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Comparative Study on Serum Calcium Level in Preeclampsia Patients and Normal Pregnancy at Medical College & Hospital

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ABSTRACT

Background: Preeclampsia is a multi-system disorder with varied etiology. Serum calcium derangements have been reported in this group. **Methods:** The present comparative study included 50 cases with preeclampsia and 50 controls. History was taken from each patient and thorough clinical examination was done. Serum calcium levels were estimated and compared. **Result:** Serum calcium levels were lower in women with preeclampsia and the difference was statistically significant (p=0.000). **Conclusion:** Hypocalcaemia may have a role in pre-eclampsia.

Keywords: Comparative study, Normal Pregnancy, Preeclampsia, Serum Calcium

INTRODUCTION

Preeclampsia is a multi-system disorder of pregnancy. It is characterized by hypertension (systolic and diastolic blood pressure of ≥ 140 and 90 mm Hg, respectively, on two occasions, at least 6 hours apart) and proteinuria (protein excretion of ≥ 300 mg in a 24 hr urine collection, or a dipstick of ≥ 2+), that develop after 20 weeks of gestation in previously normotensive women.[1,2]

The pathophysiology of this multisystem disorder is still unclear. It has been postulated that the environmental and nutritional factors may play a role in its development.[3] Studies have shown that serum calcium level is significantly low in pre-eclamptic women as compared to normal pregnant ($p<0.05$).[4] Other studies indicate that the serum levels of calcium did not differ significantly between pre-eclamptics and normal women.[5,6]

Therefore, the present study was conducted to assess serum calcium levels in preeclamptic women.

Aims and objectives

The present study was conducted to compare the serum calcium levels in women suffering from pre-eclampsia and that in normal pregnant women.

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MATERIALS AND METHODS

The present comparative study was conducted at the department of Biochemistry at a medical college hospital. Cases included 50 women with diagnosed pregnancy induced hypertension based on criteria - blood pressure ≥140/90 mmHg on two separate occasions 6 hours apart, Proteinuria more than 300 mg in 24 hour urine or 1+ dipstick in two midstream urine samples collected 4 hours apart, with or without edema, in more than 20 weeks gestational age. Another 50 women with normal pregnancy reporting to the department of Obstetrics and Gynecology were selected as controls. Those with pre-existing hypertension were excluded.

Detailed history was taken from each patient and thorough clinical examination was done. Blood pressures were carefully recorded. 5 ml of venous blood was collected from each subject and allowed to clot spontaneously in a container. It was then centrifuged at 3000 rpm for 10 minutes. Serum calcium was estimated by colorimetric assay. The data obtained were entered in MS Excel. Data were expressed as mean ± SD and independent t-test was applied. $p < 0.05$ was considered to be statistically significant.

RESULTS

A total of 50 women with preeclampsia and another 50 with normal pregnancy were studied. The mean age was 27.93 ± 5.26 years in pre-eclampsia and 26.11 ± 4.98 years in normotensive pregnant

women. The difference was not significant statistically (t= -1.77; p=0.08). The mean gestational age was 32.72 ± 3.28 weeks in preeclampsia and 32.91 ± 3.02 weeks in normotensive pregnant women. This difference was also not significant statistically (t= 0.301; p=0.764).

Table-1 shows that serum calcium levels were lower in women with preeclampsia and the difference was statistically significant (p=0.000).

Table 1: showing serum calcium levels in women with preeclampsia and normal pregnancy

Parameter	Cases (n=50)	Controls (n=50)	Significance
Serum Ca (Mean ±SD)	8.34±1.62	9.87±0.83	t= 5.94, p= 0.000

DISCUSSION

It is seen in the present study that the mean age was 27.93 ± 5.26 years in pre-eclampsia and 26.11 ± 4.98 years in normotensive pregnant women. The mean gestational age was 32.72 ± 3.28 weeks in preeclampsia and 32.91 ± 3.02 weeks in normotensive pregnant women. The serum calcium level is lower in women with preeclampsia as compared to those with normal pregnancy with significant difference (p=0.000).

Roy et al found that the mean age and mean gestational age of pre-eclampsia was not significantly different from those of normotensive pregnant women (p=0.203 and p=0.251 respectively). The mean serum calcium level was 7.27 ± 3.01 mg/dl in pre-eclampsia and 7.25 ± 2.59 mg/dl in normal pregnant women; did not differ significantly between the subjects of pre-eclampsia and normal pregnant women (p=0.963). Serum calcium had no association in occurrence of preeclampsia.[7]

Sultana et al observed that the mean serum calcium level in normotensive, mild PIH and severe PIH patients was 9.64±0.77 mg%, 9.18±0.83 mg% and 8.45±0.58 mg% respectively (p<0.05). There was a negative correlation of serum calcium level with mild and severe pregnancy induced hypertension (p<0.05). They concluded that the decreased level of serum calcium can be an etiological factor of PIH and can be a predictor of different fetal and maternal complications in women with preeclampsia.[8]

Pairu et al reported that the mean serum calcium was significantly lower in pregnancy induced hypertension group (8.15 ± 0.37 mg/dl) compared to normal pregnancy (9.16 ± 0.82 mg/dl). The mean serum magnesium was lower in pregnancy induced hypertension group (1.78 ± 0.70 mEq/L) than normal pregnancy (2.08 ± 0.46 mEq/L) which was moderately significant. They also concluded that the serum calcium and serum magnesium levels were decreased in pregnancy induced hypertension patients compared to normotensive normal pregnant women, suggesting the possible role of calcium and magnesium in etiopathophysiology of pregnancy induced hypertension.[9]

Chaudhari et al also found that mean Serum Ca and Mg was significantly lower in PE compared to normotensive pregnant women (8.69±1.59 mg/dL and 1.91±0.36 mg/dL versus 10.13±0.66 mg/dL and 2.08±0.12 mg/dL). Serum Uric acid and creatinine was raised in PE compared to the control women respectively.[10]

CONCLUSION

The present study concluded that there is significant reduction of serum calcium level in pre-eclamptics compared to normotensives. This supports the hypothesis that hypocalcaemia may have a role in pre-eclampsia. Monitoring of serum calcium level during the antenatal period should be done to reduce the incidence of pre-eclampsia.

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