IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB)
ISSN: 2455-264X, Volume 3, Issue 6 (Nov.- Dec. 2017), PP 36-38
www.iosrjournals.org

Role of Serum Lactate Dehydrogenase in Preeclampsia in Assessing The Maternal And Fetal Outcome

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Abstract: *Objective: Preeclampsia is responsible for significant maternal and perinatal mortality worldwide. Lactate dehydrogenase is mainly an intracellular enzyme. The levels of LDH in serum are increased in clinical situations associated with cell damage, leak, hemolysis and cell death. Preeclampsia is such a situation associated with these features. The present study was done to know the levels of serum LDH in preeclampsia patients and if there is an association between these LDH levels and the fetal outcome. Methods : A case control study was done with 100 pregnant women diagnosed with preeclampsia and 50 pregnant women without any complications as controls. Results :Serum LDH levels were found to be higher in preeclampsia patients compared to controls. The fetal outcome was poor in the group having high LDH levels. Interpretations and conclusion : Serum levels of lactate dehydrogenase as a biochemical marker is easily available test which can be offered to all patients with Hypertension. Serum LDH Levels can be used as a biochemical predicator for the prognosis of preeclampsia.*

Keywords: *Pregnant women, Preeclampsia, Serum lactate dehydrogenase, fetal outcom*e

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Date of Submission: 03-11-2017 Date of acceptance: 16-11-2017

I. Introduction

Pre-eclampsia is a condition that is characterized by hypertension and proteinuria occurring after 20 weeks of gestation. It complicates 5–8% of all pregnancies[1]. It is a clinical diagnosis characterised by heterogeneous clinical and laboratory findings. Few studies suggest that there may be several underlying causes 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[2][3]. Preeclampsia is a multisystem disorders and lead to a lot of cellular death. It carries substantial risks for both fetus and mother with a subsequent increase in the perinatal and maternal morbidity and mortality[1][4]. The effects of LDH in pregnancy related complications like preeclampsia is now gaining attention. LDH is an intracellular enzyme and its level is increased in these women due to cellular death. Though cellular enzymes in the extracellular space have no metabolic function, they are still of benefit because they serve as indicators suggestive of disturbance of cellular integrity induced by pathological conditions and is used to detect cell damage or cell death. So, serum LDH levels can be used to assess the extent of cellular death and thereby the severity of disease[5]. The present study was done to assess the prognostic significance of serum LDH as a marker of severity of preeclampsia and also its association with the fetal outcome.

II. Materials And Methods

A case control study was conducted in the Department of Biochemistry, Osmania General Hospital, Hyderabad. The study was conducted over a period of two years. 100 pregnant women diagnosed with preeclampsia in their third trimester formed the cases and pregnant women without any complications were considered as controls and were included in the study. The cases and samples were collected from Department of Obstetrics and Gynaecology, Government Modern Maternity Hospital, Osmania medical college. Investigations were performed at the Department of Biochemistry, Osmania Medical College/Osmania General Hospital, Hyderabad.

2.1 Inclusion criteria

Preeclamptic women whose blood pressure was normal during first 20 weeks of gestation and no previous history of hypertension. All the cases were in the third trimester of pregnancy (>28wk of gestation).

2.2 Exclusion criteria

Pregnant women with H/O smoking, alcoholism, diabetes mellitus, chronic hypertension, cardiac, liver, lung disease, multiple and molar pregnancies were excluded from the study.

2.3 Data collection

Proforma including age, medical history, parity, weeks of gestation, drug history was filled. Blood sample was collected from all the subjects. Serum LDH was estimated in the samples.

III. Statistical Analysis

The data was analyzed using GraphPad Prism software version 6.0. Descriptive results are expressed as mean and SD and percentages. Unpaired t test was used for comparing the mean LDH level with the maternal and perinatal outcomes. p value<0.05 was considered statistically significant.

IV. Results

Serum LDH was significantly higher in pregnant women with preeclampsia compared to controls (p<0.001). The levels were significantly higher in severe preeclampsia than those in mild preeclampsia and even low in normotensives Fig 1. Increasing levels were associated with adverse maternal and fetal outcome. The mean birth weight was low 1.9±0.105 for babies of mothers having high LDH levels compared to babies of mothers with low LDH levels 2.6±0.8kg. With increasing maternal LDH levels (>800), the neonatal complications went up to 42% and neonatal deaths 26.3% in that group. TABLE 1. The maternal outcome was also affected TABLE 2.

