

## STUDY OF SERUM LIPIDS AND MDA LEVELS IN PREGNANCY INDUCED HYPERTENSION.

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**ABSTRACT: OBJECTIVE:** This study has been under taken to correlate hyperlipidemia with lipid peroxidation in primigravida patients with pregnancy induced hypertension. **MATERIALS AND METHODS:** 60 cases of primigravida patients with pregnancy induced hypertension as test group and 20 healthy primigravida pregnant women as controls were studied. Serum lipids and MDA were estimated. Maternal blood pressures, age and baby birth weights were recorded.

**RESULTS AND CONCLUSIONS:** Serum cholesterol, triglycerides, LDL, VLDL and MDA levels were significantly elevated in primigravida PIH patients when compared with control subjects. 36 % of primigravida patients with PIH were below 20 years of age, while only 20 % of controls were below 20 years. This indicates younger maternal age is one of the factors to PIH.

**KEY WORDS:** PIH, lipid peroxidation, MDA, cholesterol, triglycerides, HDL, LDL.

**INTRODUCTION:** Pregnancy induced hypertension (PIH) is a syndrome of hypertension in pregnancy with or without proteinuria and edema. In India, the national incidence of PIH is 15.2%, with the incidence in primigravida women being four times greater than in multipara<sup>1</sup>.

Preeclampsia is a syndrome of generalised endothelial dysfunction initiated by abnormal placentation and consequent placental under perfusion, release of cytokines, peroxidants and vasoconstriction and platelet activation<sup>2</sup>. Hypertension in pregnancy strikes mostly in the primigravida after 20<sup>th</sup> week of gestation and frequent occurrences are seen near term. It contributes significantly to the cause of maternal and perinatal mortality and morbidity<sup>3</sup>.

Serum lipids increase significantly during pregnancy and are further elevated two fold during PIH<sup>4,5,6</sup>. Several studies have shown that lipid peroxides like malondialdehyde (MDA) are significantly elevated in mild and severe PIH<sup>7,8,9</sup>.

## ORIGINAL ARTICLE

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This study was carried out in semirural area where early marriage of female will happen. The aim of the study was to correlate lipid peroxidation products like MDA with concentration of maternal serum lipids in primigravida patients with severity of PIH.

**MATERIALS AND METHODS:** The study was conducted in department of biochemistry and obstetrics at Prathima Institute of Medical Sciences situated in Nagunur village of Karimnagar district. 20 healthy subjects who had absolute normal pregnancy with normal blood pressure and 60 primiparae with PIH were included into the study. All the patients survived till the end of the study. The diagnosis of PIH was done as per the norms of American college of Obstetrics and Gynaecologists<sup>4</sup> which states that a) systolic blood pressure  $\geq 140$  mm Hg, b) diastolic blood pressure  $\geq 90$  mm Hg or c) increase of  $\geq 30$  mmHg in systolic pressure or d) increase of  $\geq 15$  mmHg in diastolic pressure. PIH was diagnosed when any one of these criteria were present on at least two occasions. The study was approved by the ethics committee of the medical college.

Maternal venous blood samples were collected after over night fasting for estimation of serum cholesterol, triglycerides, HDL, LDL, VLDL and lipid peroxidation product malondialdehyde (MDA).

Serum cholesterol was estimated by CHOD-PAP enzymatic method<sup>10</sup>

Serum triglycerides was estimated by glycerol-3-phosphate oxidase method<sup>11</sup>, HDL was estimated by phosphotungstic acid precipitation method<sup>12</sup>, LDL and VLDL were calculated by Friedewald's formula as follows<sup>13</sup>:

VLDL = triglycerides/5 mg/dl

LDL = total cholesterol - (HDL+ TG/5) mg/dl

MDA was estimated by thiobarbituric acid method<sup>14</sup>

Both systolic and diastolic blood pressures were recorded on two occasions separated by an interval of six hours and the patients were categorised into mild and severe PIH by taking 110 mmHg for diastolic BP and 150 mmHg for systolic BP as the cut off levels.

**STATISTICAL ANALYSIS:** The numerical data was presented as Mean  $\pm$  SD. ANOVA was applied to analyse the significance in more than two group means and 'p' value was elicited. 'p' value of  $<0.05$  was considered as statistically significant. This analysis performed through SPSS version 17.

