

A prospective study of association of deranged liver function tests and renal function tests with severity of preeclampsia

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Abstract

Hypertensive disorders represent the most common complication of pregnancy affecting 7 to 15% of all gestations. Amongst these, preeclampsia accounts for 5-7 percent of all pregnancies. Even after considerable research, the cause for preeclampsia remains unclear and there are no useful screening tests in early diagnosis of preeclampsia. The aim of the study was to see the association of deranged liver function tests and renal function tests with severity of preeclampsia. This is a hospital based prospective study and was conducted in the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur from April 2016 to November to find association of deranged liver function tests and renal function tests with severity of preeclampsia. After the informed consent, total 250 women of more than 20 weeks and more than +1 dipstick urine protein were included in this study. Preeclampsia is seen more frequently in nulliparous women than in multiparous women. This study show SGOT and SGPT had a mean value of 60.76u/l \pm 22.63 and 62.47 u/l \pm 22.36 respectively. Similarly serum creatinine and serum uric acid mean values were 0.58mg/dl \pm 0.20 and 4.82 mg/dl \pm 1.08 respectively. This indicates that women with mild preeclampsia had a relatively stable liver and renal function. In this SGOT and SGPT had a mean value of 120.76u/l \pm 22.63 and 128.47 u/l \pm 22.36 respectively. Similarly serum creatinine and serum uric acid mean values were 2.4mg/dl \pm 0.20 and 10.56 mg/dl \pm 1.08 respectively. This indicates that women with severe preeclampsia had an unstable liver and renal function. Liver and renal involvement is common in preeclampsia and eclampsia. These can be taken as predictors of the disease, assess its severity and manage the patients timely. This can help to reduce the maternal and foetal morbidity to a great extent.

Keywords: Hypertension, preeclampsia, pregnancy, SGOT, SGPT.

1. Introduction

Hypertensive disorders represent the most common complication of pregnancy affecting 7 to 15% of all gestations [1]. Amongst these, preeclampsia accounts for 5-7 percent of all pregnancies [2].

Gestational hypertension can be defined as onset or first diagnosed at more than 20 weeks gestational age, of blood pressure \geq 140/90mmHg measured twice, 4-6 hours apart but not more than 7 days apart in a previously normotensive woman [3]. Proteinuria is defined as urinary excretion of protein \geq 300mg in 24 hr urine or urine protein creatinine ratio \geq 30ng/ml or \geq +1 by qualitative estimation using reagent strips on at least two random urine samples

collected 4-6 hours apart with no evidence of urinary tract infection. Nonetheless, atypical forms of hypertension combined with clinical or laboratory abnormalities in the absence of proteinuria should also be considered as potential pre-eclampsia.

Severe preeclampsia is defined as maternal systolic blood pressure \geq 160 mmHg or diastolic blood pressure \geq 110mmHg along with other features:

- Persistent headaches, epigastric pain, blurring of vision
- Acute pulmonary edema
- SGOT / SGPT > twice the normal values
- oliguria <500cc/day,

- creatinine >1.1 mol/L
- Thrombocytopenia < 100,000/mm³

The pathogenesis of preeclampsia is best explained by the two stage hypothesis [4]. Preeclampsia is a two stage disorder. Stage 1 is caused by faulty endovascular trophoblastic remodelling that down streams and causes the stage two of a systemic clinical syndrome. Due to incomplete trophoblastic invasion, the abnormally narrow spiral arteriolar lumen, likely impairs the placental blood flow. Diminished perfusion and hypoxic environment eventually lead to release of placental debris or micro particles. In response to placental factors released, a cascade of events begins.

Thus the second stage begins which under the influence of pre-existing medical conditions causes exaggerated endothelial cell activation and a generalized hyper inflammatory state. Endothelial injury or activation causes vascular constriction with increased resistance and subsequent hypertension. Endothelial cell damage also causes interstitial leakage through which blood constituents, including platelets and fibrinogen, are deposited subendothelially manifested as thrombocytopenia. The much larger venous circuit is similarly involved, and with diminished blood flow because of maldistribution, ischemia of surrounding tissues can lead to necrosis, haemorrhage, and other end organ disturbances characteristic of this syndrome.

Liver function abnormalities and renal function abnormalities are the important effects. Preeclampsia is associated with substantial risks for the fetus, which include intrauterine growth retardation, death and prematurity with associated complications. Whereas mother is at risk of seizures (eclampsia), renal failure, pulmonary edema, 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. In HELLP syndrome, an elevation in liver function test results is noted. Periportal hemorrhagic necrosis in the periphery of the liver lobule is Liver Function Test (LFT) abnormalities occur in 3% of the pregnancies, and probably the lesion that causes elevated serum liver enzymes.

