Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com/journal/sjams/home

OPEN ACCESS

Obstetrics & Gynaecology

Liver Function Tests in Preeclampsia- A Clinical Study

Dr. Barun Kr. Basumatary[1], Dr. Biva Goswami[2], Dr. Pranabjyoti Kalita[3*]

[1]Professor, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankardeva University of Health Sciences, Guwahati, Assam
[2]Assistant Professor, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankardeva University of Health Sciences, Guwahati, Assam
[3]Post Graduate Student, Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital, Guwahati Under Srimanta Sankardeva University of Health Sciences, Guwahati, Assam

***Corresponding author:** Dr. Pranabjyoti Kalita
| **Received:** 26.12.2018 | **Accepted:** 05.01.2019 | **Published:** 30.01.2019
DOI: 10.36347/sjams.2019.v07i01.040

Abstract | **Original Research Article**

Introduction: Hypertensive disorders complicate 5 to 10 percent of all pregnancies and together they are one member of the deadly triad –along with haemorrhage and infections - that contributes to maternal mortality and morbidity. Hypertensive disorders during pregnancy may cause damage to liver which may manifest biochemically as a deranged liver function test and subsequent maternal morbidity and mortality. Elevation in liver enzymes in a pre-eclamptic patient is significant and influences fetomaternal outcome. The aim of this study is to study the liver function tests in preeclamptic patient, to compare the serum liver enzymes in normal pregnant women and in women with preeclampsia and to compare maternal and perinatal outcomes and severity of the disease with serum liver enzymes. ***Materials and Methods:*** This study was conducted in antenatal patient admitted in Department of Obstetrics and Gynaecology, Gauhati Medical College & Hospital, which is a tertiary care hospital, located at Guwahati, in the state of Assam, North East state of India. This study was conducted during the period of one year w.e.f. 1st September, 2017 to 31st August, 2018, the pregnant women were followed till discharge to know the maternal and perinatal outcome. This study was conducted on 100 patients after approval by the institute ethics committee, informed consents were taken from patients, inclusion and exclusion criteria were met, and all enrolled patients were classified into mild and severe preeclampsia and managed as per standard guidelines. A random venous blood sample (5ml) was drawn under aseptic precautions from the selected patients in to a plain vial by sterile disposable syringe. The serum was used for the estimation of urea, creatinine, uric acid, alanine transaminase, aspartate transaminase, bilirubin, LDH. Estimation was done by using a fully automated biochemical analyzer.(VITROS 5600). ***Results:*** From the present study it can be derived that de-arranged liver function test is associated with poor maternal outcome and adverse fetal complications are likely to occur. ***Conclusion:*** From the present study it can be concluded that severity of liver function test derangement is directly related to severity of preeclampsia which in turn is related to severity of fetomaternal complications.

Keywords: Elevated liver enzymes, Preeclampsia, Maternal, Neonatal outcome.

INDTRODUCTION

Hypertensive disorders complicate 5 to 10 percent of all pregnancies. Preeclampsia is a multisystem disorder of unknown etiology, unique to pregnancy with onset after 20 weeks of gestation. It is characterised clinically by new onset of hypertension, proteinuria with or without pathological edema. Preeclampsia complicates 2-8% of pregnancies and is a major cause of maternal morbidity, perinatal mortality & morbidity and premature delivery. FOGSI and other studies show the incidence of preeclampsia in India ranges between 11-13%.

The complications of uncontrolled high blood pressure during pregnancy affect multiple organ systems and can be detrimental to both mother and fetus. Maternal complications of preeclampsia include seizure activity, placental abruption, stroke, HELLP syndrome (hemolysis, elevated liver enzymes and low platelets), liver hemorrhage, pulmonary edema, acute renal failure and disseminated intravascular coagulation (DIC). Of all these complications the main cause of death in preeclampsia and eclampsia are cerebrovascular complications, primarily cerebrovascular haemorrhage. Renal and hepatic failure is also listed frequently in the cause of death. Disseminated intravascular coagulation is another

important cause seen in 15% of the patients. Liver function tests are routinely performed in women as a part of investigations to assess the severity at admission and later to guide appropriate management. In women with preeclampsia, liver function tests performed better in predicting adverse maternal than fetal outcomes. The presence of increased liver enzymes was associated with an increased probability of maternal and fetal complications. The knowledge of liver function and of its role in various disease processes is essential for the practising obstetrician. Although severe liver disease is only an occasional complication of pregnancy, it has disproportionately high mortality rate. In India only few studies have been conducted on liver function tests in preeclampsia and observed significantly raised values of AST, ALT and LDH in preeclampsia. Deterioration of hepatic function is a crucial determination in the clinical management of the hypertensive pregnancies.

