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Status of Hepatic Enzymes and Other Biochemical Parameters in Pre-Eclemptic Pregnancy.

Medical Science

KEYWORDS : Preeclampsia, AST, ALT, ALP, LDH, GGT and Bilirubin

*** Dr. Deepa Kajla**	M.Sc. (Med.) Biochemistry, Department of Biochemistry, JLN Medical College, Ajmer (Raj.), * Corresponding Author
Dr. G.G. Kausik	Professor & Head, Department of Biochemistry, JLN Medical College, Ajmer (Raj.)
Dr. Harshvardhan	M.Sc. (Med.) Biochemistry, Department of Biochemistry, JLN Medical College, Ajmer (Raj.)

ABSTRACT

Introduction: Pregnancy is a physiological state associated with many alterations in metabolic, biochemical, physiological, hematological and immunological processes. If there are no complications, all these changes are reversible following a few days to a few months after delivery. Preeclampsia is being diagnosed according to American College of Obstetrics and Gynecology (ACOG) criteria: a SBP>140mm Hg, DBP>90mm Hg and proteinuria more than 300mg/24hrs observed on at least two occasions more than 6hrs apart after the 20th weeks of pregnancy. Liver dysfunction during preeclampsia has serious consequences. Several standard biochemical and hematological parameters such as liver enzymes are reported to have a significant prognostic value in the prediction of preeclampsia. Therefore, the present study is an attempt to compile complete Hepatic enzymes and other biochemical parameters in preeclamptic pregnancies.

Material and method: Study was carried out in the Biochemistry department in collaboration with department of Gynecology, of J L N Medical College and associated group of hospitals, Ajmer. Present study was carried in 100 pregnant women who meet our inclusion and exclusion criteria. Hepatic enzyme and biochemical parameters were measured by relevant methods.

Results: the levels of serum AST, ALT, ALP, LDH, GGT and Bilirubin are significantly increased in women with preeclampsia but level of Total protein and Albumin are decreased in severe pre-eclampsia than normal pregnancy.

Conclusion: Hepatic enzymes measurement i.e. GGT and LDH with AST and ALT may be clinically beneficial for monitoring the liver function in the management of preeclampsia which has hepatic involvement.

Introduction: Pregnancy is a physiological state associated with many alterations in metabolic, biochemical, physiological, hematological and immunological processes. If there are no complications, all these changes are reversible following a few days to a few months after delivery. Preeclampsia is a clinical manifestation characterized by hypertension, proteinuria and edema that occurs after 20th week of pregnancy. It is a multisystem disorder of pregnancy with potentially severe consequences for both mother and child.[1]It can induce damage to cardiovascular system, kidneys, brain and liver. It is being diagnosed according to American College of Obstetrics and Gynecology (ACOG) criteria: a SBP>140mm Hg, DBP>90mm Hg and proteinuria more than 300mg/24hrs observed on at least two occasions more than 6hrs apart after the 20th weeks of pregnancy.

It affects about 5-8% of all pregnancies and is a major cause of maternal, fetal and neonatal mortality and morbidity.[2]

The etiology of preeclampsia is unknown but thought to be related to hypoxia in the placenta and endothelial dysfunction.[3] There is increasing evidence that endothelial cell and altered endothelial cell function play an important role in the pathogenesis of preeclampsia. Young age and primigravidity are the well-known risk factors for developing preeclampsia.[4] Liver dysfunction during preeclampsia has serious consequences. Several standard biochemical and hematological parameters such as liver enzymes are reported to have a significant prognostic value in the prediction of preeclampsia.[5]In preeclampsia accompanied by HELLP syndrome (hemolysis, elevated liver enzymes and low platelet), an elevation in liver function test results is noted. [6]

Therefore, the present study is an attempt to compile complete Hepatic enzymes and other biochemical parameters in preeclamptic pregnancies.

Aims & Objective: the main objective of our study was to assess complete hepatic enzymes and other biochemical parameters in preeclamptic pregnancies.