Table 1: Showing fetal outcome in different groups depending on the LDH levels.

S. LDH IU/L	<600 (94)	600-800 (37)	>800 (19)
Mean gestational age	34.1±3.5	34.8±3.1	33.2±3.2
Mean birth weight	2.6±0.8	2.4±0.04	1.9±0.105
Live births	72(76.5%)	24(64.8%)	9(47.3%)
Neonatal complications	18(19.1%)	11(29.7%)	8(42%)
Neonatal Deaths	1(1.06%)	2(5.4%)	5(26.3%)

Table 2: Showing adverse maternal outcome depending on LDH levels

S LDH IU/L	<600 (94)	600-800 (37)	>800 (19)
Abruption	0	2 (5.4%)	3 (15.7%)
Eclampsia	1 (1.06%)	3 (8.1%)	5 (26.3%)
Intracranial hemorrhage	0	0	0
HELLP	0	1 (2.7%)	2 (10.5%)
Acute Renal Failure	0	0	1 (5.2%)
Pulmonary edema	0	1 (2.7%)	2 (10.5%)
DIC	0	1 (2.7%)	3 (15.7%)

V. Discussion

Preeclampsia is a multisystem disorder that is specific to pregnancy. The prevention of severe preeclampsia and eclampsia has become the main problem to prevent the complications of pregnancy. In order to prevent it, we must diagnose the disease at its earliest. Therefore, there is need for a marker which can be useful in early diagnosis and which can reflect the severity of the disease. In the present study, LDH has been evaluated as a biochemical marker for preeclampsia. In present study, we observed a significant rise in the LDH levels with increasing severity of the disease (P <0.001 – statistically significant).Mean LDH level in control is 188.02±38, mean LDH level in mild preeclampsia is 243.26±56 and in severe preeclampsia is 662.82±76. Qublan HS, et al in their study also demonstrated a significant association of serum LDH levels with severe preeclampsia(P <0.001) [6]. In another study by Jaiswar S.P et al, mean LDH levels of control group was 278.3±119.2 IU/l (normotensives). In mild preeclampsia group it was 400.45 + 145.21 IU/l in severe preeclampsia group it was 646.95±401.64 IU/l and eclampsia group was 1648.10±1992.29 IU/l[7]. 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.[8]

In a study conducted by Martin JN Jr et al, a high serum level of LDH (>1,400 IU/l) were shown to have a high predictive value for significant maternal morbidity[9]. Catanzerite VA et al reported that subgroup of patients who had elevated levels of LDH manifested with hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome and were at a high risk for developing maternal mortality[10]. Demir SC et al in their study concluded that there was a relationship between maternal complications and high LDH levels which was statistically significant[11]. Jaiswar SP et al also observed that 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 [7].In a study conducted by Umasatyasri et al, they observed an increase in maternal morbidity with increasing serum LDH

level[12]. They also observed that 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. Andrews L et al in their study had similar results [13].

In our study, not just the maternal morbidity was significant but also the fetal outcome was poor in patients having high serum LDH levels. The mean birth weight of the babies was low and the percentage of live births was low in pregnant women with high LDH levels compared to controls. Moreover, the neonatal complications and neonatal deaths were high in percentage compared to control group. Few studies showed association of low birth weight of infants with increase in serum LDH levels[7],[14]. This was in contrary to Qublan HS et al who did not find any significant association[6]. Bera S et al showed LDH is a good parameter to predict severity of PIH and bad fetal outcome.[15]

VI. Conclusion

Preeclampsia is a multisystem disorder specific to pregnancy and has many complications. It leads to poor maternal and fetal outcome. The observations of the present study show that serum LDH levels increased in preeclamptic patients compared to controls. Also, the maternal and fetal outcome was poor in patients with high serum LDH levels. Therefore, serum LDH levels can be used as a biochemical marker and prognostic indicator of the severity of the disease and its influence on the maternal and fetal outcome. 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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IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB) is UGC approved Journal with Sl. No. 4033, Journal no. 44202.

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