Also as definitive management of preeclampsia is termination of pregnancy with ultimate aim of achieving optimal fetomaternal well-being therefore an attempt is being made to evaluate the liver enzymes as a diagnostic and therapeutic tool in the management of preeclampsia and to establish a correlation between severity of liver function test derangement and severity of fetomaternal complications.

Aim & Objectives

To study the liver function tests in preeclamptic patient .To compare the serum liver enzymes in normal pregnant women and in women with preeclampsia and to compare maternal and perinatal outcomes and severity of the disease with serum liver enzymes.

MATERIALS AND METHODS

This study was conducted in antenatal patient admitted in Department of Obstetrics and Gynaecology, Gauhati Medical College & Hospital, which is a tertiary care hospital, located at Guwahati, in the state of Assam, North East state of India. This study was conducted during the period of one year w.e.f. 1st September, 2017 to 31st August, 2018; the pregnant women were followed till discharge to know the maternal and perinatal outcome.

Inclusion criteria

All pregnant women ≥ 20 weeks of gestation will be enrolled in this study and divided into following groups: Group A- Healthy normo-tensive pregnant women (controls) and Group B- Patients of preeclampsia (subjects). Subjects will be further subdivided into following subgroups: Subgroup I- Mild preeclampsia and Subgroup II- Severe preeclampsia.

Exclusion criteria

1. Pregnant women with essential hypertension or hypertension. < 20 weeks gestation. 2. Patients with Diabetes 3. Patients with heart disease. 4. Patients with Liver disease 5. Patients with epilepsy

A random venous blood sample (5ml) was drawn under aseptic precautions from the selected patients in to a plain vial by sterile disposable syringe. The serum was used for the estimation of urea, creatinine, uric acid, alanine transaminase, aspartate transaminase, bilirubin, LDH. Estimation was done by using a fully automated biochemical analyser (VITROS 5600).

Clinical Data

This study was conducted on a total of 50 preeclampsia women as subject group and 50 healthy normotensive pregnant women (controls). They were enrolled in the study after approval by the institute ethical committee; informed consents were taken from patients, inclusion and exclusion criteria were met, all enrolled patients were classified into mild and severe preeclampsia and managed as per standard guidelines.

Outcome were measured in terms of age of the mother, parity, socioeconomic status, antenatal care status, duration of gestation, BP, degree of proteinuria, mode of delivery, perinatal and maternal outcome. Maternal complications in the form of severity of preeclampsia, eclampsia, HELLP syndrome, placental abruption, hepatic failure (Hepatic encephalopathy with deranged INR), renal failure, postpartum hemorrhage, hypertensive encephalopathy and maternal death were recorded. Fetal complications in the form of fetal distress, meconium aspiration syndrome, preterm birth, IUGR and intrauterine fetal death were also recorded. For every woman the following data was noted. The significance of these tests was calculated using various formulas. The significance was based on P-value. P value is considered significant when it is < 0.05.

RESULTS

The study comprises of 100 pregnant women in their third trimester which were divided into two groups: Group-A- Consisted of 50 normotensive pregnant women and Group-B- 50 patients with preeclampsia (8 patients with mild preeclampsia and 42 patients with severe preeclampsia).

Table -1: Showing Gestational age of delivery in the two groups,

Gestational age (In weeks)	Groups	
	A	B
<34 wks	0	4(8%)
34-36 wks	4(8%)	11(22%)
37-38 wks	23(46%)	18(36%)
39-40 wks	15(30%)	13(26%)
41 wks & above	8(16%)	4(8%)

Table-1: Showing Gestational age of delivery in the two groups. The gestational age at delivery of patients in the various groups is different. In Group-A the maximum number of patients are in 37-38 weeks range and only 8% preterm deliveries. Whereas in Group B preterm deliveries constitute a larger number (30%) of patients.

Table-2: Showing distribution of cases with altered liver enzymes

Liver Enzymes Groups	AST	ALT	ALP	GGT	LDH
Group-A	2(4%)	3(6%)	2(4%)	0	0
Group-B	34(68%)	33(66%)	23(46%)	38(76%)	13(26%)

This table shows the distribution of cases with altered liver enzymes in two groups. In the normotensive group or Group-A, there was elevation of AST and ALT only in 2(4%) & 3(6%) case. In Group-B, maximum patients had liver enzyme elevation. In preeclampsia 34 cases had elevated AST and 33 cases had elevated ALT.