Material and method: After obtaining the institutional ethical clearance, the present study was carried out in the Biochemistry department in collaboration with department of Gynecology, of J L N Medical College and associated group of hospitals, Ajmer. Informed consent was obtained before starting the study. Present study was carried in 100 pregnant women who meet our inclusion and exclusion criteria. Preecleptic pregnant women of age group between 18-35 years and not using any kind of oral contraceptives, anticoagulant drugs etc. were included whereas subjects having past medical history of diabetes, systemic or endocrine disorder, chronic renal disease, hypertension, Thyroid disease , liver disease or any chronic infection were excluded from study. Preecleptic pregnant women of our study were divided into mild (Group B1, no.-75) and severe (Group B 2, no.- 25) preecleptic subjects. In our study 50 subjects (Group A) were taken as a control group.

About 5ml blood sample was collected in the morning in a plain vial with aseptic conditions before initiation of medical therapy form the subjects of both groups. Hepatic enzyme and biochemical parameters were measured by relevant methods. [7-13]

Observations & results: We estimate the level of bilirubin, total protein, albumin, SGOT (serum glutamate oxaloacetate transferase), SGPT(serum glutamate pyruvate transferase), ALP (Alkaline Phosphate), LDH (lactate dehydrogenase) and GGT (Gama glutamyl transferase) in both groups. Result were expressed as mean ± SD &are shown in tabulated form as-

Table 1- Demographic characteristics of study subject-

Parameters	Control Group A(n=50)	Study Group B1(n=75)	Study Group B2(n=25)
Age(Yrs.)	28.0 ± 5.0	29.7 ±4.8	29.4 ±5.3
Systolic BP(mmHg)	110.0 ± 10.4	143.0 ±12.5	170.5 ±10.6
Diastolic BP(mmHg)	67.4 ± 4.8	92.0 ±7.5	112.0 ±5.8

Table-2: Values of various parameters measured.

Clinical Parameters	Control Group A(n=50)	Study Group B1(n=75)	Study Group B2(n=25)	P Value
Bilirubin	0.68 ±0.05	0.93 ±0.11	1.50 ±0.28	◎0.001
Total protein	6.62 ± 0.51	5.25 ± 0.23	4.84 ± 0.19	◎0.001
Albumin	4.46 ± 0.48	3.13 ± 0.17	2.29 ± 0.31	◎0.001
AST	17.0 ± 6.4	42.18 ± 4.28	51.84 ± 6.18	◎0.001
ALT	21.36 ± 6.67	47.04 ± 5.21	58.08 ± 5.90	◎0.001
ALP	50.0 ± 12.26	114.38 ± 12.04	147.8 ± 7.65	◎0.001
LDH	284.42 ± 58.03	509.09 ± 23.04	813.52 ± 52.33	◎0.001
GGT	14.48 ± 3.02	42.88 ± 5.73	63.80 ± 4.83	◎0.001

Discussion: In present Systolic and diastolic blood pressure were found significantly increased in mild ($p<0.001$) and severe ($p<0.001$) preeclamptic women [table-1]. It is evident from table-2, that the levels of serum AST, ALT, ALP, LDH, GGT and Bilirubin are significantly increased in women with preeclampsia but level of Total protein and Albumin are decreased in severe pre-eclampsia than normal pregnancy. In mild preeclampsia increase is within normal range but in severe preeclampsia highly increased levels of AST, ALT, ALP, LDH, GGT and Bilirubin are found. Our result were found in accordance with various other studies. [1, 14, 15, 16].

In preeclampsia elevated levels of liver function tests are observed. ALT and AST levels are elevated, and hyper-bilirubinemia occurs, especially in the presence of haemolysis. The lesion due to periportal hemorrhagic necrosis in the periphery of the liver lobule probably causes elevation in the levels of liver enzymes in serum.[17] Therefore serum lactate dehydrogenase (LDH) and serum gamma glutamyl transferase (GGT) are the useful biochemical markers reflecting the severity of the occurrence of preeclampsia. Serum lactate dehydrogenase (LDH) and serum gamma glutamyl transferase (GGT) are most often measured to evaluate the presence of tissue damage associated with endothelial damage. Dysfunction of endothelial cells can contribute to inappropriate vasoconstriction and platelet aggregation which are early signs of hypertension.[18]

Conclusion: We conclude that serum GGT and LDH measurements may provide a sensitive indicator of hepatic damage and could have some advantage over routine investigations of liver function, especially in early recognition or severity of preeclampsia. Hepatic enzymes measurement i.e. GGT and LDH with AST and ALT may be clinically beneficial for monitoring the liver function in the management of preeclampsia which has hepatic involvement.

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