

Assessment of Lipid Peroxidation and Antioxidant Enzymes in Pregnant Women Suffering from Pre-Eclampsia : Sub-Urban Area of Prayagraj and Adjacent Districts

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Abstract

➤ Introduction

Pre-eclampsia is medical condition among pregnant woman where high blood pressure (BP) ranges from 140/90 mmHg or more and high amount of protein present in urine. It is noticed that systolic blood pressure diastolic blood pressure raise line of 30mmHg and 15 mmHg. An important symptom of pre-eclampsia is considered swelling or edema noticed in the hands, feet and face. The cumulative research findings indicate that blood pressure of pregnant woman when raised more than 160/110 indicates condition of severe pre-eclampsia.

➤ Objective

The major objective of this study is to determine the role of antioxidant defense mechanism in pre-eclampsia from early pregnancy.

➤ Method

The present study was undertaken in 25 healthy pregnant women and 25 pre-eclampsia pregnant women of age group between 20-35 years in the Department of Biochemistry, Motilal Nehru Medical College, Prayagraj. The malondialdehyde (MDA) used as a marker of lipid peroxidation and antioxidant enzymes viz., superoxide dismutase (SOD) and catalase levels of each subject is determined.

➤ Results

The malondialdehyde (MDA) level was raised 74.56% in pre-eclamptic pregnant women when compared to healthy pregnant women. The enzymatic antioxidant superoxide dismutase (SOD) and catalase levels were significantly decreased 23.1% and 38% in pre-eclamptic women as compared to healthy pregnant women.

➤ Conclusion

Taken together, it can be concluded that in pre-eclampsia the pregnant women had low level of antioxidant enzymes which is due to raised oxidative stress in pregnant women.

Keywords:- Pre-eclampsia, lipid peroxidation, superoxide-dismutase, antioxidant.

I. INTRODUCTION

Pre-eclampsia is a disease which develops specially in any trimester of pregnancy through blood pressure with increased amount of protein in urine. It affects 2-8% of gestations^(7, 11). Pre-eclampsia (PE) is the major medical condition during pregnancy and every year it has been continued to be increase in world. Yearly it is recommended that 50,000 deaths in world during pregnancy^(5, 16).

Pre-eclampsia is a hypertensive disorder during pregnancy therefore also referred as pregnancy induced hypertension (PIH). The HELLP syndrome which means haemolysis, elevated liver enzymes, and low platelet count, is finding out in patients when disturbance of lever function and in case of hemolysis⁽¹²⁾. Pre-eclampsia can affects the multisystem organs such as disturbance in function of brain, kidney, lungs and lever.

Some aspect of pregnant females are raised possibilities of pre-eclampsia such as past miscarriages and abortions, high blood pressure, diabetes during pregnancy or genetically diabetic, incase of twins babies and past history of mother related with pre-eclampsia^(4, 3).

II. METHODS

The study was performed at Motilal Nehru Medical College, Prayagraj. We included 50 pregnant women in which 25 normal pregnant women and 25 pre-eclamptic pregnant women during second trimester and third trimester in age between 20-35 years in rural areas. Blood sample were collected from the subject between 8.00 to 10 am. Blood sample were centrifuged at 3000rpm for 15 min. at 4⁰ C. Serum was separated for the biochemical parameters selected to assess the oxidative stress during pregnancy. Malondialdehyde (MDA) was estimated in serum by the method of Philipot.⁽¹⁴⁾ Superoxide dismutase (SOD) activity was measured by Markland and Markland method⁽¹⁰⁾. Catalase was analysed by the method of Abei method⁽¹⁾.

➤ *Statistical analysis*

The data are formatted by Mean ±SD. The comparison of two graphs were dependent on significance of mean differences, which is calculated by student t-test and value of probability ‘P’.

III. RESULTS

The present study evaluates the role of oxidative stress during pregnancy. There was significant difference in level of malondialdehyde (MDA), superoxide dismutase (SOD) and catalase. The changes in malondialdehyde (MDA), superoxide dismutase (SOD) and catalase in normal pregnant women and pre-eclamptic pregnant women showed in below table.

A lipid peroxidation level was highly significant (P<0.001) in pre-eclampsia pregnant women as compared to healthy pregnant women (P<0.001).

The enzymatic antioxidant i.e., superoxide dismutase (SOD) and catalase level were significantly reduced in pre-eclampsia pregnant women as compared to healthy pregnant women.

S.N.	Parameters	Normal pregnant women N=50	Pre-eclamptic pregnant women N=50	P-value
1.	Malondialdehyde	2.28±0.51	3.98±0.55	<0.001
2.	(SOD)	1670.84±230.30	1284.71±154.99	<0.001
3.	Catalase (CAT)	20.80±1.05	15.03±0.39	<0.001

Values are expressed as Mean±SD.
Table 1

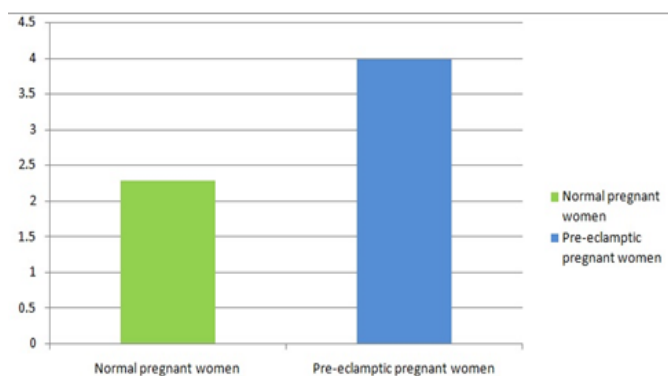


Fig 1:- Level of MDA in blood serum in normotensive & pre- eclamptic pregnant women.

