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Study of Association of LDH and Maternal Outcome in Pregnancy with Preeclampsia and Eclampsia in A Tertiary Referral Centre of Kerala

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ABSTRACT

Preeclampsia (hypertension and proteinuria) and eclampsia (preeclampsia and seizures) are major killers in obstetrics. Preeclampsia is associated with maternal complications like eclampsia, abruptio placentae, HELLP syndrome, preterm deliveries, postpartum hemorrhage shock and sepsis. Aim of the study was to compare serum LDH levels in pregnancy complicated by preeclampsia and eclampsia, and the association of maternal outcomes with serum levels of LDH . On the basis of laboratory results, patients were devided into three groups according to serum levels of LDH(Group I :<600 IU/L,Group II :600-800 IU/L, Group III:>800 IU/L) and followed up till delivery and early postnatal period. There was significant association of edema ($p<0.001$), headache ($p=0.001$), oliguria ($p = 0.02$), vomiting ($p = 0.02$) with increasing LDH levels. It was found that high systolic and diastolic BP was associated with higher levels of LDH ($p<0.001$).Significant association of abruptio placentae ($p=0.004$) and maternal morbidity ($p<0.001$) was observed with rising LDH levels. LDH provides important information about the prognosis of pregnancy complicated with preeclampsia and eclampsia. Therefore, more severe the disease, more the endothelial damage and haemolysis and more increase in LDH levels. Hence LDH should be measured in all women with hypertensive disorders of pregnancy.

KEYWORDS LDH, Preeclampsia, Eclampsia

Introduction

Preeclampsia (hypertension and proteinuria) and eclampsia (preeclampsia and seizures) are major killers in obstetrics. They are responsible for a large proportion of maternal morbidity and mortality. Their management requires tremendous medical expertise. Preeclampsia is associated with maternal complications like eclampsia, abruptio placentae, HELLP syndrome, preterm deliveries, postpartum hemorrhage shock and sepsis. Various biochemical parameters are used to assess the gravity of the disease and subsequent outcomes in these patients. The commonly used biochemical tests include urinary proteins, platelet counts, blood urea, serum creatinine, serum uric acid, liver enzymes, (ALT, AST, alkaline phosphatase), serum bilirubin. None of these are found to be accurate in predicting the prognosis.Lactate dehydrogenase is an intracellular enzyme that indicate cell death and leakage of enzyme from the cell. In view of multiorgan system involvement significant cellular damage occurs in preeclampsia-eclampsia syndrome and this leads to elevated LDH levels. This study was conducted to assess importance of LDH as a biochemical marker in predicting maternal outcome in preeclampsia and eclampsia.

Aim

Aim of the study was to compare serum LDH levels in pregnancy complicated by preeclampsia and eclampsia, and the association of maternal outcomes with serum levels of LDH .

Material and methods

Study was conducted as a prospective hospital based study to compare the serum levels of LDH with pregnancy outcome in preeclampsia and eclampsia. The study was conducted in Department of Obstetrics and Gynecology, (ACME, Pariyaram, Kannur, Kerala) for a period of one year from 1st December 2013 to 30th November 2014. Preeclampsia was defined as onset of hypertension after 20 weeks of gestation with DBP ≥90 mm and SBP ≥140mm on two measurements one hour apart with significant proteinuria(>300 mg/d). Eclampsia was defined as one or more episodes of generalized tonic and clonic convulsions during course of their pregnancy or labor associated with preeclampsia. On the basis of laboratory results, patients were devided into three groups according to serum levels of LDH

Group I : <600 IU/L
Group II : 600-800 IU/L
Group III: >800 IU/L.

Patients were followed up till delivery and early postnatal period and neonate upto day 5 during their hospital stay. Symptoms, systolic and diastolic BP, urine output ,fundus examination, urine albumin, hemoglobin ,platelet count , LFT, RFT, time and mode of delivery and complications were recorded.

Results

Study was conducted in 132 patients with preeclampsia and eclampsia.

Table 1.

Table 2.

Various symptoms when studied according to LDH levels, it was found that the common symptoms reported in this study e.g. edema, headache, oliguria and blurring of vision occurred more frequently in patients with LDH level > 800 IU/L.There was significant association of edema ($p<0.001$), headache

(p=0.001), oliguria (p = 0.02), vomiting (p = 0.02) with increasing LDH levels.

Table 3.
On statistical analysis it was found that high SBP was associated with higher levels of LDH (p<0.001)

Table 4.
On statistical analysis it was found that high DBP was associated with higher levels of LDH (p<0.001)

Table 5.
Table 5 shows maternal complications observed during the study, which have been compared with the levels of LDH.