Table-3: Showing variation in AST values in various groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	24.28	10.618	-
B	92.6	96.286	<0.0001

Table-3: Showing variation in AST values in various groups Mean and Standard Deviation, in relation to Group A 24.28 and 10.618; B 92.6 and 96.286. P value <0.0001. This table shows the mean and standard deviation (SD) of the AST values in the two groups. It has been observed that the P-value of the mean differences in the Group-B is significant.

Table 4: showing variation in ALT values in various groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	24.84	79.384	-
B	76.56	113.06	<0.0148

Mean, Standard Deviation & P value in relation to Group A-24.84, 79.384 - B 76.56, 113.06 and P value <0.0148. In the present series the ALT values (in U/L) vary in the various groups. The mean of the values in Group A is 24.84 and in Group B, 76.56. The mean value of Group B, when compared with Group A is significant.

Table-5: Showing ALP values (U/L) in two groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	228.36	79.384	-
B	355.92	113.06	<0.0001

In the present study the mean of ALP values (U/L) in two groups were 228.36 and 355.92 respectively (Table-5).

The mean difference in group A and group B is significant. The p-value of mean difference is statistically very significant in group B (Table-6).

Table-6: Values of GGT in two groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	22.14	2.148	-
B	35.92	15.118	<0.0001

Table-7: Showing values of LDH in two groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	274.44	48.247	-
B	399.48	134.39	<0.0001

The mean difference of the values of LDH (U/L) in the different groups are shown in the table above. It is observed that the mean of Group B or the preeclampsia group differs significantly from the normotensive group.

Table-8: Showing values of LDH in two groups

Groups	Mean	Standard Deviation	P value in relation to Group A
A	274.44	48.247	-
B	399.48	134.39	<0.0001

The mean difference of the values of LDH (U/L) in the different groups are shown in the table above. It is observed that the mean of Group B or the preeclampsia group differs significantly from the normotensive group.

Table-9: Showing specific therapy in the various groups

Drugs	Groups	
	A	B
Antihypertensives	0	44(88%)
MgSO4 therapy	0	39(78%)
Ursodeoxycholic acid	2(4%)	18(36%)

The patients in group A did not receive any antihypertensive or anticonvulsant therapy as they belonged to the normotensive group. Only two (4%) women received ursodeoxycholic acid. In group B, the percentage of patients receiving antihypertensive drugs is 88%. MgSO4 therapy was given to 39 patients (78%) in group B. Ursodeoxycholic acid was given to 18 patients (36%) in group B, This drug was given to patients electively admitted in ward and not to those which came as emergency admissions in labour.

DISCUSSION

Hypertensive disorders of pregnancy are one of the leading causes of maternal and perinatal morbidity and mortality. Pregnancy normally induces appreciable changes in the physical findings as well as biochemical tests involving almost all systems in the body. In normal pregnancy considerable changes are seen in the liver function. Liver dysfunction complicates as many as 3% pregnancies [1].

The multisystem nature of preeclampsia is often manifested as elevated liver enzymes due to vasoconstriction of hepatic vascular bed. The prevalence of liver dysfunction was 20-30% as documented in the previous studies. But when the pregnancy specific reference range was used, the prevalence was much higher (54%) [2].

Gestation in weeks at delivery

The mean gestational age at delivery of the preeclampsia women with elevated liver enzymes in the study conducted by J.C. Girling & co-workers [2] was 35.7 weeks and 37.29 weeks in our study.

In the present study, the gestational age in weeks at delivery in the normal & deranged liver enzymes in the different groups is shown in the table. It is found that gestational age at delivery is lower in patients with abnormal liver enzymes in preeclampsia.

In the present study, the incidence of elevated liver enzymes was found to be 66% in preeclamptic women. In a study conducted by J.C. Girling & Coworkers, incidence of liver dysfunction in preeclampsia cases was 54% which was comparable to our study.

In the present study, the rate of induction in the preeclampsia group with elevated liver enzymes is 66.67%, which is quite comparable with of the study conducted by J.C. Girling & Coworkers [2].

In the present study caesarean section rates in the preeclamptic women with deranged liver enzymes was 57.57% , which is comparable to study conducted by Al Inizi *et al*. (54%), Sivai *et al*. (49%), Tuffnell *et al*. [5](72.1%), J. Francisco Abbade & Coworkers [3] (90.2%). The caesarean section rate in the study conducted by J.C. Girling & Coworkers [2] was 68%. The higher rate of caesarean section in our study is due to the fact that cases present lately to our hospital which is a teritiary care center.

In this present study, preeclamptic women with derangement of liver enzymes had higher complications rate than patients with normal liver enzymes. The complication rates were comparable to the study conducted by J. Francisco Abbade & Coworkers [3] and Puneeta *et al*. [4], the higher rate of imminent eclampsia in our study is due to the fact that cases present lately to our hospital, which is tertiary care centre.

