



Evaluation of serum calcium levels in pre-eclampsia

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Abstract

Background: Pre-eclampsia is the most common medical complication of pregnancy associated with increased maternal and infant mortality and morbidity. Reduced serum calcium level are found associated with elevated blood pressure in preeclampsia.

Objectives: To evaluate serum calcium level in preeclamptic women.

Methods: This cross sectional study was carried out in among 50 pre-eclamptic patients, aged 20 to 40 years, and gestational age ranges from 20 to 40 weeks and 50 age and gestational age matched normotensive pregnant women having no proteinuria. Serum calcium was measured by Colorimetric method.

Results: 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 body mass indexes of the test patients were significantly different from those of normotensive pregnant women ($p<0.001$). 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 ($p=0.963$). Conclusion: Serum calcium has no association in occurrence of pre-eclampsia. Pre-eclampsia is defined as gestational hypertension of at least 140/90mmHg on two separate occasions ≥ 4 hours apart accompanied by significant proteinuria of at least 300mg in a 24-hour collection of urine, arising de novo after the 20th week of gestation in a previously normotensive and non-proteinuric woman resolving completely by the 6th postpartum week. The pregnant woman's body provides daily doses of 50 to 330mg of calcium to support the developing foetal skeleton. This high foetal demand for calcium is facilitated by profound physiological interaction between mother and fetus. This additional calcium is normally provided by an increase in maternal intestinal calcium absorption. There may not be a necessary increase in dietary calcium intake. Several studies have linked calcium to the aetiopathogenesis and prevention of preeclampsia, however, the precise mechanism involved is unclear. Normal Serum total calcium is 2.2- 2.6mmol/L(8.6-10.3mg/dl). Thus values less than 2.2mmol/L (< 600 mg/day, corresponding to less than two dairy serving per day) may harm by causing vasoconstriction, either through increasing magnesium levels or stimulating release of parathyroid hormone or renin, thereby increasing vascular smooth muscle intracellular calcium. Some studies have shown that changes in the level of serum trace elements in pre-eclamptic patients may be implicated in its pathogenesis.

There is paucity of studies on the relationship between serum calcium and pre-eclampsia in Nigeria and none from Imo State. Thus, this study will give a baseline of the relationship between serum calcium and pre-eclampsia in pregnant women carrying singleton fetus in Imo State.

MATERIALS AND METHODS

Study Area - This study was carried out in the maternity unit of the Department of Obstetrics and Gynaecology of the Federal Medical Centre, Owerri, Imo State, South East Nigeria. Federal Medical Centre Owerri is a tertiary health facility which provides health service delivery to citizens of the state and neighbouring states.

Study Population - This study population comprised pregnant women with singleton fetus with a diagnosis of pre-eclampsia as cases and women with normal singleton pregnancies (without pre-eclampsia) as controls all at gestational ages above 20 weeks from LMP.

Study Design - It is a comparative cross-sectional study of preeclamptic as cases and normotensive pregnant women as controls.

Sampling Techniques - Consecutive, eligible and consenting preeclamptic women were enrolled from among ante-natal clinic attendees after obtaining ethical approval from the institution's Research and Ethical Committee. Eligible normotensive women were enrolled from the same antenatal population to serve as a control. The cases and controls were women of similar gestation.

Data Collection - The procedure was explained to all the subjects, and written consent was obtained. Data were recorded from each subject using a well designed questionnaire. Before the blood pressure measurement, the woman would have rested for 5 minutes and seated at a 45 degree angle. The mercury sphygmomanometer appropriate sized cuff was applied around the upper arm at the level of the heart. The korotkoff sound V was used to get the diastolic blood pressure as it is more reproducible than the fourth sound [8]. Two blood pressure measurements were taken at least 5 minutes apart, and the average of these was used. Sustained elevation of blood pressure was confirmed by repeating the above procedure at least 4hours later. All blood pressure measurements were carried out by the researcher or trained assistants. The subjects were weighed and Urine Protein estimation was carried out using the Dipstick measurement of clean catch midstream specimens. The trained assistants and researcher did the later measurement estimation.

Sample Collection - Two millilitres of the blood sample for calcium estimation was drawn from the cubital vein using a heparinised syringe and needle without using a tourniquet by the researcher or trained assistants. The blood was dispensed into a plain specimen bottle. The sample was left to stand for fifteen minutes, after clot retraction, the sample was spun at 3000 rpm for 5 minutes. The supernatant was collected and stored at -15 degree Celsius until analysis.

Biochemical Analysis - The Laboratory estimation of serum calcium was done in the Federal Medical centre Owerri laboratory by a spectrophotometric manual method using O-cresolphthalein-complexone as the colour indicator. The calcium kits were manufactured by Giese Diagnostics. The analysis was carried out by a laboratory scientist while the researcher assisted. This method is highly sensitive as it accurately measured calcium levels as low as 0.15mmol/L and up to 5.5 mol/L. Normal Serum total calcium is 2.2- 2.6mmol/L(8.6-10.3mg/dl). Thus values less than 2.2mmol/L.

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