To Study the Role of Serum Lactate Dehydrogenase in Prediction of Adverse Outcomes of Pre-Eclampsia and Eclampsia

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Abstract:

Background: In developing nations, pregnancy-induced hypertension is one of the most dreaded complications. This study aims to assess the relationship between blood LDH levels and the incidence, risk factors, and consequences of pre-eclampsia and eclampsia. The purpose of this research is to determine if serum lactate dehydrogenase plays a part in predicting the unfavorable consequences of pre-eclampsia and eclampsia.

Methods: From October 2021 to September 2023, the present retrospective study was conducted at Department of Obstetrics and Gynecology, TMMC and RC, Moradabad, Uttar Pradesh. The patients were chosen from the labor room register admissions from the previous few years, regardless of age or parity, as well as from patients who were admitted as emergency cases. The patient details, including the whole obstetric history, examination, and laboratory results, were examined on a proforma created especially for this study.

Results: 76% of the preeclampsia and 96% of the eclampsia patients in the study were unbooked cases, and the majority of them lived in rural areas, with the remainder patients coming from urban slums. Small proportions of patients with pre-eclampsia and eclampsia have hyperbilirubinemia. There was also evidence of abnormal liver enzyme levels in a small subset of pre-eclamptic and eclamptic patients. More than 600 IU/L of LDH was shown to be significantly higher in pre-eclamptic and eclamptic patients.

Conclusion: Significant maternal and neonatal morbidity and mortality are linked to eclampsia. Due to a high percentage of unbooked patients and the majority not receiving therapeutic intervention prior to admission, there is a greater fatality rate. 76% of the preeclampsia and 96% of the eclampsia patients in the study were unbooked cases, and the majority of them lived in rural areas, with the remainder patients coming from urban slums. Small proportions of patients with pre-eclampsia and eclampsia have hyperbilirubinemia. There was also evidence of abnormal liver enzyme levels in a small subset of pre-eclamptic and eclamptic patients. More than 600 IU/L of LDH was shown to be significantly greater in pre-eclamptic and eclamptic patients.

Keywords: Pre-eclampsia, Eclampsia, Serum LDH levels, Prediction, Outcome.

Introduction

Though prevalence varies among hospitals, regions, and nations, 5 to 10 percent of pregnancies are complicated by hypertensive diseases. [1] Globally, these conditions are a leading contributor to maternal and neonatal morbidity and mortality. [2] Preeclampsia's cause is still unknown, and the condition is still considered to be a theory.

The examination of biochemical markers, namely those associated with vascular dysfunction including uric acid, AST, and LDH, may improve the capacity to anticipate and avert preeclampsia in the near future. [3] During glycolysis, an intracellular enzyme called lactate dehydrogenase (LDH) changes pyruvic acid into lactic acid. Preeclamptic placentas exhibit more LDH gene expression and activity than placentas from healthy pregnancies. There are five different types of LDH, and the one

that responds to hypoxia the most in preeclampsia is LDHA [4]. Increased LDH levels signify cell damage and malfunction. Preeclampsia may arise as a result of the multiorgan failure in preeclampsia brought on by vascular end othelial injury, which causes excessive LDH leakage and high serum levels as a result of cellular malfunction. [4]

Because it indicates the severity of the illness, the occurrence of complications, and the outcome of the fetus, it can therefore be employed as a biochemical marker.

Material and Methods

From October 2021 to September 2023, the present retrospective study was conducted at Department of Obstetrics and Gynecology, TMMC and RC, Moradabad, Uttar Pradesh. The patients were

chosen from the labor room register admissions from the previous few years, regardless of age or parity, as well as from patients who were admitted as emergency cases. The patient details, including the whole obstetric history, examination, and laboratory results, were examined on a proforma created especially for this study.This study included all confirmed cases of eclampsia (albumin, convulsion, and hypertension) as well as cases of impending eclampsia. However, cases of known epilepsy, convulsions resulting from uremia complications, and convulsions or comas brought on by cerebral diseases such ruptured cerebral aneurysms, encephalitis, meningitis, and cysticercosis were not included.

