

A COMPARATIVE STUDY OF HEPATIC ENZYMES BETWEEN PREECLAMPSIA AND NORMAL PREGNANT WOMEN

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Abstract:

Background: Preeclampsia is a multisystem disorder, unique to pregnancy that is usually associated with high blood pressure and proteinuria after 20 week of gestation. Abnormal liver function tests occur in 20% to 30% of pregnancies complicated by preeclampsia and are associated with a higher risk of adverse maternal and fetal outcome.

Objective: To observe the alteration of hepatic enzymes in preeclampsia.

Methods: The present cross-sectional study was carried out in the Department of Biochemistry, Dhaka Medical College, and Dhaka from July 2015 to June 2016. A total number of one hundred pregnant women in third trimester of pregnancy with or without preeclampsia, attending in the outpatient Department of Obstetrics and Gynecology in DMCH, were selected as study subjects. Of them fifty pregnant women in third trimester of pregnancy were with preeclampsia and fifty were normal healthy pregnant women. Estimation of hepatic enzymes like aspartate transaminase, alanine transaminase and gamma glutamyl transferase were done in both preeclampsia and normal pregnant patients and mean values of the variables were compared between them.

Results: The mean serum aspartate transaminase level was significantly higher in preeclampsia compared to normal pregnant woman (32.4 ± 15.4 IU/L vs 24.8 ± 11.8 IU/L respectively and $p < 0.007$). Serum alanine transaminase level was also significantly higher in preeclampsia than normal pregnancy (38.1 ± 19.9 IU/L vs 18.8 ± 6.95 IU/L, respectively and $p < 0.001$). Serum gamma glutamyl transferase was also significantly higher in preeclampsia than normal pregnancy (44.7 ± 19.1 IU/L vs 26.6 ± 6.0 IU/L $p < .001$).

Conclusions: Hepatic enzymes (alanine transaminase, aspartate transaminase, gamma glutamyl transferase) were increased. So routine assessment of these parameters may helpful to prevent worse outcome of preeclampsia patients.

Key words: preeclampsia, Aspartate transaminase, Alanine transaminase, Gamma glutamyl transferase.

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Introduction

Preeclampsia is a syndrome defined by hypertension and proteinuria that also may be associated with other signs and symptoms, such as edema, visual disturbances, headache, and epigastric pain. Laboratory abnormalities may include hemolysis, elevated liver enzymes,

and low platelet counts (HELLP syndrome). Women with chronic hypertension who develop headache, scotomata or epigastric pain also may have superimposed preeclampsia¹. Incidence of preeclampsia varies with geographic location. It is the leading global cause of maternal and perinatal mortality and approximately 50,000

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to 60,000 women die each year out of which 9% of maternal deaths in Asia². Mild preeclampsia occurs in approximately 15% of pregnancies, moderate to severe preeclampsia in around 8% and severe preeclampsia in about 1% to 2 % and is 'responsible for 16% maternal morbidity and 28% of perinatal mortality³. All over the world preeclampsia is the 3rd leading cause for maternal mortality and the 7th leading cause for the perinatal mortality⁴. Dhaka Medical College Hospital is one of the well-known tertiary referral hospitals in Bangladesh with a separate well equipped eclampsia unit functioning since 1992. Each year around 600-700 patients are admitted in the eclampsia unit, which is recorded as 7.0 - 8.5 % of the total obstetric admission⁵.

Liver function test abnormality occurs in 3 % of the pregnancies. Preeclampsia is the most frequent cause. The liver disease peculiar to pregnancy has a definite time of onset⁶. The findings are more common in patients with hypertension induced or aggravated by pregnancy that causes loss of maternal and fetal lives⁷. The pathogenesis of hepatic damage in HELLP syndrome involves intravascular fibrin deposition and sinusoidal obstruction that can cause hepatic hemorrhage and infraction⁸. When preeclampsia complicated by HELLP syndrome, elevation of liver enzymes are usually noted⁹. It is found that ALT, AST, and GGT markedly increase in patient with preeclampsia¹⁰. Values for serum aspartate transaminase (AST), alanine transaminase (ALT), gamma glutamyl transferase (GGT) do not significantly altered during normal pregnancy.

Any increase in these values may reflect hepatobiliary pathology¹¹.

In this study liver enzymes were assessed to predict adverse maternal outcome in women with preeclampsia.

Materials and Methods

This cross sectional study was carried out in the Department of Biochemistry, Dhaka Medical College, Dhaka, from July 2015 to June 2016. A total one hundred patients including preeclampsia and healthy pregnant women attending in the department of obstetrics and gynecology were taken as study population, fifty with preeclampsia and fifty with normal pregnancy without preeclampsia. Sample was taken purposively. Data was collected by using a preformed data collection sheet. AST, ALT and GGT of both groups were measured. All the analytical measurements were done by using an autoanalyzer. Statistical analysis was performed by using the SPSS version 20. All data were processed to compute mean and standard deviation. Difference of mean among two groups was compared by unpaired t test. Determinations of correlation between variables were done by Pearson's correlation test. All analysis was done using the SPSS 20.0. Data was presented by table and graphs.

