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Research Article

Correlation of serum lactate dehydrogenase and pregnancy induced hypertension with its adverse outcomes

Liggy Andrews*, Nikunj Patel

GMERS medical college, Dharpur, Patan, Gujarat, India

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***Correspondence:**
Dr. Liggy Andrews,
E-mail: liggyand@gmail.com

ABSTRACT

Background: Pregnancy induced hypertension (PIH) is a global problem with a 5-15% incidence rate in India and complicating 10-17% of all pregnancies. The complications of PIH are responsible for significant maternal and perinatal morbidity and are the third leading cause of pregnancy related death. Lactate dehydrogenase (LDH) serves as indicators suggestive of disturbance of cellular integrity induced by pathological conditions and is used to detect cell damage or cell death. The main objective was to assess significance of the value of serum LDH as a marker of PIH and its severity.
Methods: Serum LDH was analyzed by modified UV Kinetic IFCC method. This study was conducted from February 2014 to June 2015 and all the patients admitted in the department of obstetrics and gynecology and biochemistry, at the GMERS medical college, Dharpur, Patan, Gujarat, India.
Results: Total 110 cases were studied during the study period, 40 were normal pregnant women and remaining 70 were PIH cases. Out of the 70 PIH cases, 15 (21.5%) were mild preecclampsia, 35 (50.0%) were severe preeclampsia and 20 (28.5%) were eclampsia. Maternal mortality occurred in 06 cases (8.5%). Perinatal mortality was seen in 28 (40.0%), Out of these, 20 (71.4%) were stillbirth and 08 (28.6%) were neonatal deaths. There is significant rise in the LDH levels with the increasing severity of the disease (172.37±28.09) normotensive, (356.33±24.47) mild preeclampsia, (609.91±136.92) severe preeclampsia and (854.05±247.45), eclampsia (P<0.0001). Perinatal deaths occurred in 28 cases, out of these 06 (21.5%) had LDH levels <600 IU/l, 8 (28.5%) had LDH levels between 600-800 IU/l and 14 (50%) had LDH levels >800 IU/l.
Conclusions: Serum LDH showed significant association with severity of disease and maternal and fetal complications in patients with preclampsia-eclamapsia.

Keywords: LDH, Preeclampsia, Perinatal outcomes

INTRODUCTION

Pre-eclampsia is a multisystem disorder, unique to pregnant women after twenty weeks of gestation. It is progressive disease with a variable mode of presentation and rate of progression.[1] Pre-eclampsia is one of the leading causes of maternal and fetal morbidity and mortality.[2] In India incidence of preeclampsia as recorded from hospital statistics vary widely from 5-15%.[3] Despite research for many decades, the etiology of this disorder is unknown. Recent evidence suggests that there may be several underlying causes or predispositions leading to endothelial dysfunction and causing the signs of hypertension, proteinuria and edema findings that allow making the diagnosis of the syndrome of pre-eclampsia.[4,5] Preeclampsia is a multisystem disorders and lead to a lot of cellular death. LDH is an intracellular enzyme and its level is increased in these women due to cellular death. So, serum LDH levels can be used to assess the extent of cellular death and thereby the severity of disease.[6] The ability to predict preeclampsia is currently of limited benefit because neither the

development of the disorder nor its progression from the mild to the severe spectrum of disease can be prevented in most patients, and only cure is delivery. Nevertheless, the accurate identification of women at risk, early diagnosis, and prompt and appropriate management may help to improve maternal outcome, and possibly perinatal outcome, as well. Currently, there are no clinically available tests that perform well in distinguishing women who will develop preeclampsia from those who will not.[7] The aim of the present study was to compare serum LDH levels in normal pregnant women and in women with preeclampsia and eclampsia and also to study the correlation of maternal and perinatal outcomes with serum LDH levels.

METHODS

This study was conducted from February 2014 to June 2015 and all the patients admitted in the obstetrics and gynecology department were examined and tests were analyzed in the department of biochemistry, at the GMERS medical college, Dharpur, Patan, Gujarat, India.

