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ORIGINAL ARTICLE

ROLE OF MDA, VITAMIN E AND VITAMIN C IN PREGNANCY INDUCED HYPERTENSION - A CLINICAL STUDY

Sweta Kumari[1], Beena Singh[2]

[1,2]Assistant Professor, Department of Biochemistry, Mayo Institute of Medical Science, Barabanki U.P., India

ABSTRACT:

Background: Hypertension is the leading causes of maternal and perinatal deaths in developing countries. Hypertension prevalence in pregnancy varies from 5% -10% and it affects 20% - 30% of the adult population. The present study was conducted to assess the level of MDA, vit E and vit C in pregnancy and their effect in development of pregnancy induced hypertension. **Materials & Methods:** Study included 40 pregnant women in age range from 18- 30 years. Primigrividae with blood pressure >140/90mm of Hg with odema and proteinuria within 28-42 weeks were included. After obtaining written consent, they were divided into 2 groups- 1. Primi with mild preeclampsia with B.P. > 140/90- 150/109 mm Hg and urinary protein > 0.3 gm/day. 2. Primi with severe preeclampsia with B.P. > 160/ 100 mm Hg and urinary protein > 3 gm/ day. An aged matched control group with B.P <140/100mm Hg with no odema and proteinuria was included in the study. In all subjects, serum malondialdehyde level (MDA), serum vitamin E level, plasma vitamin C level and urinary protein estimation was performed. **Results:** 40 subjects had normal prima gravida, 28 had primi with mild preeclampsia and 12 had primi with severe pre eclampsia. The difference was significant (P-0.02). Mean age in normal prima gravid was 24 years, in primi with mild preeclampsia was 25.32 and primi with severe pre eclampsia was 26.45. Systolic blood pressure was 148.2 mm Hg and 166.4 mm Hg in primi with mild preeclampsia and primi with severe pre eclampsia respectively. Distolic blood pressure was 98 mm Hg and 114. 6 mm Hg in primi with mild preeclampsia and primi with severe pre eclampsia respectively. Mean priteinuria was 0.92 gm/day and 3.2 in with mild preeclampsia and primi with severe pre eclampsia respectively. Odema was + and ++ in with mild preeclampsia and primi with severe pre eclampsia respectively. Mean MDA was 2.44, 4.88 and 5.64 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. Vitamin E level was 8.25, 7.14 and 7.62 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. Plasma vitamin C level was 8.26, 6.8 and 6.9 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. The difference was significant (P < 0.05). **Conclusion:** There is imbalance between antioxidant vitamin status and lipid peroxidation. Lipid peroxidation is one of the initiating factor in preeclampsia.

Key words: Hypertension, lipid peroxidation, vitamin C.

Corresponding author: Dr. Beena Singh, Assistant Professor, Department of Biochemistry, Mayo institute of Medical Science, Barabanki, UP, India

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INTRODUCTION

Pregnancy is the physiological state. There can be many complications during pregnancy. These include hypertension, hemorrhage, infection, cervical insufficiency, gestational diabetes and preterm labour, etc. Among all complications, hypertension is the leading causes of maternal and perinatal deaths in developing countries.[1] Hypertension prevalence in pregnancy varies from 5% -10% and it affects 20% - 30% of the adult population. Hypertension in pregnancy is defined as a systolic BP of 140 mmHg and higher, and a diastolic BP of 90 mmHg and higher. Studies have shown that almost 15% of maternal deaths are related to hypertension (HTN).[2]

The American College of Obstetricians and Gynecologists (ACOG) has classified pregnancy induced hypertension (PIH) into four types: 1. gestational hypertension, where after the 20th week of gestation, resting BP is 140/90 mmHg or higher; 2. chronic hypertension, which exists before pregnancy or begins in the first 20 weeks of gestation; 3. preeclampsia that is raised BP and edema or proteinuria/ eclampsia which includes preeclampsia and seizures; and 4. preeclampsia superimposed on chronic hypertension.[3]

The incidence of preeclampsia is 10% in primigravidae and 5% in multigravidae. It is the cause of maternal and perinatal mortality and morbidity. Uncontrolled lipid peroxidation is a key contributing factor to pathophysiologic condition of preeclamps. It has also been hypothesized that

reduction in the antioxidant activity may enhance endothelial cell oxidative damage but studies of various systems have produced conflicting results. It has been suggested that uncontrolled lipid peroxidation may play a role in the etiology of the PIH.[3]

The present study was conducted to assess the level of MDA, vit E and vit C in pregnancy and their effect in development of pregnancy induced hypertension.