It was found that there were 4 cases (4.7%) of abruptio placentae where LDH levels were <600IU/L, 5 cases (29.4%) where LDH levels were 600-800 IU/L and 6 cases (20%) where LDH levels >800IU/L. There was statistically significant increase in occurrence of abruptio placentae with rising LDH levels (p=0.004).

It was seen that there were no cases of HELLP when LDH <600IU/L. there was 1 case (5.9%) when LDH 600-800 IU/L and 6 cases (20%) when LDH >800IU/L.

No cases of DIC were seen in LDH <600 and LDH 600-800 IU/L group. 2 cases (6.7%) were seen when LDH >800IU/L.

Complications like pulmonary edema and renal failure, no cases were present in LDH <600 IU/L, 1 case (3.3%) in LDH 600-800 IU/L and 1 case (3.3%) in LDH >800 IU/L.

Hence the complications like HELLP (p=0.06), DIC (p=0.066), pulmonary edema (p=0.13) and ARF (p=0.13) showed no statistically significant association with rise in LDH levels.

Table 6.
The above table denotes association of maternal outcome with LDH levels. In total 85 patients with LDH levels <600IU/L all were alive and healthy. 3 cases (17.6%) out of 17 with LDH levels between 600-800 IU/L had morbidity but were discharged alive and well. Among 30 cases with LDH levels >800 IU/L, 7 cases had various type of morbidities but were discharged alive and healthy. There was no maternal death seen in any group. Maternal morbidity (p<0.001) increased significantly with rising levels of LDH.

Discussion
Various clinical and biochemical parameters have been studied to assess the severity and outcome in preeclamptic and eclamptic women in relation to LDH. Several studies have been done by different workers to assess and establish the role of serum LDH levels to assess the outcome in patients of preeclampsia and eclampsia. Sammour MB et a.l in 19751 studied the serum and placental levels of LDH in normal pregnancy and in pregnancy complicated by preeclampsia. Later Panat SP et al in 19902 and He S et al. in 19953 showed the correlation of LDH levels and other enzymes with the outcomes in such cases. Shukla PK et al. 19784 described the presence of liver injury in preeclampsia with raised LDH levels. In 2005, Qublan HS et al.5 conducted a study on, LDH as a biochemical marker of poor pregnancy outcomes in severe preeclampsia. Other authors like Sumra S et al. (1988)6, Demir SC et al. (2006)7, have also studied other biochemical parameters including LDH to predict the pregnancy outcome.

The results concluded in different studies quoted above have shown a direct association between LDH levels and pregnancy outcome in terms of severity of disease and occurrence of maternal and perinatal outcome. In the study by Qublan HS5, vomiting and epigastric pain were observed in 40.3% and 30.6% respectively in patients suffering from preeclampsia. However, the incidence of headache was reported to be highest (69.4%) and was significantly higher in severely preeclamptic patients with - levels of LDH >800 IU/L, while no significant difference in the frequency of the other symptoms according to the levels of LDH was noted. Martin JN et al.8 reported that patients with nausea, vomiting and epigastric pain on admission had significantly higher LDH levels than symptom free mothers.

When the symptoms of study groups, were evaluated according to LDH levels (Table 6), the incidence of edema was 38.8% in <600 IU/L group. 70.6% in 600-800 1U/L group and 83.3% in >800 IU/L group, and was found to be statistically significant (p<0.001). Incidence of headache was 12.9% in cases with LDH <600. (41.2%) cases with LDH levels between 600-800IU/L and 40% cases with LDH >800IU/L. It was also found to be statistically significant with (p=0.001).

Comparing occurrence of oliguria in different groups, 2.4% cases had oliguria in group with LDH <600. 11.8% cases had oliguria in group with LDH between 600-800 IU/L and 16.7% cases had oliguria when LDH>800IU/L, hence found statistically significant (p=0.02).

There was no vomiting in cases with LDH <600. 5.9% had vomiting when LDH 600-800IU/L and 10% had vomiting when LDH >800IU/L and was found to be statistically significant. But the incidence of other symptoms like epigastric pain and blurring of vision in various study groups was not found to be statistically significant. The increase in symptoms with LDH levels was similar to Martin JN et al.8

In our study it was found that majority (63.5%) of patients in study group with LDH levels <600 IU/L had systolic BP (Table 7), in range of 140-<160 mm Hg. Most of the patients with LDH 600-800 IU/L or >800 IU/L had systolic BP ≥ 160 (58.8%) and (56.7%) respectively, while number of patients with systolic BP <140 were less (17.6%) and (6.7%) respectively. There was found to be a statistically significant association of increasing systolic BP with increasing LDH levels (p<0.001).

