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RELEVANCE OF VARIATION OF LIVER FUNCTION TESTS IN PREGNANCY INDUCED HYPERTENSION

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ABSTRACT

Pregnancy induced hypertension is one of the most common and challenging medical complication of pregnancy as this complex disease continues to defeat all efforts to bring about satisfactory and rewarding policy of management because of its poor understanding of pathological basics. It is the hypertension that results from direct gravid state and is one of the critical obstetric complications attributing to high incidence of fetal and maternal morbidity and mortality. This complication of pregnancy though responsible for large number of maternal and perinatal deaths, can be easily prevented and controlled by early detection of disease and proper management. In this study, we assessed the extent to which liver function tests can be used to predict the adverse maternal outcomes.

KEYWORDS : PIH, Liver enzymes, fetal, maternal, complications

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INTRODUCTION

Pregnancy induced hypertension (PIH) is the second killer disease of pregnant mothers all over the world in developing countries. It forms a deadly triad along with hemorrhage and infection. PIH is one of the most common causes of both maternal and neonatal morbidity[1]. PIH associated liver dysfunction includes HELLP syndrome and pre-eclamptic liver dysfunction. HELLP syndrome stands for hemolysis, elevated liver enzyme AST (>70IU/L) and low platelet count (<100,000/μL. Pre-eclamptic liver dysfunction comprises of elevated liver transaminases or bilirubin in the presence of hypertension, proteinuria and edema occurring after 20 weeks of gestation[2]. The HELLP syndrome and increased oxidative stress in preeclampsia occurs in about 5-8% of pregnancies[2]. Preeclampsia occurs during second and third trimester of pregnancy. It is characterized by blood pressure above 140/90 mmHg or rise in systolic blood pressure (SBP) more than 30mmHg and diastolic blood pressure (DBP) more than 15mmHg after 21 weeks of gestation[3]. Pre-eclampsia is a multi-system disorder of the mother that affects the fetus because of utero-placental insufficiency[4]. As a consequence these babies are at risk for intra-uterine growth restriction and premature birth. They may also suffer due to high rate of operative deliveries and the adverse effects of maternal drugs. Liver enzymes like aspartate aminotransferase (AST) or serum glutamic oxaloacetic transaminase (SGOT) and alanine aminotransferase (ALT) or serum glutamic pyruvic transaminase (SGPT) are often increased in preeclampsia. The Delphi survey of international experts considered liver function tests (LFTs) to be the third most important predictor of maternal and fetal complications in preeclampsia after blood pressure and proteinuria[6]. Other studies have reported a positive association between elevated maternal serum liver enzyme levels and adverse maternal and fetal outcomes[7-9]. In this study, we assessed the extent to which liver function tests can be used to predict the adverse maternal outcomes in pregnancy in hypertension.

MATERIALS AND METHODS

This prospective study was conducted in the Department of Physiology in collaboration with Department of Biochemistry and Obstetrics & Gynaecology of SCB Medical College, Odisha. The study was approved by the institute research council and informed consent was taken from the patients for inclusion in the study. Cases comprised of mothers diagnosed as having pregnancy induced hypertension. Controls were selected from mothers not having PIH. The mothers were diagnosed as having PIH when their present blood pressure was greater than 140 / 90 mmHg along with proteinuria. The subjects under the study group & control group were divided into five groups taking their blood pressure as criteria. Group I comprised of 20 normotensive pregnant women taken as control. Group II- V included 80 subjects taken in the study groups and were divided based on their Diastolic Blood Pressure. Thus Group II – mild P.I.H (DBP 90-100mmHg), Group III- moderate P.I.H (DBP 100-110mmHg), Group IV- severe P.I.H (DBP≥110 mmHg) and Group V included patients with Eclampsia . The cases and controls having past history of diabetes, hypertension, renal diseases, liver disorders, multiple pregnancies, gestational diabetes, over weight and obese were excluded from the study. Complete history and examination findings of both cases and controls were noted. Fasting blood sugar samples were collected and serum was analyzed for parameters like Bilirubin, SGOT, SGPT, Alkaline phosphatase by enzymatic method using A-15 biosystems biochemistry analyzer. The data was analyzed for statistical significance using one way ANOVA followed by student t-test wherever appropriate. P value < 0.05 was considered as statistically significant.

