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LDH A Prognostic Marker for Preeclampsia: An Observational Study

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Abstract

Objective: Elevated LDH levels can be used to help in decision-making and management to improve the maternal and fetal outcome, as elevated LDH levels are indicative cellular damage and dysfunction. Elevated LDH levels indirectly reflect severity of preeclampsia. *Materials and Methods:* This retrospective observational study was conducted in a tertiary referral hospital of Northern India (Banaras Hindu University), which has a wide catchment area. We wanted to find out the role of LDH levels in explaining prognosis to the mother and also in prediction of adverse outcome of feto-maternal outcomes. *Results:* Total 46 women. 31(67.39%) were nonsevere gestational hypertension (NSGH) and 15 (32.60%) were severe gestational hypertension (SGH). There were 3 women out of the SGH category who had eclampsia. LDH levels were >800 in all three eclamptic women. LDH was 600-800 in 83.33% of severe gestational hypertension group (SGH). In nonsevere gestational hypertension (NSGH) LDH level was <600 in 64.51%. In the group with LDH levels of 600-800 one case of Abruptio placentae was diagnosed. The group with LDH>800, they all had eclampsia, there was thrombocytopaenia/ HELLP in all 3 cases and oliguria found in 2 pregnant women. Fetal growth restriction was found in 2 cases. *Conclusion:* The study concludes that LDH levels have significant association with increasing maternal and fetal morbidities in patients with severe gestational hypertension.

Keywords: Lactic Dehydrogenase; Severe Preeclampsia; Eclampsia; Severe Gestational Hypertension, Nonsevere Gestational Hypertension.

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Introduction

Preeclampsia and Eclampsia is a multi organ disorder that complicates 6-8% of all pregnancies and lead to various maternal and fetal complications including maternal death. Preeclampsia and Eclampsia still contribute to a major proportion of maternal death in the developing world.

Preeclampsia and Eclampsiais mainly a clinical diagnosis based on clinical features laboratory parameters and ultrasound scan. Fetal wellbeing is assessed by ultrasound Doppler study for causes related to reduced blood flow [1].

Exact aetiology of Preeclampsia and Eclampsia is not yet known, but there are various theories postulated and the research is still ongoing. Endothelial dysfunction and defective placentation is supposed to be prime aetiopathological factors. Other factors are prostaglandin imbalance, increased oxidative stress, hypoxia, immunological factors, and racial, genetic and dietary factors [2].

LDH is am intracellular cytoplasmic enzyme which is found in many organs and cells eg kidney, heart, muscles, RBCs and WBCs. It converts pyruvic acid to lactic acid during the process of glycolysis. Glycolysis is the major mechanism of energy production

for the placenta; in cases of preeclampsia there is reduced blood supply, which further enhances glycolysis and LDH production. There are studies that have shown that LDH activity and gene expression are higher in placentas of preeclampsia than in normal pregnancy [3].

Elevated LDH levels can be used to help indecision-making and management to improve the maternal and fetaloutcome, as elevated LDH levels are indicative cellular damage and dysfunction. Elevated LDH levels indirectly reflect severity of preeclampsia [4,5].

Materials and Methods

This retrospective observational study was conducted in a tertiary referral hospital of Northern India, Banaras Hindu University; which has a wide catchment area. We wanted to find out the role of LDH levels in explaining prognosis to the mother and also in prediction of adverse outcome of feto-maternal outcomes.

We collected socio-demographic data of 46 pregnant mothers during the July 2012-December 2013. Those cases, which were admitted in the labour ward with preeclampsia and eclampsia, were included. Haematological and biochemical investigations were done along with ultrasound and Doppler for fetal wellbeing.

Exclusion Criteria, were those Diseases which could have Interfered with the Exact Diagnosis

1. known case of essential hypertension
2. known case of renal disease
3. known epileptic
4. Liver disease, thyroid disease and diabetes mellitus

Patients were categorized as 'Nonsevere preeclampsia' and 'Severe preeclampsia'. This is because the Task force (2013) discourages use of mild preeclampsia. This is due to the fact that there are definite criteria for 'Severe preeclampsia' but the default classification is implied for mild, and also there are no generally agreed upon criteria for moderate preeclampsia. We have used this classification for the first time [6,7].

Results

Total 46 women. 31(67.39%) were nonsevere gestational hypertension (NSGH) and 15(32.60%) were severe gestational hypertension (SGH). There were 3 women out of the SGH category who had eclampsia. The age range of the study group was 18-27 years.The number of primipara women in NSGH group was 83.87%(26/31) and in SGH group was 80%(12/15), which is almost similar in both groups (Table 1).