Methodology

- Blood pressure recording: The lateral recurrent position was used to record blood pressure. When Korotkoff's sound did not go away until zero, it was determined that the point of muffing was diastolic pressure; if it disappeared at all, it was determined to be diastolic blood pressure. A minimum of two recordings were made, separated by six hours.
- Family history of PIH - The majority of the information is based on the patient's or the attendants' verbal accounts, and every effort was made

to obtain a thorough family history with relation to the affected sisters, moms, and mother-in-law.

- Proteinuria - A midstream urine sample was two thirds full in a test tube. Over a heat, the top 2 centimeters of the pee were cooked. Urine turbidity, which persisted after adding 10% acetic acid, was thought to be a sign of proteinuria. In practical terms, the protein content was shown as a cloud (++), haze (+), or granular precipitate (+++).

Data that is normally distributed has been shown as mean and standard deviation, while data that is not parametric has been shown as median and interquartile range. The spearman rho test for non-parametric data and the Pearson correlation test for parametric data have been used to determine correlation. Student's t test has been used to compare means between two groups of parametric data.

The Mann Whitney U test has been used to compare the median values between two groups of non-parametric data.

A P value of <0.05 is regarded as significant.

Results

Table 1: Distribution of cases according to diagnosis

Diagnosis on admission	No. of cases	Present	No. of death	Mortality %
Preeclampsia	120	31.58%	12	12%
Eclampsia	160	68.42%	23	8.84%
Total	380	100%	35	9.21%

According to Table no. 1 there were 120 (31.58%) cases of preeclampsia and 160 cases (68.42%) were eclampsia. The mortality rate of Preeclampsia was 12% and Eclampsia was 8.84%.

Table 2: Distribution of preeclampsia and eclampsia in relation to booked/unbooked status

Status	Preeclampsia (n=120)				Eclampsia			
	No.	%	Death	Mortality%	No.	%	Death	Mortality%
Booked	28	23.33%	1	3.57%	13	5.0%	1	7.69%
Unbooked	92	76.0%	11	11.95%	247	95.0%	22	8.90%
Total	120	100.0%	12	10.0%	260	100.0%	23	8.84%

According to Table no. 2 pre-eclampsia and eclampsia were higher in pregnant women, at term, who were unbooked and did not attend antenatal care. The mortality rate of Preeclampsia in related to unbooked status was76.0% and Eclampsia in related to unbooked status was 8.90%.

Table 3: Distribution of cases showing lactate dehydrogenase level (LDH) on admission

LDH (IU/L)	Preeclampsia (n=120)				Eclampsia			
	No.	%	Death	Mortality%	No.	%	Death	Mortality%
<600	27	22.50%	1	3.57%	56	21.54%	2	3.57%
>600	93	77.50%	11	11.95%	204	78.46%	21	10.29%
Total	120	100.0%	12	10.0%	260	100.0%	23	8.84%

According to Table no. 3 in preeclampsia patients LDH >600 was 93 (77.50%), <600 was 27 (22.50%) and eclampsia patient LDH >600 was 204 (78.46%), <600 LDH was 56(21.54%). The LDH of Eclampsia patients

was higher. The mortality rate of Preeclampsia patients was 11.95% (>600 LDH), 3.57 % (<600 LDH) and Eclampsia patients the mortality rate was 10.29% (>600 LDH), 3.57% (<600 LDH). The mortality rate was higher in preeclampsia patients.

Table 4: Statistical Analysis

LDH	Case	Mean	SD	P value
	Preeclampsia	725.81	195.92	0.181
	Eclampsia	758.77	234.80	0.154

According to Table no. 4 in preeclampsia patients the LDH mean±SD was 725.81±195.92 and Eclampsia patients mean±SD was 758.77±234.80. The P value is not significant in Preeclampsia and Eclampsia Patients. (P>0.05)

Table 5: Distribution of cases showing serum creatinine on admission

Serum creatinine (mg/dl)	Preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage
<1.5	97	80.83%	201	77.31%
>1.5	23	19.17%	59	22.69%
Total	120	100.0%	260	100.0%

According to Table no. 5 in preeclampsia patients serum creatinine <1.5 was 97 (80.83%), >1.5 was 23 (19.17%) and eclampsia patient serum creatinine <1.5 was 201 (77.31%), >1.5 was 59(22.69%).