MATERIALS & METHODS

This study included 40 pregnant women in age range from 18- 30 years. Primigrividae with blood pressure >140/90mm of Hg with odema and proteinuria within 28-42 weeks were included. They were informed regarding the study and written consent was obtained. Approval was obtained from institutional ethical committee.

After obtaining written consent, they were divided into 2 groups-

1. Primi with mild preeclampsia with B.P. > 140/90-150/109 mm Hg and urinary protein > 0.3 gm/day.
2. Primi with severe preeclampsia with B.P. > 160/ 100 mm Hg and urinary protein > 3 gm/ day.

An aged matched control group with B.P <140/100mm Hg with no odema and proteinuria was included in the study.

In all subjects, serum malondialdehyde level (MDA), serum vitamin E level, plasma vitamin C level and urinary protein estimation was performed.

Results thus obtained were tabulated for correct inferences. P value< 0.05 was considered significant.

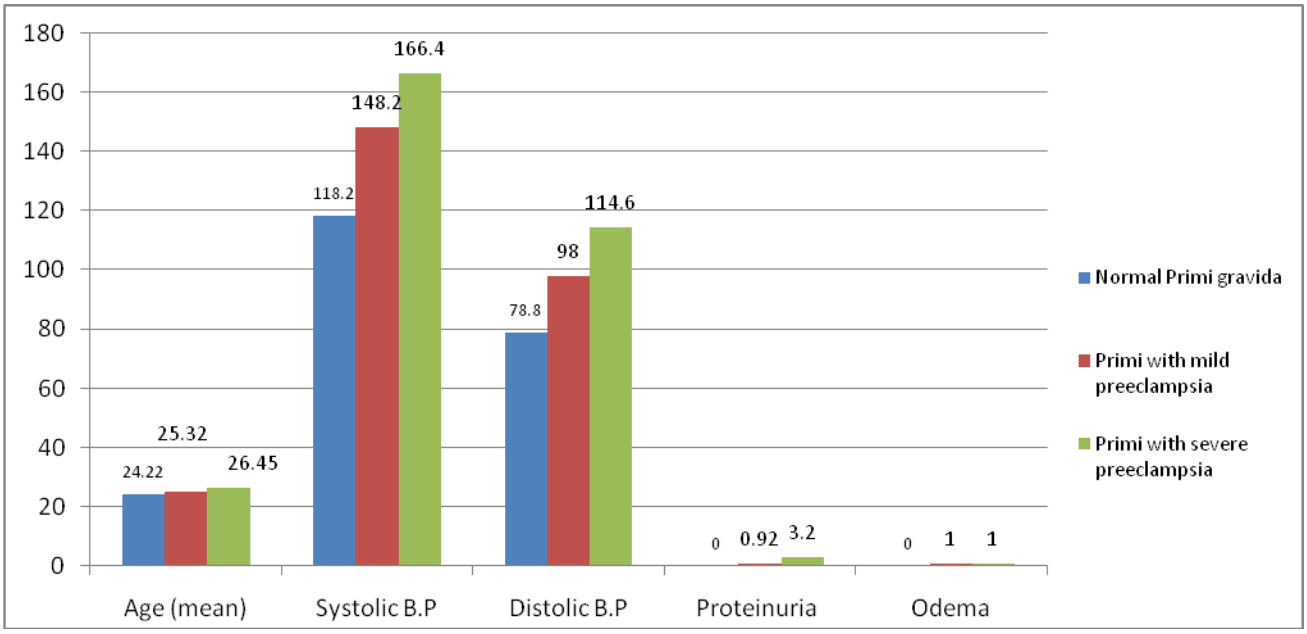
RESULTS

Table I shows that 40 subjects had normal prima gravid, 28 had primi with mild preeclampsia and 12 had primi with severe pre eclampsia. The difference was significant (P-0.02). Graph I shows that mean age in normal was 24 years, in primi with mild preeclampsia was 25.32 and primi with severe pre eclampsia was 26.45. Systolic blood pressure was 148.2 mm Hg and 166.4 mm Hg in primi with mild preeclampsia and primi with severe pre eclampsia respectively. Distolic blood pressure was 98 mm Hg and 114.6 mm Hg in primi with mild preeclampsia and primi with severe pre eclampsia respectively. Mean priteinuria was 0.92 gm/day and 3.2 in with mild preeclampsia and primi with severe pre eclampsia respectively. Odema was + and ++ in with mild preeclampsia and primi with severe pre eclampsia respectively. Graph II shows that mean MDA was 2.44, 4.88 and 5.64 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. Vitamin E level was 8.25, 7.14 and 7.62 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. Plasma vitamin C level was 8.26, 6.8 and 6.9 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. The difference was significant (P < 0.05).

