Free Radical Induced Oxidative Stress In Pre-Eclampsia And Eclampsia Of Pregnancy

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Citation

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Abstract

Aim

To predict pre-eclampsia and eclampsia of pregnancy much before its detection Clinically.

Methodology

This study included 42 patients who attended OPD of Obstetrics and Gynaecology, GSVM Medical College Kanpur. Out of these patients 11 normal pregnant women were having no disease, constitued control group and 31 having preeclampsia & eclampsia were kept in test group. Their blood was collected for estimation of malonaldehyde and for assessment of levels of superoxide dismutase and catalase. Study was conducted in collaboration with the Department of Biochemistry, King George's Medical College, Lucknow. Recent research implicates free radical in the pathophysiology of preeclampsia, as oxidative stress is a mediator of endothelial cell dysfunction and this contributes to the cardiovascular complication of pre eclampsia. [1]

Result

The frequency of PIH in primigravida patient was more (70.96%) than that in 2005 multipara patients (29.03%). The mean systolic and diastolic blood pressure in test group was found to be higher in comparison to mean systolic and diastolic B.P. of control group, the difference is highly significant (P<.001) with preeclampsia and eclampsia was found to be higher (8.48±0.96 Nmoles/ml of plasma) as compared to control group in which mean MDA level was found 4.88±10.35 Nmoles/ml of plasma (Control Vs test P<.001).The mean value of enzymes SOD in control group is much higher (0.704±0.109 unit/mg of protein) than test group (0.347±0.069 u/mg of Protein).The mean value of enzyme catalase in control group is significantly higher (0.304±0.089) than test group (0.112±0.02).

Conclusion

These findings support notion that increased oxidative stress in the pre-eclamptic placenta may contribute to the patho physiology of this disease-

INTRODUCTION

Free radicals are chemicals species with an unpaired electron in the outer most orbital, the unpaired electron make them paramagnetic and relatively reactive. At present reactive oxygen, species and lipid per oxidation have been implicated in the pathogenesis of large number of diseases. Much recent work has focused on the role of oxidative disturbances in the pregnancy-induced hypertension, preclampsia, eclamsia. Preclampsia remains a leading cause of maternal and fetal morbidity and mortality. There is a substantial evidence to suggest that the diverse manifestation of preeclampsia and discrete pathology in many organ systems are derived from pathologic changes within the material vascular endothelium.

The non-convulsive form of pregnancy-induced hypertension is termed as preeclampsia (PIH) and with the development of convulsions and coma, disorder is termed as eclampsia.

In a recent years there is growing evidence of possible role of free radical in PIH that are produced continuously either in the intracellular compartment by the mitochondrial respiratory chain and mixed function oxidase system or in the extracellular compartments especially by phagocytes.The pathogenisis of PIH may be associated with the defective free radicals and defensive effects of superoxide dismutase (SOD). It can be hypothesized that placental oxidant, antioxidant balance intensifies the lipid peroxidation products into circulation; Vascular contact with circulating

peroxidable product cause dysfunction of vascular endothelium by promoting peroxidative damage of endothelial membrane ultimately resulting in manifestation of the disease.[2]

AIMS OF STUDY:

Prediction of pre-eclampsia and eclampsia much before it is detection clinically.

MATERIAL AND METHOD

The present work on study was carried out in the department of pathology GSVM Medical College, Kanpur in collaboration with the department of obstetric/gynecology GSVM medical college, lucknow and department of biochemistry K.G.M.C, Lucknow. The study included 42 patients who came for antenatal checkup in out patient department and patients admitted to wards. 11 patients were of normal pregnancy 31 cases of preeclampsia & eclampsia of pregnancy.

A) Selection of patients:

Control group: Normal healthy pregnant woman within the age group of 20-30 years and with blood pressure ranging from 100/70 to 120/88

Blood pressure:

SPECIFIC INVESTIGATION

COLLECTION OF BLOOD FOR ENZYMES ANALYSIS

Blood was collected with informed consent of all patients. It was taken from both controls as well as study groups for determination of MDA and for assessment of antioxidant status by determining levels of SOD and catalase Plasma thus obtained was used for the estimation of lipid peroxidation.

9 ml blood was immediately transferred after removing bubbles into a plastic tube containing 1 ml 0.129 M Citrate buffer PH-7.0. The contents were mixed by gently inverting the tube. These plastic tubes were cooled at 0°C for 1 hour and were sent to GSVM for estimation at temperature (2 degree to 8 degree °C) where blood samples were centrifuged at 800 x g for 10 minutes at 4°C in refrigerated centrifuge.

The plasma (Supernatant) was carefully decanted into plastic tubes. Care was taken to ensure that plasma was not contaminated with red blood cells (RBCs).Plasma thus obtained was used for the estimation of lipid peroxidation.

Packed RBC

OBSERVATION

The present study was conducted on 42 patients registered in the department of obstetrics and gynecology UISEMH G.S.V.M Medical College, Kanpur.

Table 1

Sociodemogrephic profile of control & test group

	Sociodemogrephicparameter	Control		Case	
1	Age Range (in year)	No	Mean with SD	No	Mean with SD
	20-24	5	21.6±1.14	19	21.6± 1.14
	25-30	4	26.5± 1.29	10	26.5± 1.29
	31-35	2	30.5± 2.0	2	30.5± 2.0
2	Residential (Area)	No	% Age	No	% Age
	Urban	9	81.81	23	74.19
	Rural	2	18.18	8	25.80
3	Party		% age		% age
	Primigravida	6	78.57%	22	64.28%
	Multigravida	5		9	
4	Gestational Age (weeks)	No	(Range) MEAN with SD	No	(Range) MEAN with SD
		11	(32-38) 35±2.04	31	(28-38) 34±3.25
5	SYSTOLICBLOOD PRESSURE (mm Hg)	No	(Range) MEAN with SD	No	(Range) MEAN with SD
		11	(100-120) 112.54±7.10	31	(126-160) 148±7.91
6	DIASTOLIC BLOOD PRESSURE (mm Hg)	No	(Range) MEAN with SD	No	(Range) MEAN with SD
	RANGE	11	(64-82) 70.72±6.46	31	(90-110) 98.45±5.28

The above study

DISCUSSION

The present work aimed to delineate the status of free radical and its scavenging enzymes in eclampsia preeclampsia

To evaluate the oxidative stress, we measured MDA as a free oxyradical injury product, a marker of lipid peroxidation, and to assess the antioxidant defense system we measured two enzymes (1) superoxide dismutase (SOD) (2) catalase.

In present study females of test and control group are of approximately same age group, therefore age did not act as confounding factor.

The distribution of patients according to residential area showed no marked difference, though most of the patients of control group (81.8%) as well as case group (74.19%) belongs to urban locality, this may be due to the urban location of the hospital from where the patients were selected for study and most of the patients from rural area were referred to UISEMH Deptt. ofObstetrics and Gynaecology, G.S.V.M Medical College, Kanpur for better management of PET.

The study showed increased incidence of PET in primiparous patient (78.57%) as compared to multiparous patients (68.28%), which is in accordance with study of **S.Pandey et al, 2000**. [7]

The gestational age ranged from 32-38 weeks in control group and 28-38 weeks in test group, the mean gestation age was 35

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