RESULTS

Table 1
Distribution of cases

GROUPS	NO.OF CASES	PERCENTAGE
Group I	20	-
Group II	4	5
GroupIII	18	22.5
GroupIV	26	32.5
Group V	32	40

Table 2
Serum Bilirubin Level (mg/dl)

GROUPS	MINIMUM	MAXIMUM	MEAN±1 SD
CONTROL	0.86	1.12	0.95±0.07
MILD P.I.H	0.90	1.1	0.98±0.09
MODERATE P.I.H	0.86	1.2	1.03±0.22
SEVERE P.I.H	0.88	1.5	1.00±0.13
ECLAMPSIA	0.89	4.6	1.37±0.76

F=3.93, df = 99, p=0.01

Table 3
Serum SGOT/AST Level (IU/L)

GROUPS	MINIMUM	MAXIMUM	MEAN±SD
CONTROL	14	54	26.9±8.70
MILD P.I.H	26	36	30.5 ±4.12
MODERATE P.I.H	18	68	31.9±13.93
SEVERE P.I.H	21	80	42.73±18.08
ECLAMSIA	22	112	50.06±24.89

F=6.71, df=99, p<0.001

Table 4
Serum SGPT/ALT Level (IU/L)

GROUPS	MINIMUM	MAXIMUM	MEAN±SD
CONTROL	18	70	29±10.46
MILD P.I.H	22	3O	25.5±4.12
MODERATE P.I.H	18	82	34.1±18.25
SEVERE P.I.H	22	89	44.1±18.70
ECLAMSIA	28	130	50.75±23.46

F=5.65, df=99, p<0.001

Table 5
Serum Alkaline Phosphatase Level (IU/L)

GROUPS	MINIMUM	MAXIMUM	MEAN±SD
CONTROL	184	366	227.50±49.28
MILD P.I.H	188	288	235.00±46.92
MODERATE P.I.H	196	404	239.33±59.92
SEVERE P.I.H	192	602	330.00±18.70
ECLAMPSIA	220	984	407.50±l73.27

F=10.28 df=99, p<0.001

DISCUSSION

Hypertensive disorder during pregnancy complicates 7- 10% of total pregnancies out of which 70% are preeclamptic[10]. Pre-eclampsia is a multi-system disorder of the mother that affects the fetus because of utero-placental insufficiency. Complications in the mother include eclampsia, abruption, oliguria, anuria, dimness of vision, and the HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet counts). Intrauterine deaths, intrauterine growth restriction, prematurity and perinatal asphyxia are common complications in the baby[11]. Table I shows the distribution of cases in the different groups i.e. in mild, moderate, severe PIH & control group. Table II-V compares the serum liver enzymes levels (serum bilirubin, SGOT, SGPT, Alkaline phosphatase) of control and the study groups. There is a progressive increase in the different liver enzymes in mild, moderate, severe PIH and eclampsia respectively as compared to the control group. The p value of serum bilirubin variation in relation to severity of disease was < 0.01 which is significant, whereas in case of serum SGOT, SGPT and Alkaline Phosphatase the p value < 0.001, which is highly significant. The mechanisms driving the abnormal elevation of liver enzymes like SGOT, SGPT, Alkaline phosphatase leading to pre eclampsia are unclear .In pre eclampsia 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 like SGOT, SGPT, Alkaline phosphatase[12]. This association between P.I.H and liver function test may help in developing strategies for prevention and early diagnosis of maternal and fetal complications.

CONCLUSION

In any country maternal deaths due to hazards of pregnancy and labor reflects the standard of maternal services and facilities available. Severe hypertension in a pregnant woman is a multisystem disease and a threat to the well-being of both mother and child. Being able to determine which women and fetuses most are at risk early in the course of the illness would enable clinicians to tailor individual management more effectively. Identifying women at risk for adverse outcomes would allow intensive monitoring or intervention and effective use of resources. So, liver function tests are routinely performed in women as part of a battery of investigations to assess severity at admission and later to guide appropriate management.

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