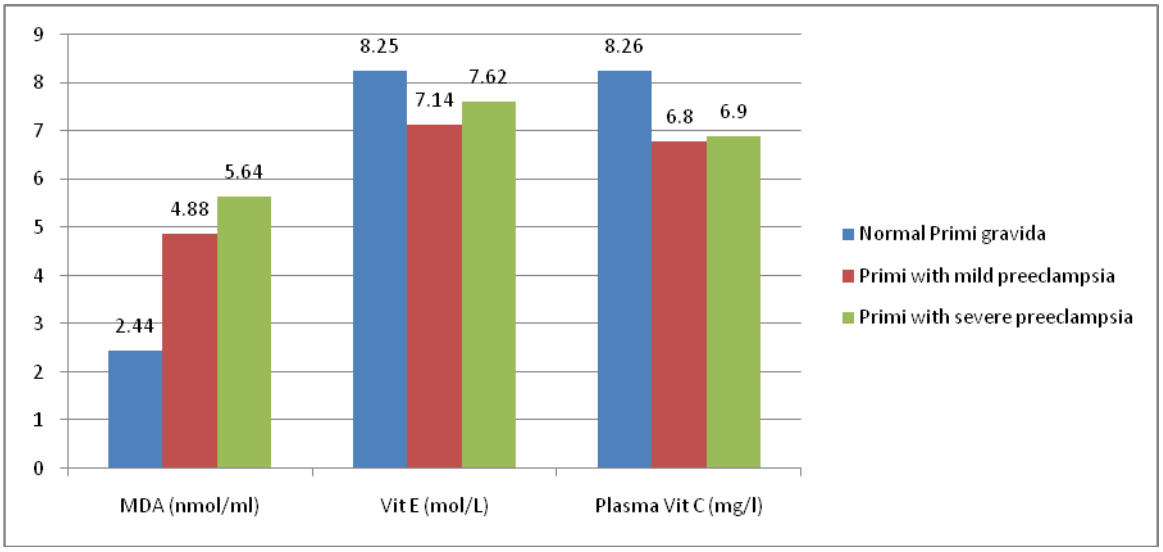
Table I: Distribution of subjects

Primi with mild preeclampsia	Primi with severe preeclampsia	Normal Prima Gravida (Control)	P value
28	12	40	0.02

Graph I: Clinical parameters



Graph II: MDA, Vitamin E and Plasma C level



DISCUSSION

There are many complications seen in pregnancy. PIH is one of those complications. Elevated levels of MDA are associated with elevated serum lipid levels, indicating that PIH is associated with excessive free radical formation.[4] The present study was conducted to assess the level of MDA, vit E and vit C level in pregnancy. 40 subjects had normal prima gravid, 28 had primi with mild preeclampsia and 12 had primi with severe pre eclampsia.

We found that mean MDA was 2.44, 4.88 and 5.64 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. The increase level of MDA indicates the development of pre eclampsia. This is in accordance to Davidge et al.[5]

There was reduction in vit. E level in both pre eclampsia. There was an imbalance between the rise in lipid peroxidation and fall in the defensive antioxidant mechanism. Vitmain E is a antioxidant and free radical scavenger.[6] Hence abnormal rise in lipid peroxides in preeclampsia could increase consumption of antioxidants resulting in decreased vitamin E levels. Another possibility is decreased absorption of vitamin E from the gut as a result of vasoconstriction in preeclampsia. This is in comparison to study done by Wisdom et al.[7]

Plasma vitamin C level was 8.26, 6.8 and 6.9 in normal prima gravida, primi with mild preeclampsia and primi with severe pre eclampsia respectively. There was significant reduction in level of vit. C in both pre eclampsia. This is similar to Wang et al.[8] They concluded in their study that in pregnancy the level of vit. C decreases. Reduced vit. C as a water soluble antioxidant was reported to function as the first-line anti-oxidant defence against free oxygen radicals present primarily in plasma. This is in accordance to Mikhail et al.[9]

CONCLUSION

There is imbalance between antioxidant vitamin status and lipid peroxidation. Lipid peroxidation is one of the initiating factor in preeclampsia.

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