Exclusion criteria

Patients with history of preexisting diabetes, hypertension, renal disease, cardiovascular illness, liver disorder, thyroid disorder, epilepsy and symptomatic infectious diseases were excluded.

Sample size and sampling includes all pregnant women admitted during the study period were examined. Blood pressure was measured by mercury sphygmomanometer in reclining position in right brachial artery. Three readings were taken at 10 minutes interval. Total 110 were studied during the study period. Out of these 40 were normal pregnant women who served as control group and 70 women having average systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg were included in the present study. All were singleton pregnancy.

Pre-eclampsia is defined as hypertension presenting after 20 weeks with significant proteinuria. Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment. Eclampsia is a convulsive condition associated with pre-eclampsia.[8]

Data collection

After enrolment participants were grouped into mild preeclampsia, severe preeclampsia and eclampsia. Informed consent was taken from all the participants. The history of all participants was taken. Blood samples of participants were collected in plain tubes and serum LDH was measured by modified UV Kinetic (IFCC) method using a semiautoanalyzer.[9] Participants were observed throughout the pregnancy for maternal and perinatal outcomes.

Statistical analysis

The data were validated and analyzed with the help of free statistical software. Authors used unpaired t test for comparing the mean LDH level with the maternal and perinatal outcomes. p value<0.05 was considered statistically significant.

RESULTS

Total 110 cases were studied during the study period, 40 were normal pregnant women and remaining 70 were PIH cases. Out of the 70 PIH cases, 15 (21.5%) were mild preecclampsia, 35 (50.0%) were severe preeclampsia and 20 (28.5%) were eclampsia. Maternal mortality occurred in 06 cases (8.5%). Perinatal mortality was seen in 28 (40.0%) women with PIH. Out of these, 20 (71.4%) were stillbirth and 08 (28.6%) were neonatal deaths.

There is significant rise in the LDH levels with the increasing severity of the disease (172.37±28.09) normotensive, (356.33±24.47) mild preeclampsia, (609.91±136.92) severe preeclampsia and (854.05±247.45) eclampsia (P<0.0001) (Table 1). In control group and in mild preeclampsia all the women had a serum LDH level <600IU/l, whereas in severe preeclampsia out of the 35 cases, 18cases (51.4%) had LDH levels <600 IU/l, 12 (34.2%) had levels between 600-800 IU/l and 05 (14.2%) cases had >800IU/l and in eclamptic women 05 (25%) had levels <600, 09 (45%) had levels between 600- 800 IU/l and 06 (30%) had LDH levels >800 IU/L.

Table 1: Comparison of normal and different PIH cases with serum LDH.

Cases	Serum LDH (Mean± SD) IU/l
Normotensive (40)	172.37±28.09
Mild preeclampsia (15)	356.33±24.47*
Severe preclampsia (35)	609.91±136.92*
Eclampsia (20)	854.052±47.45*

*P value <0.05 statistically significant

The mean gestational age at the time of delivery was 37.21±2.73 weeks in women with LDH levels <600IU/l while it was less 36.61±1.82 weeks when LDH levels were between 600 and 800 IU/L and 36.13±1.12 weeks in women with LDH levels >800 IU/l. The mean birth-weight was 2.76±0.24 Kg in women with LDH levels <600 IU/l, it was 2.52±0.56 Kg in women with LDH levels between 600-800IU/l and women with >800 IU/l it was 2.27±0.25Kg (Table 2). Maternal mortality occurred in 06 cases out of which 02 (33.3%) had LDH levels between 600-800 IU/l and 04 (66.7%) had >800 IU/l. Post-partum hemorrhage was found in 02 case and abruption placenta in 02 cases who had LDH levels >800 IU/l, HELLP syndrome was seen in 03 cases who had LDH levels between 600-800 IU/l while <600 IU/l was

seen in 02 PIH cases with ARF and one case with abruptio placenta.

