Article

Serum Lactate Dehydrogenase (LDH) Level in Severe Preeclampsia

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Abstract

Background: Serum LDH level is an useful biomarker for cellular injury which may reflect the severity of preeclampsia and it's level might be a guideline for the management of patient. **Objective:** To assess serum LDH level in preeclamptic women. **Methods:** This cross sectional study was conducted in the Department of Physiology, Dhaka Medical College (DMC), Dhaka from January to December 2014. Total 105 pregnant women during third trimester (28-40 weeks) aged 18 to 35 years were selected from the Department of Obstetrics & Gynecology of DMC Hospital, Dhaka for this study. Among them, 35 were mild preeclamptic and 35 were severe preeclamptic women. Age matched 35 normotensive pregnant women were control. Serum LDH level was estimated by continuous spectrophotometric method. **Results:** In this study, serum LDH level was significantly higher (P<0.001) in preeclamptics compared to those of control. Again, this value was significantly higher in severe preeclamptics than those of mild preeclamptics. Moreover, 82.9% mild preeclamptic and 91.4% severe preeclamptic women had abnormally elevated serum LDH level (>200 U/L). **Conclusion:** From this study, it can be concluded that elevated serum LDH level is associated with severity of preeclampsia.

Key-words: Preeclampsia, serum LDH

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Introduction

Preeclampsia is a condition of hypertension (> 140/90 mm Hg) associated with proteinuria and oedema in pregnant women after the 20th gestational week and most frequently near term[1].

Preeclampsia can be categorized in to mild and severe forms[2]. Mild preeclampsia is defined as onset of hypertension after 20 weeks of gestation with systolic blood pressure of > 140 to < 160 mmHg or a diastolic blood pressure > 90 to < 110 mmHg in combination with proteinuria > 0.3gm to < 5gm per day. Severe preeclampsia is diagnosed when systolic blood pressure is greater than 160 mmHg or diastolic blood pressure is greater than 110 mmHg and associated with proteinuria greater than or equal to 5 gm per day. Severe preeclampsia is accompanied by thrombocytopenia, pulmonary oedema, or oliguria [2-3].

Preeclampsia is a major cause of maternal and perinatal morbidity and mortality[4]. Preeclampsia virtually affects all maternal organ system including liver, kidneys, brain, clotting system and primarily the placenta[5-6].

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Despite considerable research, the exact cause of preeclampsia is still remained unclear[7]. Defective placentation and endothelial dysfunction are considered as the core features of preeclampsia[7-8]. Endothelial cells dysfunction can contribute to inappropriate vasoconstriction, platelet aggregation, activation of the coagulation system and ultimately decreased blood flow to organs [5,9].

Lactate dehydrogenase is an intracellular enzyme and it's elevated blood level indicates cellular death followed by it's leakage to circulation[6,10]. Recently, LDH level has been suggested as potential markers to predict the severity of preeclampsia and indicator for multiorgan involvement [6].

Several studies reported that serum LDH level increases with severity of preeclampsia and showed significant correlation with high blood pressure and poor maternal and perinatal outcomes. In their study, the symptoms and complications of preeclampsia along with perinatal mortality were significantly increased in patients with serum LDH > 800 IU/L [5-6,8,10]. Moreover, the serum LDH was found a good predictor of the severity of pregnancy induced hypertension (PIH) and bad foetal outcome [11]. But some researchers did not find significant difference of serum LDH level between preeclamptic women and healthy pregnant women [12-13].

From the above studies, it has been observed that the result is conflicting. So the precise nature of relationship between serum LDH level and preeclampsia remains still obscure. Therefore, the present study has been designed to assess the serum LDH level in pregnant women with mild and severe preeclampsia.

Methods

The present cross sectional was carried out in the Department of Physiology, Dhaka Medical College, Dhaka from January 2014 to December 2014. Protocol of this study was approved by Ethical Review Committee of Dhaka Medical College, Dhaka. For this study, 70 diagnosed preeclamptic women aged 18 to 35 years during third trimester (28-40 weeks) were included as study group. They were divided in to 35 mild preeclamptic women (SBP: >140 to <160mm Hg, DBP: >90 to < 110mm Hg with or without proteinuria > 0.3gm/ 24 hrs)[2-3,6] and 35 severe preeclamptic women (SBP:> 160mm Hg, DBP: > 110mm Hg with significant proteinuria > 5gm/ 24 hrs or > 2+ on dipstick) [2-3,6]. For comparison, age matched 35 healthy pregnant women at their 3rd trimester (28-40 weeks) were included as control. All of the subjects were selected from Department of Obstetrics & Gynecology of Dhaka Medical College Hospital, Dhaka by simple random sampling. After selection the nature, purpose, benefit and risks of the study were explained in details. Informed written consent was taken from the participants. Before taking blood, detailed family and medical history were taken and recorded in a prefixed data schedule. Serum LDH level was estimated by continuous spectrophotometric method [14].In addition, BMI was calculated and blood pressure was measured. Presence of proteinuria was determined by conventional heat coagulation test [15-16]. Then interpretation of the heat coagulation test result was done according to presence of turbidity in the urine as nil/ trace (0), 1+, 2+, 3+ and 4+ [15-16]. For statistical analysis one way ANOVA test and student's unpaired 't' test were performed by using SPSS version 22.

