Original Article

ALT in Preeclampsia

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Abstract

Background: *Preeclampsia is the most frequent cause of abnormal liver function test in pregnancy. Women with preeclampsia and raised serum alanine aminotransferase (ALT) have chance of greater proteinuria and more maternal complications than those with normal liver function.* ***Objective:*** *The present study was designed to assess the association of serum ALT with preeclampsia.* ***Materials and method:*** *A case control study was conducted in the Department of Biochemistry, Dhaka Medical College, Dhaka, Bangladesh, from July 2010 to June 2011. From the pregnant women in third trimester of pregnancy attending in Obstetrics and Gynecology Department of Dhaka Medical College Hospital, 50 diagnosed cases of preeclampsia were selected purposively as cases and 50 normal healthy pregnant women as controls. Serum ALT concentration was measured in all the study subjects.* ***Results:*** *The mean serum ALT concentration in cases and controls were 57.92±20.99 U/L and 15.46±2.66 U/L respectively. The level was significantly higher in cases than that of controls (p=0.001).* ***Conclusion:*** *The study revealed that increased serum ALT concentration is associated with preeclampsia.*

Keywords: *Preeclampsia; Alanine aminotransferase.*

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Introduction

Preeclampsia (PE) is a multisystem disorder affecting central nervous system, liver, kidney and coagulation system.[1] It complicates about 5-10% of pregnancies and is associated with maternal mortality and morbidity.[2] Preeclampsia can be defined as pregnancy specific syndrome observed usually after 20th weeks of gestation with systolic BP ≥140 mm of Hg and diastolic BP ≥90 mm of Hg accompanied by significant proteinuria with or without edema. In majority cases (over 80%) however, there are features of severe preeclampsia. Severe preeclampsia is associated with elevated BP ≥160 mm of Hg systolic or ≥110 mm of Hg diastolic, on 2 occasions at least 6 hours apart, on bed rest; with proteinuria ≥5 gm in 24 hours urine sample; along with other symptoms such as headache, visual disturbances, hyperreflexia, epigastric or right upper quadrant pain, vomiting, oliguria, impaired liver function and thrombocytopenia (HELLP syndrome).[3] Abnormalities of liver function test in preeclampsia have been documented in literature.[4]

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Liver function test abnormalities occur in 3% of pregnancies and PE is the most frequent cause.[5] In preeclampsia accompanied by HELLP syndrome, an elevation in liver enzymes such as alanine aminotransferase (ALT), aspartate aminotransferase (AST) are noted and hyperbilirubinemia may occur especially in presence of hemolysis.[6] The exact pathophysiology of preeclampsia is not yet fully understood. However, endothelial dysfunction has been considered to play a central role in the pathogenesis of preeclampsia.[7] In liver, this endothelial damage can cause periportal hemorrhagic necrosis that causes elevation in liver enzyme levels.[6] Alanine aminotransferase (ALT) is a liver enzyme that normally resides inside cells (in cytoplasm). So, raised level usually represents hepatocellular damage. It is more specific to liver, as AST is also found in cardiac muscle, skeletal muscle and red blood cells.[8] The analysis of a combination of biochemical marker, particularly markers related to vascular dysfunction, such as increased serum alanine aminotransferase concentration may enrich our ability to predict and prevent preeclampsia in near future. Therefore, the present study was designed to assess the association of alanine aminotransferase (ALT) level in preeclampsia and normal pregnancy.

Materials and method

A case control study was conducted in the Department of Biochemistry, Dhaka Medical College, Dhaka, Bangladesh from July 2010 to June 2011. From the pregnant women in third trimester of pregnancy attending in Obstetrics and Gynecology Department of Dhaka Medical College Hospital, 50 diagnosed cases of preeclampsia were selected purposively as cases and 50 normal healthy pregnant women as controls. Pregnant women with pre-existing hypertension, diabetes mellitus, renal disease, liver disease, cardiac disease and history of drug intake that affects the liver function were excluded from the study by history, clinical examination and relevant laboratory investigations. After obtaining informed written consent from all the study subjects and maintaining all aseptic precaution blood samples were collected from all the study subjects for estimation of serum ALT concentration. Serum ALT level was estimated by Humalyzer-2000. Statistical analysis was performed by using computer based software, Statistical Package for Social Science (SPSS) for Windows version 14. Mean values of different parameters were compared to see the differences between two groups by using student's unpaired 't' test. For all statistical analysis, two tailed 'p' value <0.05 was considered as the lowest level of significance.