With severe renal involvement, glomerular filtration may be impaired and the plasma creatinine concentration may begin to rise. Elevated uric acid is another component of the preeclampsia. Although hyperuricemia does correlate with maternal morbidity, there is an even stronger association of uric acid with the risk for small birth weight infants and with overall fetal mortality. The hyperuricemia of preeclampsia has been variably suggested to be associated with lactic acidosis, altered renal functions or oxidative stress. The aim of the study was to see the association of deranged liver function tests and renal function tests with severity of preeclampsia.

1.1 Aims and objective

To find association of deranged LFT and RFT with severity of preeclampsia so as to facilitate early prediction of severe preeclampsia and its timely intervention.

2. Material and methods

This is a hospital based prospective study and was conducted in the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur from April 2016 to November to find association of deranged liver function tests and renal function tests with severity of preeclampsia.

After the informed consent, total 250 women of more than 20 weeks and more than +1 dipstick urine protein were included in this study. A detailed history was taken and general physical and systemic examination done. The blood and urine samples for CBC, LFT, RFT, and URINE RMC were sent to laboratory. Those who threw fits or delivered before completion of the test were excluded from the study.

3. Results and discussion

Table 1: Distribution of cases according to gravidity

Gravidity	Number of Patient	Percentage
Primi gravida	138	55.2%
Gravida 2	69	27.6%
Multi gravida	43	17.2%
Total	250	100%

The above table shows distribution of cases according to gravidity. 55.2 percent of the women were primigravida, 27.6 percent were gravid a 2 and 17.2 percent were multigravida.

Preeclampsia is seen more frequently in nulliparous women than in multiparous women.

In a study by Augustin Conde Agudelo et al [5] nulliparity had RR of 2.38 with 95% CI while multiparity had RR of 2.10 with 95% CI.

Table 2: Distribution of cases according to severity of preeclampsia

Systolic Blood Pressure	Number of Cases	Percentage
140-159	140	56%
≥160	110	44%
Diastolic Blood Pressure	Number of Cases	Percentage
<90	1	0.4%
90 - 109	196	78.4%
110 or more	53	21.2%

56% of women had a systolic blood pressure in the range of 140-159 mmHg and 44% had a systolic blood pressure ≥160mmHg. Similarly 78.4% had a diastolic blood pressure in the range of 99-109 mmHg and 21.2% had diastolic blood pressure >110 mmHg.

Table 3: Mean value of SGOT, SGPT, Serum Creatinine and Serum Uric Acid

Mild Preeclampsia	Mean ± SD	Median
SGOT	60.76 ± 22.63	56.00
SGPT	62.47 ± 22.36	58.00
S. Creatinine	0.58 ± 0.20	0.54
S. uric acid	4.82 ± 1.08	4.65

In this SGOT and SGPT had a mean value of 60.76u/l ± 22.63 and 62.47 u/l ± 22.36 respectively. Similarly serum creatinine and serum uric acid mean values were 0.58mg/dl± 0.20 and 4.82 mg/dl ± 1.08 respectively.

This indicates that women with mild preeclampsia had a relatively stable liver and renal function.

Table 3: Mean value of SGOT, SGPT, Serum Creatinine and Serum Uric Acid

Severe Preeclampsia	Mean ± SD	Median
SGOT	120.76 ± 22.63	110.00
SGPT	128.47 ± 22.36	125.00
S. Creatinine	2.4 ± 0.20	2.15
S. Uric acid	10.56 ± 1.08	10.25

In this SGOT and SGPT had a mean value of 120.76u/l ± 22.63 and 128.47 u/l ± 22.36 respectively. Similarly serum creatinine and serum uric acid mean values were 2.4mg/dl± 0.20 and 10.56 mg/dl ± 1.08 respectively.

This indicates that women with severe preeclampsia had an unstable liver and renal function.

A total of 250 cases were taken and divided into mild and severe preeclampsia. Values of LFT and RFT correlated well with the severity of preeclampsia.

It is in line with study of Jumaan et al [6], Suchandaand Kiyomi et al [7,8] also had same results.

Jaleel et al [9] found that there was a highly significant rise in serum lactate dehydrogenase and aspartate aminotranferase level in preeclamptic women compared to normotensive pregnant women.

Rath et al [10] also noticed elevated level of ALT and AST in severe preeclampsia.

4. Conclusion

Liver and renal involvement is common in preeclampsia and eclampsia. There is a derangement of parameters of RFT and LFT in severe preeclampsia. But there was no significant elevation in mild preeclampsia. These can be taken as predictors of the disease, asses its severity and manage the patients timely. This can help to reduce the maternal and foetal morbidity to a great extent.

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