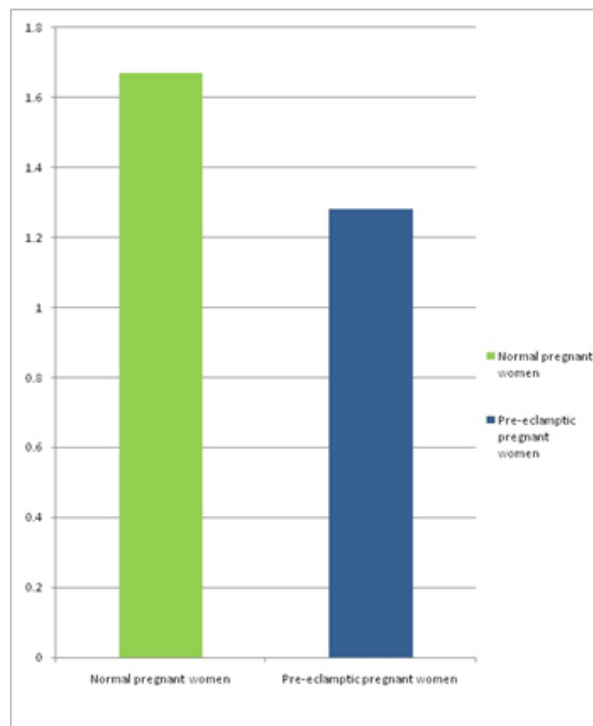


Fig 2:- Specific activity of SOD in hemolysate of normotensive & Pre-eclamptic pregnant women

3 Catalase (CAT)

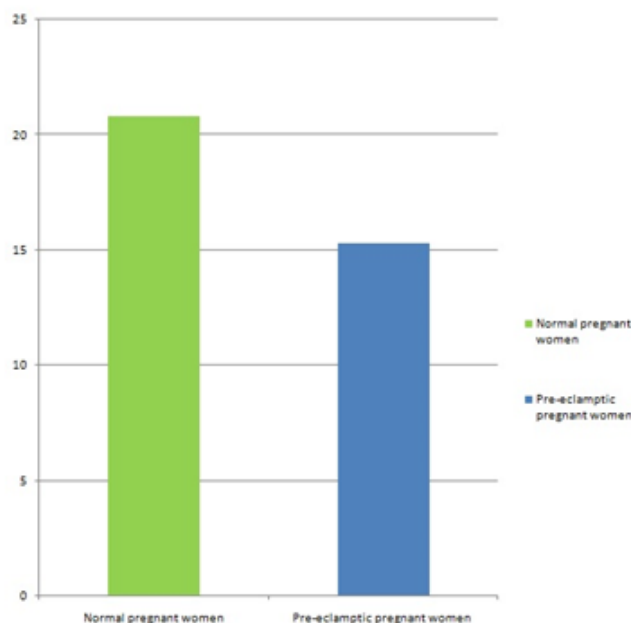


Fig 3:- Specific activity of Catalase in hemolysate of normotensive & Pre-eclamptic pregnant women

IV. DISCUSSION

From our study malondialdehyde (MDA) level in preeclamptic patients was raised in comparison to healthy pregnant women. Free radical formation is a general physiological process but increased production of free radicals it can be damaged cell membrane. Free radicals are unstable molecules. Lipid peroxidation is leading to chain reaction. Lipid peroxidation is also responsible for pregnancy induced hypertension⁽¹³⁾. Similar to the study by Lihan et al. and Rukmini et al. statistical increased MDA levels in pre-eclamptic patients in comparison to healthy pregnant women⁽¹⁵⁾. These results are accordance with the findings of Madazli et.al., Gratacos et.al., at that found raised level lipid peroxides in PIH and pre-eclampsia as compared to control group⁽⁹⁾. The research study by Kumar CA and Das UN was considered with previous studies suggest that lipid peroxidation is play a significant role in pathogenesis of pre-eclampsia⁽⁶⁾. In the present study antioxidant SOD and catalase were significantly reduced in pre-eclamptic patients as compared to control groups. Similar research findings of bayhan et al., suggested that the SOD activities is significantly decreased ($P < 0.001$) in pre-eclampsia as compared to normotensive. The catalase activities of Pre-eclampsia had showed similar than the control ($P < 0.05$)⁽²⁾. Similar to the present study Oladipo et al suggested that SOD and catalase activity is significantly reduced in pre-eclamptic patients in comparison to healthy pregnant women⁽⁸⁾.

V. CONCLUSION

From our study it is concluded that lipid peroxidation plays an significant role in pregnancy because of raised oxidative stress in pregnant women. Consumption of antioxidant free radical increases due to raised lipid peroxidation. In pre-eclampsia there is disturbance in lipid peroxidation and antioxidant.

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