When diastolic BP was studied with respect to LDH levels, as shown in table No. 8, majority of patients (83.5%) with LDH levels <600 IU/L had mildly elevated diastolic BP (i.e. between 90-<110 mm Hg). All the patients in 600-800 IU/L group had raised diastolic BP, out of which 52.9% had DBP between 90-<110 mmHg and 47.1% had DBP≥110mmHg. Majority of patients (60%) with LDH levels >800 IU/L had DBP ≥110 and 40% patients had DBP between 90-< 110 mm Hg.

Qublan HS et al5. showed that women with severe preeclampsia with LDH >800 1U/L showed significant increase in terms of eclampsia, abruptio placentae and various other complications compared to women who had lower levels (p<0.001). Martin JN et al.8 showed that LDH levels were significantly correlated with maternal morbidity. Odendall HJ et al.9 Showed that LDH levels were significantly correlated with maternal morbidity.

In the present study, (Table 18,19), 47.1% of patients with LDH levels ranging between 600-800 IU/L and 40% patients with LDH levels >800IU/L developed various complications. Abruption Placentae was found to be significantly associated with higher levels of LDH (p=0.004). There was a significant increase in maternal morbidity with increasing LDH levels (p<0.001). There was no maternal mortality seen in any study group. Therefore, the present study was comparable to the above quoted studies.

Conclusion
LDH provides important information about the prognosis of pregnancy complicated with preeclampsia and eclampsia. Therefore, more severe the disease→ more the endothelial damage and haemolysis →more increase in LDH levels. Hence LDH should be measured in all women with hypertensive disorders of pregnancy.

Tables

Table 1:Distribution of patients into groups according to LDH levels.

Groups	Number of patients
Group 1	85
Group II	17
Group III	30

Table 2: Association of symptoms with LDH levels in study group (N=132)

Clinical Feature	LDH Levels (IU/L)						2	P
	< 600		600 - 800		>800			
	No.	%	No.	%	No.	%		
Vomiting	0	0.0	1	5.9	3	10.0	8.086	0.02
Epigastric pain	1	1.2	0	0.0	2	6.7	3.463	0.177
Blurring Vision	1	1.2	1	5.9	2	6.7	2.815	0.245
Headache	11	12.9	7	41.2	12	40.0	13.026	0.001
Edema	33	38.8	12	70.6	25	83.3	20.052	<0.001
Oliguria	2	2.4	2	11.8	5	16.7	7.902	0.02

Table 3: Association of Systolic BP with LDH levels in study group

Systolic BP Categories	LDH Levels (IU/L)			Total (N=132)
	<600(n=85)	600-800 (n=17)	>800(n=30)	
90 - <140	13(15.3)	3 (17.6%)	2(6.7%)	18(13.6%)
140 - <160	54(63.5)	4(23.5)	11(36.7%)	69(52.3%)
160 & above	18(21.2)	10(58.8)	17(56.7%)	45(34.1%)

χ^2=19.279: df=4,p=0.001

Table 4: Association of Diastolic BP with LDH levels in study groups

Diastolic BP Categories	LDH Levels (IU/L)			Total (N=132)
	<600 (n=85)	600-800 (n=17)	>800 (n=30)	
60 - <90	3(3.5%)	0	0	3(2.3%)
90 - < 110	71(83.5%)	9(52.9%)	12(40%)	92(69.7%)
110&above	11(12.9%)	8(47.1%)	18(60.0%)	37(28.0%)

χ^2=28.512;(df=4); p<0.001

Table 5 : Association of Maternal Complications with LDH levels in study groups (N=132)

Maternal complication	LDH Levels (IU/L)			Total (N=132)	χ^2	P
	<600 (n=85)	600-800 (n=17)	>800 (n=30)			
Abruptio placentae	4 (4.7%)	5 (29.4%)	6 (20%)	15 (11.4%)	11.460	0.004
HELLP	0	1 (5.9%)	2 (6.7%)	3 (2.3%)	5.582	0.06
DIC	0	0	2 (6.7%)	2 (1.5%)	6.905	0.066
Pulm. Edema	0	1 (5.9%)	1 (3.3%)	2 (1.5%)	4.145	0.13
ARF	0	1 (5.9%)	1 (3.3%)	2 (1.5%)	4.145	0.13

Table 6 : Association of Maternal Outcome with LDH levels in study groups (N=132)

Maternal Outcome	LDH Levels (IU/L)		
	<600(n=85)	600-800 (n=17)	>800 (n=30)
Alive & Well	85 (100.0%)	14 (82.4%)	23 (76.7%)
Morbidity	0	3 (17.6%)	7 (23.3%)

χ^2=20.069; df=2, p<0.001

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