Table-10: Showing maternal complications in preeclamptic women with elevated liver enzymes

Maternal complications	Studies		
	J. Francisco Abbade&Coworkers, 2002	PuneetaMahajan et al, 2018	Present study
Imminent eclampsia	43.9%	-	87.87%
Eclampsia	14.6%	3.20%	9.09%
Partial HELLP syndrome	12.9%	-	3%
HELLP Syndrome	-	1.42%	6%
Abruptio placentae	-	3.56%	6%
Maternal death	-	0.36%	3%
Hysterectomy		0.36%	3%

In this present study, preeclamptic women with derangement of liver enzymes had higher complications rate than patients with normal liver enzymes. The complication rates were comparable to the study conducted by J. Francisco Abbade & Coworkers [3] and Puneeta *et al*. [4], the higher rate of imminent eclampsia in our study is due to the fact that cases present lately to our hospital, which is tertiary care centre.

Fetal outcome in preeclamptic women with liver dysfunctions

In the present study, there was more fetal complication in the preeclampsia with liver dysfunction.

Table-11: Showing outcome in preeclamptic groups in the present study

Foetal Outcome	Groups	
	Normotensive	Preeclamptic
Preterm delivery	6%	33.3%
Term delivery	94%	66.67%
Still Birth/IUFD	-	21.21%
Neonatal death	-	3%
IUGR	-	42.42%
NICU Admission	-	42.42%

Table-12: Table showing fetal outcome in different studies

Outcome variables	Studies		
	J. Francisco	Puneeta Mahajan et al, 2018	Present Study
Preterm delivery	57.7%	47.05%	33.3%
Term delivery	42.3%	52.95%	66.67%
Still Birth/IUFD	5.1%	4.34%	21.21%
Neonatal death	8.8%	-	3%
IUGR	27.4%	28.9%	42.42%
Foetal distress	-	8.69%	36.36%
NICU Admission	-	49.20%	42.42%

In the present study percentage of preterm deliveries (33.3%) neonatal death (3%), still births (21.21%), & IUGR (42.42%) is comparable to the study conducted by J. Francisco Abbade & co-workers [3] & Puneeta Mahajan *et al*. [4].

CONCLUSION

From the present study it can be concluded that severity of liver function test derangement is directly related to severity of preeclampsia which in turn is related to severity of fetomaternal complications.

In pregnant women with preeclampsia with elevation of liver enzymes, there is increased rate of induction of labour, increased caesarean section rates and more maternal complications in the form of impending eclampsia, eclampsia, HELLP syndrome, placental abruption, intensive care unit stay, liver failure, renal failure, postpartum hemorrhage. Fetal outcome is also affected as there are more preterm deliveries, fetal distress, intrauterine growth retardation, stillbirths and neonatal deaths in the abnormal liver enzyme group compared to normal liver enzyme group of patients. Thus proper diagnosis and timely management of these patients can give us a favourable pregnancy outcome.

Acknowledgements

I would like to thank Dr. R.K. Talukdar, Department of Obstetrics and Gynaecology, GMCH, Guwahati, for helping and giving guidance in making this paper.

REFERENCES

1. Ch'Ng CL, Morgan M, Hainsworth I, Kingham JG. Prospective study of liver dysfunction in pregnancy in Southwest Wales. Gut. 2002 Dec 1;51(6):876-80.
2. Girling JC, Dow E, Smith JH. Liver function tests in pre-eclampsia: importance of comparison with a reference range derived for normal pregnancy. BJOG: An International Journal of Obstetrics & Gynaecology. 1997 Feb;104(2):246-50.
3. *Abbade JF, Peraçoli JC, Costa RA, Calderon ID, Borges VT, Rudge MV. Partial HELLP Syndrome: maternal and perinatal outcome. Sao Paulo Medical Journal. 2002;120(6):180-4.*
4. Puneeta Mahajan1, Vinita Gupta2, Aarushi Chaudhary3,*, Shinky Mehta4 1Medical Director, 2OBG Specialist, 3Secondary DNB Resident, 4Senior Resident, 1-3Dept. of Obstetrics and Gynaecology, 4Dept. of Biochemistry, Dr. Baba Saheb Ambedkar Medical College and Hospital, Rohini, New Delhi, India.
5. Tuffnell DJ, Jankowicz D, Lindow SW, Lyons G, Mason GC, Russell IF, Walker JJ, Yorkshire Obstetric Critical Care Group. Outcomes of severe pre-eclampsia/eclampsia in Yorkshire 1999/2003. BJOG: An International Journal of Obstetrics & Gynaecology. 2005 Jul;112(7):875-80.