European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 03, 2022

ORIGINAL RESEARCH

STUDY AND COMPARISON OF LIVER FUNCTION TESTS IN PRE-ECLAMPSIA AND ECLAMPSIA WITH NORMAL HEALTHY PREGNANT WOMEN

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ABSTRACT:

Background:Preeclampsia is a multisystem disorder, which occurs only in pregnant women during the second and third trimesters of pregnancy and is associated with raised blood pressure and proteinuria. It rarely presents before 20 weeks of gestation like in hydatidformmole.Eclampsia is a syndrome with one or more episodes of convulsions in association with preeclampsia. In India, the national incidence of hypertensive disorders is 15.2%,with incidence in nulliparous women being four times greater than in multipara.Liver Function Test (LFT) abnormalities occur in 3% of the pregnancies, and preeclampsia is the most frequent cause6.In HELLP syndrome, an elevation in liver function test results is noted7. Periportal hemorrhagic necrosis in the periphery of the liver lobule is probably the lesion that causes elevated serum liver enzymes.AIM: To Study and compare liver function tests in Pre-eclampsia and Eclampsia with normal healthy pregnant women and assess the ante-partum severity in both the diseases.

Materials and Methods: Study was conducted on 70 pregnant women admitted with pre-eclampsia and eclampsia and 35 normal pregnancy patients in between 19-26 yrs of age in third trimester of pregnancy.

Results: There is an increase in Diastolic blood pressure in mild pre-eclampsia and significant increase in severe pre-eclampsia and eclampsiapatientswhen compared to controlsThere is an increase in AST, ALT, LDH parameters in mild pre-eclampsia and significant increase in severe pre-eclampsia and eclampsia patientswhen compared to controls except for bilirubin.

Conclusion: There is a derangement of parameters of LFT in severe preeclampsia and eclampsia. But there was no significant elevation in mild pre-eclampsia.Persistant liver parameter that increased was ALT (as it is more specific to the liver damage). These can be taken as a predictor of the disease.

Keywords: DiabetesPre-eclampsia, Eclampsia, Bilirubin, Alanine transaminase(ALT), Aspartate transaminase (AST), Lactate dehydrogenase(LDH).

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INTRODUCTION:

Preeclampsia is a multisystem disorder, which occurs only in pregnant women during the second and third trimesters of pregnancy and is associated with raised blood pressure and proteinuria. It rarely presents before 20 weeks of gestation like in hydatidform mole.[1]

Eclampsia is a syndrome with one or more episodes of convulsions in association with preeclampsia.In India, the national incidence of hypertensive disordersis15.2%,with incidence in nulliparous women being four times greater than in multipara.[2]

In normal pregnancy there is decreased blood pressure response to pressor substances but in preeclampsia there is marked response to vasopressin, norepinephrine and angiotensin.This response of arterial system leads to generalized vasoconstriction and hypertension in preeclampsia .Generalized vasoconstriction is responsible for decreased GFR and renal plasma flow. This causes alteration in various biochemical parameters. These alterations secondarily lead to many pathophysiological changes which adversily affect maternal and fetal wellbeing.

Preeclampsia is multi systemic disorder and multi organ dysfunction is due to increased blood pressure.[3] Liver function abnormalities and renal function abnormalities are the important causes.[4]Preeclampsia is associated with substantial risks for the fetus, which include Intrauterine growth retardation, death and prematurity with attendant Complications.Whereas mother is at risk of seizures (eclampsia),renalfailure, pulmonary odema, stroke and death. Even after considerable research, the cause for preeclampsia remains unclear and there are no useful screening tests in early diagnosis of preeclampsia.[5]

Liver Function Test (LFT) abnormalities occur in 3% of the pregnancies, and preeclampsia is the most frequent cause.[6]In HELLP syndrome, an elevation in liver function test results is noted.[7] Periportal hemorrhagic necrosis in the periphery of the liver lobule is probably the lesion that causes elevated serum liver enzymes.[8]

Complications are likely to occur during pregnancy, during labour, and in puerperium if the patient is left uncared.

So, the objective of this study was to compare liver function tests in preeclampsia and eclampsia with normal pregnancy.[9]

MATERIALS & METHODS:

It is a prospective study, carried out on 70 pregnant women admitted with pre-eclampsia and eclampsia and 35 normal pregnancy patients in between 19-26 yrs of age in third trimester of pregnancy at modern govt. maternity hospital,petlaburz,hyderabad, a tertiary care referral unit.Detailed history and examination were carried out. Investigations like complete hemogram, liver function tests, renal function tests, coagulation profile, fund us and 24 hours urine for protein were done. Obstetric management was done as per existing protocol in the department, magnesium sulphate was the drug of choice for controlling convulsions, and blood pressure was controlled either by oral nifedipine or methyl dopa.