Results

Age distribution and comparison between groups are presented in Table I. Most of the subjects belonged to 21-30 years of age group (case 78%, control group 90%). The mean±SD of age of case and control was 24.06±3.71 years and 24.66±3.22 years respectively. The difference was not statistically significant (p = 0.39).

Table I: Distribution and comparison of age in study subjects

Age (years)	Case (n=50)	Control (n= 50)	t-value	p-value
<20	6(12%)	3(6%)		
21 - 30	39(78%)	45(90%)	-0.863	0.39
31 – 40	5(10%)	2(4%)		
Range	18 – 35	18 – 32		
Mean±SD	24.06±3.71	24.66±3.22		

Baseline parameters in terms of gestational age, gravida and antenatal checkup are shown in Table II, III and IV. Mean±SD of gestational age in cases and controls was 33.50±2.55 weeks and 33.60±2.95 weeks respectively. On the other hand most of the subjects were primi both in cases and controls. Both the parameters did not differ significantly (p >0.05). Majority of the subjects in both groups had antenatal check up.

Table II: Distribution and comparison of gestational age in study subjects

Study subjects	Gestational age (weeks) Mean±SD	t-value	p-value
Case (n=50)	33.50 ± 2.55	-0.181	0.86
Control (n=50)	33.60 ± 2.95		

Table III: Distribution and comparison of gravida in study subjects

Study subjects	Gravida		Chi-square value	p-value
	Primi	Multi		
Case (n=50)	38(76%)	12(24%)	3.66	0.06
Control (n=50)	29(58%)	21(42%)		

Table IV: Status of antenatal check up in study subjects

Antenatal checkup	Case (n=50)	Control (n=50)
Regular	2(4%)	18(36%)
Irregular	26(52%)	20(40%)
None	22(44%)	12(24%

Table V shows the comparison of serum ALT concentration between cases and controls. Mean ±SD serum ALT concentration in cases and controls were 57.92±20.99 U/L and 15.46±2.66 U/L respectively. The level was significantly higher in cases than that of controls (p=0.001).

Table V: Comparison of serum ALT concentration between cases and controls

Study subjects	Serum ALT (U/L) Mean±SD	t-value	p-value
Case (n=50)	57.92±20.99	3.58	0.001
Control (n=50)	15.46±2.66		

Discussion

Preeclampsia is a multisystem pregnancy specific disorder that affects almost every maternal organ, predominantly the vascular, renal, hepatic, cerebral and coagulation system.[9] The present study was aimed to find the association between serum ALT and preeclampsia. In the present study no statistically significant difference was observed between two groups regarding maternal age and gestational age. The study reveals the incidence of preeclampsia was high in primigravid. Similar conclusion was drawn by Odegard et al.[10] where they showed nulliparity as a risk factor for preeclampsia. Maximum number of cases and controls received irregular antenatal check up. The study reveals the frequency of regular antenatal check up is less in preeclamptic patients compared to normal pregnant women.

In our study, serum ALT was significantly higher in preeclamptic women compared to normal pregnant women. Several research workers also had found an elevated level of ALT in preeclampsia in their study populations which is in line with the findings of the present study. Several studies conducted by Malvino et al.[11], Rath et al.[12], Bhowmik et al.[13] and Munazza et al.[14] also found elevated level of ALT in preeclampsia in comparison of normal pregnant women. Hazari, Hatolkar & Munde[15] observed that the levels of both serum AST and ALT were significantly increased in women with preeclampsia than normal pregnancy. Girling et al.[16] reported higher prevalence of elevated liver enzymes in preeclamptic group than gestational hypertensionin their study. Kozic et al.[17] found that patients with preeclampsia and abnormal liver function tests were more likely to have a preterm birth, low birth weight neonate, experience still birth or have an adverse maternal outcome. Demir et al.[18] similarly found an association between abnormally elevated liver enzymes and adverse maternal outcome. Several studies have suggested that liver involvement in preeclampsia is serious and frequently accompanied by the evidence of other organs involvement especially kidney and brain along with hemolysis and thrombocytopenia. In women with preeclampsia, liver function tests are at best moderate predictors of maternal and fetal complications. Women with preeclampsia and abnormal liver function (raised ALT) have chance of greater proteinuria and more maternal complications than those with normal liver function.[19]

Conclusion

Preeclampsia is a pregnancy related hypertensive disorder which may lead to abnormal liver function (raised ALT). So, prior information of liver function (raised ALT) in such patients may help in planning proper intervention to improve both maternal and fetal outcome.

References

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