
B	177.4 (±9.62)	118.2 (±5.17)	1074.0 (±303.79)
C	177.8 (±26.79)	110.6 (±13.99)	1154.2 (±430.96)
D	112.7 (±9.78)	75.0 (±7.77)	292.2(±54.18)

IV. Discussion

Preeclampsia is an idiopathic multisystem disorder, that is specific to human pregnancy and the prevention of it major impact on decreasing maternal and perinatal morbidity and mortality. This study shows its relationship with age, gravidity, gestational age , blood pressure and serum LDH levels.

The cases comprised of 25 patients with mild PE (Group A), 25 patients with severe PE (Group B) and 25 patients with eclampsia (Group C) The control group comprised of 25 healthy pregnant women (Group D).

Women were in the age group of 18 to 33 years. It was found that 36% women with severe PE and 40% women with eclampsia were significantly younger (18-21 years).The mean age of Group A, B, C were 25.6 yrs, 24.96yr and 24.04 yrs respectively. The mean age of Group D, i.e., control group was 26.08 yrs. Preeclampsia is more common among both the extremes of reproductive age group and eclampsia is more common in younger women.

Majority of patients with severe PE (40%) and eclampsia (48%) were primi-gravida. The role of disturbed immunity in women who develop severe preeclampsia and eclampsia is considered. There may be loss of tolerance to paternally derived placental and foetal antigen. Therefore first pregnancy is at maximum brunt of the disease. Women with mild PE and in control group were uniformly distributed based on gravidity .

Gestational age at delivery was significantly less in women with severe PE and eclampsia when compared with mild PE and control group. In Group Band C, 28% each delivered at <33 wks and 40% and 44% delivered at < 37wks, i.e., before term.

Majority of patients with severe preeclampsia and eclampsia had LDH levels >800IU/L. On analyzing the above data it is clearly observed that there is significant rise in the LDH levels with increasing severity

Out of 40 cases with LDH >800IU/L, 2 were from mild PE. 20 were from severe of the disease ($P < 0.001$) The mean systolic BP was highest in patients of eclampsia with standard deviation of 177.8±26.79mmHg closely followed by patients of severe PE, i.e., 177.4±9.62 mmHg. In Group A, mean BP was 147.9±4.67mmHg. In control group mean BP was 112.7 ±9.78 mmHg. The mean diastolic BP was 98.8±4.36 mmHg, 118.2 ±5.17 mmHg, 110.6 ±13.99 mmHg and 75.0±7.77 mmHg in Group A, B, C, D respectively. Diastolic BP was highest in severe PE group. The values correlate well with the deviations of S.LDH levels of the groups. The greater the systolic and diastolic BP the more the damage leading to higher S.LDH levels. Hence,the study shows that the mean gestational age decreased with increased LDH levels, which could be due to induction of labour at an earlier gestational age [9,10,13.]It was well established that rise in S.LDH levels mark the severity of disease.

The mean systolic and diastolic blood pressures of all women in the case Group A, B, C were divided further in 3 groups based on S.LDH levels. The mean diastolic BP was 100.8, 105, 114.5 mmHg and systolic BP was 149.2, 160.5 and 178.3mmHg respectively in LDH groups of <600, 600-800 and >800 IU/L. All controls i. group D had LDH below 600..Mean BP increased with rising S.LDH levels.The present study highlights the long-term significance of LDH in predicting development of HDP in antenatal women (at risk) [14,15].

V. Conclusion

Elevated levels of LDH in HDP are indicative of cellular damage and dysfunction; thus LDH can be used as a biochemical marker, reflecting the severity of the disease. Detection of high-risk pregnancies with increased levels of LDH, besides careful monitoring in antenatal period and proper management would be the key to decrease both maternal and foetal morbidity and mortality

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