This study was carried out in the department of obstetrics and gynaecology in association with department of biochemistry at modern govt. maternity hospital,petlaburz,Hyderabad.

Preeclampsia: classified as mild & severe preeclampsia. Mild preeclampsia is diagnosed by high blood pressure & high levels of protein in urine. Severe preeclampsia is diagnosed by symptoms of mild preeclampsia plus signs of kidney or liver damage.

Eclampsia:A life threatening condition during pregnancy or shortly after giving birth characterised by the development of seizures.

Exclusioncriteria:

Pregnant women with other disorders like chronic liver disease, renal disease and medications causing liver damage are excluded. Those patients with pre-existing hypertension, diabetes mellitus, gestational hypertension, active urinary tract infection and refusal to cooperate are excluded.

Collection of blood sample for analysis:

A random venous blood sample(5ml) was drawn from the patients in to asterile disposable syringe which was transferred into centrifuge tubes and allowed to clot for 30 minutes. The sample was centrifuged at 3000 rotations per minute for 10 minutes and serum was separated and collected from the centrifuge tubes and stored at-20c until analysed.

The following parameters were estimated in all patients

1. Serum alanine transaminase
2. Serumaspartate transaminase
3. Serum bilirubin
4. Serum LDH

Methods:

Liver Function Tests

AST(SGOT)Mod.IFCC method(normal- ≤35U/l)

ALT(SGPT)Mod.IFCC method(normal- ≤35 U/L)

Bilirubin: Diazo method,[10]

(normal- 0.2- 1.0 mg/dl)

Lactate Dehydrogenase (LDH-P) DGKC Method11, kinetic (normal- 250-450 U/L)

RESULTS

Comparisions of Diastolic blood pressure between normal and mild pre eclampsia patients

Table 1:Comparisions of Diastolic blood pressure between normal and mild pre-eclampsia patients

S. No	Investigation		Control	Mild pre-eclampsia Group-1
01	Diastolic Blood Pressure	Mean	75	94.7
		SD	6.30	11.5
		t-Test	11.5	
		p-Value	0.0001	

The above table shows the comparative data of diastolic blood pressure(mm Hg) in control and cases of mild preeclampsia. The mean and S.D of normal pregnancy and mild preeclampsia is 75 ± 0.78, and 94.7 ± 11.18 and p value is 0.0001 which is highly significant. (P-value <0.005 is significant).

Table 2: Comparisions of different parameters between normal and severe preeclampsia/eclampsia patients

S. No	Parameters		Control	Severe pre-eclampsia/eclampsiaGroup-2
01	Diastolic Blood Pressure	Mean	74	104.5
		SD	6.05	6.1
		t-Test	20.7	
		p-Value	0.0001	

The above table shows the comparative data in control and severe preeclampsia and eclampsia cases. The means and S.D of diastolic blood pressure (mm Hg) in controls, and group-2 are 75 ± 0.762and 104.5 ± 6.1 respectively and p value is 0.0001 which is highly significant. (P-value <0.005 is significant).

Table 3: Comparisions of Liver Parameters Between Normal And Mild Pre-Eclampsia Patients

S. No	Investigation		Control	Mild Pre-EclampsiaGroup-1
01	AST	MEAN	33.17	42.5
		SD	2.06	5.6
		T-test	9.29	
		P-value	0.0001	
2	ALT	MEAN	27.31	36.6
		SD	2.9	3.5
		T-test	12.03	
		P-value	0.0001	
3	SERUM LDH	MEAN	260.2	289
		SD	17.44	28.17
		T-test	5.3	
		P-value	0.0001	
4	Total Bilurubin	MEAN	0.79	0.80
		SD	0.15	0.151
		T-test	0.41	
		P-value	0.6799	

The above table shows the comparative data of LFT in control and cases of mild preeclampsia. AST, ALT, LDH and bilirubin in controls and Group-1 are 33.15 ± 2.06, 27.31 ± 2.9, 260.2 ± 17.44, 0.79 ± 0.15 and 42.5 ± 5.6, 36.6 ± 3.5, 289 ± 28.17, 0.80 ± 0.151

respectively. P value is significant in this parameter as the value is <0.005 except in bilirubin which is >0.05 and is not significant.