Perinatal deaths occurred in 28 cases out of these, 06 (21.5%) had LDH levels <600 IU/l, 8 (28.5%) had LDH levels between 600-800 IU/l and 14 (50%) had LDH levels >800 IU/l (Table 2).

Table 2: Comparison of perinatal outcome with LDH levels.

Parameters	<600 IU/l	600-800 IU/l	>800 IU/l
Mean gestational age (weeks)	37.21±2.73	36.61±1.82	36.13±1.12
Mean baby weight (Kg)	2.76±0.24	2.52±0.56	2.27±0.25
Alive (52)	41 (78.8%)	06 (11.5%)	05 (9.6%)
Neonatal deaths (08)	02 (25%)	04 (50%)	02 (25%)
Still births (20)	04 (20%)	04 (20%)	12 (60%)
Perinatal deaths (28)	06 (21.5%)	08 (28.5)	14 (50%)

DISCUSSION

Pregnancy induced hypertension (PIH) is still considered to be a major health care related problem in pregnant women despite advancements in the field of medical sciences.[1,2] The obstetricians have to be very careful to diagnose and properly manage the PIH patients to prevent further progression of the disorder and its complications. Preeclampsia is a multisystem disorders and lead to a lot of cellular death.[6] In the present study, LDH has been evaluated as a biochemical marker for preeclampsia and eclampsia. As LDH is an intracellular enzyme and its level is increased in these women due to cellular death.

In our study serum LDH was statistically significant in PIH cases than control group (P<0.0001). Increase in serum LDH level in preeclampsia was observed by Malvino et al, Qublan et al (p<0.001), Jaiswar et al (p< 0.0001) and Samarah et al.[6,10-12]

Sarkar et al concluded in their study, the main cause of preeclampsia is due to elevated levels of serum LDH and serum GGT which indicates the tissue damage is related to endothelial vascular damage.[13] In the present study the LDH levels were significantly raised with the severity of the disease (P<0.0001) Jaiswar SP et al observed there was a significant increase in maternal morbidity with increasing serum LDH levels (P<0.001). Maternal mortality was 13.8% in patients with LDH levels >800 IU/l and this was a significant rise (P = 0.006), they concluded LDH levels have significant association with various maternal and fetal outcomes in patients of preeclampsia and eclampsia.[11]

Qublan et al and Demir et al observed that perinatal and maternal complications increased significantly with LDH >800 IU/I compared to women who had lower serum LDH levels.[6,14] Present study in comparison to other studies observed increase in the incidence of perinatal deaths and complications with increasing levels of serum LDH levels.

Umasatyasri et al observed increase in maternal morbidity with increasing serum LDH levels.[15] They observed higher serum LDH levels were associated with increased incidence of maternal complications like abruption placenta, renal failure HELLP syndrome, cerebrovascular accidents etc. as is the case in the present study.

Some studies showed association of low birth weight of infants with increase in serum LDH levels.[11,16] This was in contrary to Qublan HS et al who did not find any significant association.[6] Jaiswar et al noted with LDH levels <600 IU/l, the mean baby weight was 2.426±0.791 kg, LDH levels 600–800 IU/l, the mean baby weight was 1.992±0.618 kg while with LDH levels >800 IU/l it was 1.979±0.787 kg (P=0.019).[11] This observation was similar to present study indicating that there is reduction in the average weight of babies with higher level of LDH.

In Umasatyasri Y et al study the mean gestational age during delivery was 37.60±2.76 weeks in LDH levels <+600 IU/l, 36.71±2.96 weeks when LDH levels between 600-800IU/l and 36.27±2.69wks in LDH >800 IU/l.[15]

Bera S et al showed LDH is a good parameter to predict severity of PIH and bad fetal outcome.[17]

CONCLUSION

Serum LDH levels was observed to be significantly high in preeclampsia and eclampsia cases in comparison to normal pregnant women. Therefore, a proper monitoring of serum LDH levels in a risk pregnant woman may help in early diagnosis and early intervention of the disorder and may also help in preventing maternal and fetal complications.

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