Results

The baseline characteristics of all pregnant women are presented in Table I.

In this study, the serum LDH level was significantly ($p<0.001$) higher in both mild and

Table I: Baseline characteristics in different groups (n=105)

Parameters	Control (n= 35)	Mild Preeclampsia (n= 35)	Severe Preeclampsia (n=35)
Age (years) (Mean +SE)	25.08±1.02	26.09±0.86	25.17±0.95
BMI (kg/m^2) (Mean +SE)	29.13±0.62	30.05±0.74	30.34±0.51
SBP (mm Hg) (Mean +SE)	114.6±2.05	146.1±1.21***	168.3±2.62***,###
DBP (mm Hg) (Mean +SE)	74.29±1.36	97.9±0.94***	115.6±1.24***,###
Proteinuria Present (No. %)	3(8.6%)	31(88.6%)	35(100%)

Data are analyzed by unpaired t test (***p < 0.001, compared to control and ###p < 0.001, comparison between mild preeclampsia and severe preeclampsia). BMI=Body mass index, SBP= Systolic blood pressure, DBP= Diastolic blood pressure. n = total number of subjects.

severe preeclamptics in comparison to control group. Again, this level was also significantly ($p<0.01$) higher in severe preeclamptics than that of mild preeclamptics (Figure 1).

Moreover in this study, elevated serum LDH level (>200 U/L) was found in 82.9% mild preeclamptic , in 91.4% severe preeclamptic women but in none of the control women (Figure 2 &3).

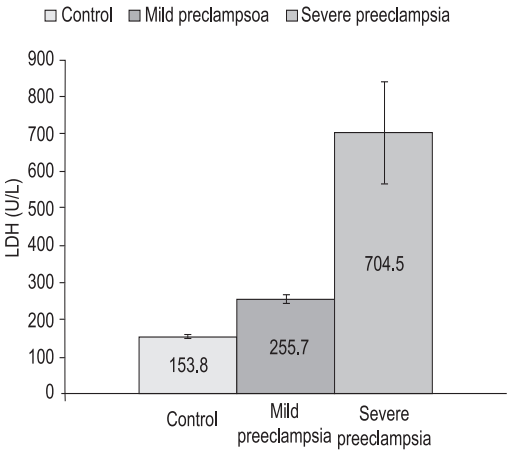

Figure 1: Serum LDH level in different groups are showing that severe preeclamptic women had higher serum LDH level than mild preeclamptic and normotensive pregnant women

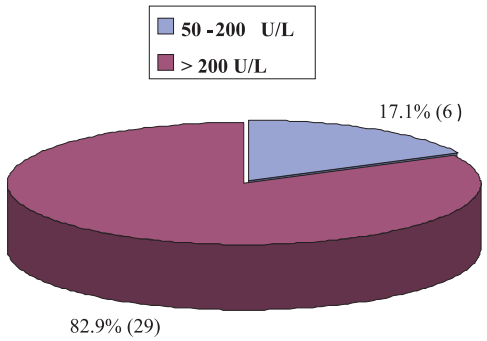

Figure 2: Frequency% of elevated serum LDH level in mild preeclamptic women (n=35) are showing majority of subjects had higher LDH level.

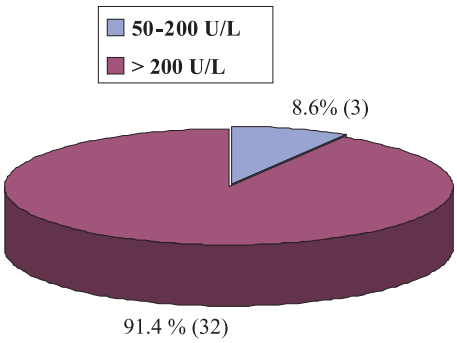

Figure 3: Frequency% of elevated serum LDH level in severe preecclamptic women (n=35) are showing majority of subjects had higher LDH level.

Discussion

In the present study, significantly higher serum LDH level was observed in preeclamptic women than normotensive pregnant women. These results are similar to other authors[5,8,10,17-18].But some investigators did not find significant difference of serum LDH level between preeclamptic women and healthy pregnant women[12-13].

Moreover in this study, 82.9% mild preeclamptic subjects and 91.4% severe preeclamptic subjects had raised serum LDH level.

Literature review suggested that in preeclampsia the progressive endothelial dysfunction in maternal vascular system induced by toxins released from hypoxic placenta cause profound vasoconstriction affecting all organ system including liver. This hypoperfusion induced ischaemic injury to hepatic cells and other organs cause increased release of intracellular LDH to circulation[6,9,11,19,20-24].

In the present study, increased serum LDH level in preeclamptic women than control women is attributed to these facts. Moreover, the progressively increased LDH level in severe preeclampsia indicates progression of cellular injury with severity of this disorder.

Conclusion

From the results of this study, it can be concluded that elevated serum LDH level is associated with severity of preeclampsia. Therefore estimation of serum LDH level in preeclamptic women may be useful for the proper management of patients to decrease maternal and fetal morbidity and mortality.

Conflict of interest: None

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