Table 6: Distribution of cases on the basis of total serum bilirubin (mg/dl) on admission

Total bilirubin (mg/dl)	Preeclampsia		Eclampsia	
	No. of cases	Percentage	No. of cases	Percentage
<1.2	93	77.50%	196	75.38%
>1.2	27	22.50%	64	24.62%
Total	120	100.0%	260	100.0%

According to Table no. 6 in preeclampsia patients Total bilirubin <1.2 was 93 (77.50%), >1.2 was 27 (22.50%) and eclampsia patient Total bilirubin <1.2 was 196 (75.38%), >1.2 was 64(24.62%).

Discussion

The prevalence of eclampsia differs between nations. Out of 1162 [5] patients, 120 were diagnosed with preeclampsia and 260 with eclampsia; eclampsia is generally avoidable and less common in affluent nations (the UK, USA). This suggests that the frequency of preeclampsia is 1.03% and that of eclampsia is 2.23%.2.2% of hospital deliveries have eclampsia, according to Swains et al. [6]In a retrospective analysis, Choudhary P (mid-April 2000 to mid-April 2001) found that there were 2.9 cases of eclampsia for every 1000 deliveries. [7]

The incidence of eclampsia at Lahore General Hospital was 2.2%, according to Dr. Tayyiba Wasim et al. (2002). [8] The results of our study show that 77.50% of patients with preeclampsia and 78.46% of patients with eclampsia had serum lactate dehydrogenase levels greater than 600 IU/L.

Demir et al. (2006) [9] discovered that there was a considerable increase in LDH levels in complex instances of preeclampsia and eclampsia. In patients with severe preeclampsia, Qublan HS et al. (2005) [10] discovered elevated levels of LDH, a biochemical predictor of a poor pregnancy outcome.Of those with severe preeclampsia, 54.8% had an LDH level > 600 IU/L, while 12.2% had mild preeclampsia. A helpful indicator of the severity and frequency of preeclampsia complications is lactate dehydrogenase. It is common for severe preeclampsia to be associated with semiquanitfied hemolysis. By higher amounts of lactate dehydrogenase in the blood.

According to Rinehart, the rate of change in LDH levels and platelet counts in preeclampsia was as follows: for patients with classes 1, 2, and 3, and for non-HELLP severe preeclampsia, the values increased at a rate of roughly 1400 IU/l per day, 600 IU/l per day, 300 IU/l per day, and 200 IU/l per day, respectively. [11]

In this study, the normal range of 0.6-1.2 mg/dl was found in the serum creatinine levels of 80.83% of preeclampsia patients and 77.31% of eclampsia patients.Martin Jn assessed the profile of the clinical and research facilities for significant toxemia, whether or not HELLP was present. He discovered that the following markers can be used to identify patients who are at high risk for critical maternal bleakness: lactate dehydrogenase level >1400 IU/L, aspartate aminotransferase level >150 IU/L, alanine aminotransferase level >100 IU/L, uric acid level >7.8 mg/dL, serum creatinine level >1.0 mg/dL, and 4+ urinary protein by dipstick. The most well-

established predictive value is associated with the convergence of lactate dehydrogenase, aspartate aminotransferase, and uric acid over these cut points, which are risk factors for worsening thrombocytopenia. [12]

Conclusion

Significant maternal and neonatal morbidity and mortality are linked to eclampsia. Due to a high percentage of unbooked patients and the majority not receiving therapeutic intervention prior to admission, there is a greater fatality rate. 76% of the preeclampsia and 96% of the eclampsia patients in the study were unbooked cases, and the majority of them lived in rural areas, with the remainder patients coming from urban slums.

Small groups of patients with preeclampsia and eclampsia have hyperbilirubinemia. There was also evidence of abnormal liver enzyme levels in a small subset of pre-eclamptic and eclamptic patients. More than 600 IU/L of LDH was shown to be significantly greater in pre-eclamptic and eclamptic patients.

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