Results

Systolic and diastolic blood pressure as well as BMI was significantly higher in preeclampsia than normal pregnancy but there was no statistical significant difference in age between these two groups. Table I shows age, blood pressure and BMI in preeclampsia and normal pregnancy.

Table I
General and physical characteristics of study subjects (n=100)

Variables	Group		p value
	Preeclampsia Mean ± SD	Normal pregnancy Mean ± SD	
Age (years)	28.06 ± 5.93	26.20 ± 5.32	0.102 ^{ns}
Systolic (mmHg)	153.4 ± 16.7	113.4 ± 4.5	0.001 ^s
Diastolic (mmHg)	91.7 ± 5.2	74.1 ± 6.6	0.001 ^s
BMI (kg/m ²)	29.9 ± 5.1	26.5 ± 4.0	0.001 ^s

Liver enzymes (AST, ALT and GGT) were significantly higher in preeclampsia than normal pregnancy.

Table II shows liver enzymes level in preeclampsia and normal pregnancy.

Table II
Liver enzymes level of study subjects (n=100)

Liver enzymes	Group		p value
	Preeclampsia Mean ± SD	Normal pregnancy Mean ± SD	
AST (IU/L)	32.4 ± 15.4	24.8 ± 11.8	0.007 ^s
ALT (IU/L)	38.1 ± 19.9	18.8 ± 6.95	0.001 ^s
GGT (IU/L)	44.7 ± 19.1	26.0 ± 6.0	0.001 ^s

All parameters of liver enzymes were positively correlated with systolic blood pressure in both groups but only ALT was significantly correlated in preeclampsia group. Table III: shows correlation of systolic blood pressure with liver enzymes parameters.

Table III
Correlation of systolic blood pressure with liver enzymes

Group Liver enzymes parameters	Preeclampsia		Normal pregnancy	
	r value	p value	r value	p value
AST	0.216	0.132ns	0.016	0.910ns
ALT	0.287	0.043s	0.059	0.686ns
GGT	0.261	0.067ns	0.140	0.333ns

All the liver enzymes were positively correlated with diastolic blood pressure in preeclampsia but not significantly. In normal pregnancy, AST and ALT were positively and GGT was negatively correlated with diastolic BP but not significantly.

Table IV : shows correlation of diastolic blood pressure with liver enzymes.

Table IV
Correlation of diastolic blood pressure with liver enzymes

Group Liver enzymes parameters	Preeclampsia		Normal Pregnancy	
	r value	p value	r value	p value
AST	0.196	0.172ns	0.075	0.606ns
ALT	0.157	0.277ns	0.172	0.231ns
GGT	0.147	0.308ns	-0.084	0.560ns

Discussion

In this study mean serum AST was found 32.4±15.4 IU/L in preeclampsia and 24.8±11.8 IU/L in normal pregnancies. Mean serum ALT was found 38.1 ± 19.9 IU/L and 18.8 ± 6.95

IU/L in both groups respectively. Mean serum GGT was found 44.7 ± 19.1 IU/L in preeclampsia and in normal pregnancy it was 26.0 ± 6.0 IU/L. The differences were statistically significant (p<0.05) between two

groups (Table-II). We have observed that the levels of serum AST, ALT and GGT were increased in women with preeclampsia than normal pregnancy. The liver enzymes positively correlated with systolic and diastolic blood pressure. These findings were similar with previous studies. Das et al. in 2013 observed that serum AST was significantly ($p < 0.001$) rise in preeclamptic women compared to normotensive pregnancy. Elevated level of AST in preeclampsia was also cited by Haddad et al. in 2000. They found positive correlation of liver enzymes with blood pressure. In the study conducted by Bhoumic et al. in 2013, ALT was elevated in 23 (48.93%) patients and AST was elevated in 15 (31.91%), patients respectively which are consistent with other studies. In their study levels of ALT, are significantly higher in preeclampsia and eclampsia in comparison to those of normal pregnant mother and normal reference level. Serum ALT of preeclamptic women in the study conducted by Munazza et al. in 2011 was significantly ($p < 0.001$) elevated from their normotensive pregnant counterparts. Malvino et al. observed in 2005 that in preeclampsia the serum transaminase level was raised to >10 mg/dl and that of ALT to 271 ± 297 mg/dl. In the study conducted by Hazari, Hatolkar and Munde, in 2014 it was observed that the levels of serum AST and ALT were significantly increased in women with preeclampsia than normal pregnancy. The prevalence of abnormal level of AST was 40% and that of ALT was 45% in preeclampsia. Significantly higher levels of serum GGT in preeclampsia than normal pregnancy was observed in the study conducted by Hazari, Hatolkar and Munde. Serum GGT was higher in severe preeclampsia than mild preeclampsia. Abnormal level was found in 87.50% women with preeclampsia. Studies conducted by Makuyana et al. in 2002 it were reported that in preeclampsia high activity of GGT was observed. Increase in GGT was independent of other biochemical markers of hepatic damage.

Conclusion:

The findings of this study showed that there is a association between preeclampsia and elevated liver enzymes like AST, ALT and GGT .

Estimation of hepatic enzymes have predictive role as an alert of preeclampsia. These findings may be very useful to prevent the adverse outcome of preeclampsia.

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