Table 1: Percentage of patients and parity

	NSGH	SGH	Eclampsia
Number of patients	31 (67.39%)	12 (26.08%)	3 (6.52%)
Number of Primipara	26	9	3

Table 2: Association of GH and LDH levels

	LDH <600	LDH = 600-800	LDH >800
NSGH (N=31)	20 (64.51%)	11 (35.48%)	0
SGH (N=12)	2 (16.60%)	10 (83.33%)	0
Eclampsia (3)	0	0	3 (100%)

Table 3: Maternal complications N=46

Abnormality	Nonsevere (N= 31)	Severe (N=15)
Headache	Absent	5
Visual disturbances	Absent	2
Upper abdominal pain	Absent	1
Oliguria	Absent	2
Convulsions	Absent	3
Serum Creatinine >1.1mg/dL	Normal	4
Thrombocytopaenia (<100,000/μL)	0	3
Serum transaminase elevation	1 (Minimal elevation)	6 (Marked elevation)
Fetal-growth restriction	Absent	2
Pulmonary edema	Absent	1

LDH levels were >800 in all three eclamptic women. LDH was 600-800 in 83.33% of severe gestational hypertension group (SGH). In nonsevere gestational hypertension (NSGH) LDH level was <600

in 64.51% (Table 2).

In severe gestational hypertension group (SGH) there were 2 pregnant women with visual disturbance, 2 with oliguria, 3 with convulsions (eclampsia), 4 with elevated creatinine, 3 with thrombocytopaenia, 6 with marked elevation if serum transaminases, 2 had fetal growth restriction and pulmonary edema in 1 case (Table 3).

The relation of LDH and perinatal complications showed that higher the LDH levels, more the complications. In cases in which LDH<600 had neonates with good outcome in 86.36% cases (19/22) and only minor neonatal problems were there in 13.63% cases (3/22). These minor neonatal problems recovered without causing significant problem. Group with LDH level between 600-800 there were 9.52% cases (2/21) of stillbirths and 4.76%(1/21) of perinatal death. The group who had eclamptic fits, had LDH levels >800. In this group there were 2 cases of stillbirths (2/3) and 33.33%(1/3) case of perinatal death.

In the group with LDH levels of 600-800 one case of Abruptio placentae was diagnosed. The group with LDH>800, they all had eclampsia, there was thrombocytopaenia/HELLP in all 3 cases and oliguria found in 2/3 pregnant women. Fetal growth restriction was found in 2 cases (2/3).

Discussion

Patients with hypertension were of younger age group, primipara and with elevated LDH, this finding was also observed by Qublan et al. Blood pressure levels were higher in patient who have higher levels of LDH.The LDH levels were >800 in all three cases of eclampsia and LDH level was > 600-800 in 10 out of 12 patients with severe gestational hypertension (SGH).

Higher levels of LDH are associated with increasing maternal morbidity; similar findings were observed in study conducted by Jaiswar et al [9].

Table 4: Perinatal complications

Outcome	LDH<600 (N=22)	LDH 600-800 (N=21)	LDH>800 (N=3)
Alive & well	19 (86.36%)	11 (52.38%)	0
Neonatal complications	3 (13.63%)	7 (33.33%)	0
Neonatal deaths	0	0	0
Still births	0	2 (9.52%)	2 (66.66%)
Perinatal deaths	0	1 (4.76%)	1 (33.33%)

Table 5: Maternal complications N=46

Abnormality	LDH 600-800 (N=21)	Severe >800 (N=3)
Headache	3	5
Visual disturbances	2	2
Upper abdominal pain	2	1
Oliguria	4	2
Convulsions	0	3
Serum Creatinine >1.1mg/dL	2	4
Thrombocytopaenia (<100,000/μL)	0	3
Serum transaminase elevation	1 (Minimal elevation)	6 (Marked elevation)
Fetal-growth restriction	1	2
Pulmonary edema	0	1

Table 6: Indicators of severity of gestational hypertensive disorder

Abnormality	Nonsevere	Severe
Diastolic BP	<100 mm Hg	≥ 110 mm Hg
Systolic BP	<160 mm Hg	≥ 160 mm Hg
Proteinuria	None to positive	None to positive
Headache	Absent	Present
Visual disturbances	Absent	Present
Upper abdominal pain	Absent	Present
Oliguria	Absent	Present
Convulsions	Absent	Present
Serum Creatinine >1.1mg/dL	Normal	Elevated
Thrombocytopaenia (<100,000/μL)	Absent	Present
Serum transaminase elevation	Minimal	Marked
Fetal-growth restriction	Absent	Obvious
Pulmonary edema	Absent	Present

LDH levels were estimated in all cases and were divided in to three groups Group 1— LDH <600, Group 2—LDH 600-800, Group 3—LDH >800.

Incidence of neonatal death, stillbirths and perinatal deaths were higher in patients with LDH levels> 600-800 and above. There were increased incidence of neonatal complicationin group with LDH level of 600-800 [10].

Study shows an association between increasing LDH levels and maternal complications. It is evident that higher LDH levels are associated with more maternal complications [11].

The study concludes that LDH levels have significant association with increasing maternal and fetal morbidities in patients with severe gestational hypertension.

Conflict of Interest

No

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