**RESULTS:** The study included 60 subjects of PIH as test group and 20 subjects of normal healthy pregnant women as controls.

The demographic details of PIH primigravida and control subjects are presented in table - I. The average birth weight of babies born to PIH primigravida mothers is less than that compared to controls. But, the difference was not statistically significant (Table - I). 36% of PIH patients were less than 20 years of age while only 20% of controls were below 20 years.

According to table - II, Serum cholesterol, triglycerides, LDL and VLDL were found to increased significantly in patients of PIH compared to control group ('p'  $< 0.001$ ). But there was no much difference in HDL levels in test group and control group. Serum MDA levels were significantly increased in PIH group compared to control with 'p' value of  $< 0.001$ .

**DISCUSSION:** PIH is associated with occurrence of large placental infarcts and decreased placental growth which results in decreased placental perfusion, fetal malnutrition and decreased fetal growth. In our study, the mean birth weight of babies born mothers with PIH was less than the control subjects. Thus PIH is a contributing factor to the lower birth weight in the study population. The risk of PIH in younger maternal age group is higher in less than 25 years. Our study showed, 36% of patients were below 20 years of age. Hence in the area where this study was conducted, younger age is important factor contributing to the higher incidence of PIH<sup>15</sup>.

Several studies have reported the elevation of serum lipids during pregnancy in general and particularly during PIH<sup>16</sup>. Our study also showed similar serum lipid elevations in PIH compared to control group. In these primigravida PIH patients, the absence of increase of HDL despite the increase of other lipid parameters is a potential risk factor for atherosclerosis<sup>17</sup>.

Increased levels of MDA were found to be associated with increased serum lipid levels, indicating that PIH is associated with excessive free radical formation. Diamant.S.et al shown significant relation between increase in BP and increase in free radical activity<sup>18</sup>. It was hypothesised by many studies that the interaction of disordered lipid profile, endothelial cell damage and oxidative stress changes especially lipid peroxidation may be the cause for the development of PIH<sup>19,20</sup>.

In conclusion, younger maternal age contributes to an increased incidence of PIH among the population studied. The existence of positive correlation between the serum lipids and lipid peroxidation products, lower birth weight of the babies and BP are found in PIH.

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**TABLE : 1**

Demographic details of primiparous PIH patients and control subjects

Parameter	PIH patients (n=60)		Controls (n=20)	
	Mean±SD	Range	Mean±SD	Range
Age (years)	21.37±3.16	18-28	21.57±3.00	19-30
Systolic BP (mm Hg)	142.78±7.5	136-160	108±4.99	90-120
Diastolic BP (mm Hg)	104.65±8.4	90-120	74.4±4.5	68-80
Baby birth weight(gms)	2220.8±252.4	1850 – 2700	2745±301.5	2250 - 3250

**Table - II**

Serum lipids and MDA in PIH patients and controls :

Parameter	Controls Mean±SD	Mild PIH Mean±SD	Severe PIH Mean±SD	Significance
Cholesterol Range(mg/dl)	224.25 ± 10.9 208 - 236	254.8 ± 11.87 240 - 276	310.15 ± 15.71 286 - 334	p<0.0001
HDL Range(mg/dl)	60.9 ± 5.9 52 - 72	59.3 ± 5.13 48 - 80	60.85 ± 3.43 48 - 86	p<0.084
LDL Range(mg/dl)	120.05 ± 13.44 99 - 159	145.65 ± 13.46 127 - 179	197.95 ± 16.91 175 - 229	p<0.0001
VLDL Range(mg/dl)	42.8 ± 1.96 40 - 46	49.85 ± 2.66 44 - 55	49.85 ± 2.64 46 - 56	p<0.0001
Triglycerides Range(mg/dl)	213.30 ± 10.72 198 - 228	249.55 ± 13.0 222 - 264	249.25 ± 13.41 232 - 278	p<0.0001
MDA Range(nM/dl)	2.60 ± 0.99 2.41 - 2.74	3.13 ± 1.85 2.90 - 3.40	3.40 ± 1.87 3.10- 3.60	p<0.001

**Table - III**

Age distribution in controls and PIH cases :

Age	Controls n = 20	PIH cases n = 60
≤ 20 years	04 20%	22 36%
20 - 25 years	10 50%	24 40%