Table 4: Comparisions of Liver Parameters Between Normal And Severe Preeclampsia/Eclampsia Patients

S. No	Parameters		Control	Severe pre-eclampsia/eclampsiaGroup-2
01	AST	MEAN	33.17	60.51
		SD	2.06	9.6
		T-test	6.1	
		P-value	0.001	
2	ALT	MEAN	27.31	51.94
		SD	2.9	11.18
		T-test	2.5	
		P-value	0.0001	
3	SERUM LDH	MEAN	260.2	440.02
		SD	17.44	108.45
		T-test	17.5	
		P-value	0.0001	
4	Total Bilurubin	MEAN	0.79	0.94
		SD	0.15	0.32
		T-test	2.5	
		P-value	0.075	

The above table shows the comparative data of liver function tests, AST, ALT, LDH and BILURUBIN in controls 33.15 ± 2.06, 27.31 ± 2.9, 260.2 ± 17.44and 0.79 ± 0.15 and Group-260.51 ± 9.6 51.94± 11.18, 440.02 ± 108.45, 0.94 ± 0.32. p value is<0.0001 which is highly significant. Except bilurubin p value is >0.0.

DISCUSSION:

Hypertensive disorders complicating pregnancies are common and form one of the deadly triad along with haemorrhage and infection that contribute greatly to maternal morbidity and mortality.

In this study 80%(56) are primis in preeclampsia and eclampsia cases Diastolic BP is significantly elevated in preeclampsia and eclampsia patients.

In the present study liver function tests like AST, ALT,LDH and total bilirubin are studied in preeclampsia and eclampsia and normal pregnancy.

The results of present studies are discussed under 3 groups.

1. Control group(normal pregnancy)
2. Mild preeclampsia (Group-1)
3. Severe preeclampsia and eclampsia (Group-2)

Control Group

A total number of 35 normal pregnant women were studied. The age group of these subjects ranged from 19-26yrs.

All these subjects are normotensive and healthy pregnant women. The results of liver function tests are with in normal limits in these group. This is in line with the study by Ylostolo (1970), Panerietal(2011).

GROUP-1(Mild preeclampsia): A total number of 35 cases have been studied in this group. Liver function tests are significantly elevated compared to control group.

GROUP 2(Severe preeclampsia and eclampsia).

In these cases there is significant raise in liver parameters which are constantlyelevated except Serum bilirubin level which is not significantly higher when compared to that of controls ($p<0.654$) of same age. This correlates to study by Paneri etal.[12]

LDH levels are significantly elevated ($P<0.001$). LDH 5 is specific to liver pathology. Jaleel et al,[13]found that there was a highly significant rise in serum lactate dehydrogenase and aspartate aminotranferase level in preeclamptic women compared to norrmo tensive pregnant women.

Serum ALT of severe preeclamptic and eclamptic women in this study was significantly($p<0.001$) elevated from their normotensive pregnant counterparts. Malvinoet al observed that in preeclampsia the serum transaminase level was raised to >70 U/L and can rise up to 210U/L in eclampsia.[14] In the present study the mean serum AST level in preeclamptic cases was found significantly higher ($p<0.001$) than the normotensive control group. Rath et al also noticed elevated level of ALT and AST in severe preeclampsia.[15]

The mechanisms driving the abnormal elevation of liver enzymesAST, ALT leading to preeclampsia are unclear. In preeclampsia hypervascularization,and vasoconstriction of liver leads to liver cell injury and alteration of cell membrane permeability and damage to the cells which allows intracellular enzyme to leak in to the blood,leading to elevated liver enzymes(Kokia E1990,Madazilla 1990) like SGOT,SGPT.

Present study suggest that serum liver enzymes AST,ALT,LDH appears to be of immense value in understanding the pathogenesis and also appears to be an important contributing factor of pre-eclampsia.

CONCLUSION:

Liver involvement is common in preeclampsia and eclampsia.

There is a derangement of parameters of LFT in severe preeclampsia and eclampsia.But there was no significant elevation in mild pre-eclampsia.

The average diastolic BP when significance changes occurred was around 105mmHg

Persistant liver parameter that increased was ALT (as it is more specific to the liver damage). These can be taken as a predictor of the disease.

Though it is ideal to perform complete tests, it may be adviced to perform ALT and LDH only in limited resource settings to make it cost effective.

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