



A Study of Serum Total Calcium Levels in Preeclampsia

***Dinesh Kumar Sharma**

***Corresponding Author:**

Medical College Baroda & SSG hospital, Baroda, Gujarat-Pin-390001
E-mail: dksharma0305@gmail.com

Abstract:

Background: It has been suggested that there is an association between calcium intake and pregnancy-induced hypertension (PIH). The present study concentrate to get significant association of serum calcium levels with pre-eclampsia.

Material and Methods: 80 Patients diagnosed as having Pre-eclampsia and 80 controls with similar age group were studied after taking their consent. Blood samples were collected under aseptic precautions in plain vacutainer for serum total calcium estimations. Total calcium estimation was done by Arsenazo III end point method on Fully Automated Biochemistry Analyzer Miura 300.

Results: The observed mean serum calcium level in preeclampsia patients was 7.09 ± 0.37 mg/dl as compared to 7.91 ± 0.911 mg/dl in controls.

Conclusion: Low serum calcium levels could be a useful indicator of the maternal and fetal complication in hypertensive patients.

Introduction

It has been suggested that there is an association between calcium intake and pregnancy-induced hypertension (PIH). Women with low calcium intake have an increase in mean blood pressure which predisposes them to the development for this process. Pregnant women who develop severe pre-eclampsia have significant lower dietary calcium intake when compared to normotensive women. Role of calcium supplementation in reducing hypertensive disorders in pregnancy can possibly be explained by reduction in parathyroid calcium release and intracellular calcium concentration, thereby reducing smooth muscle contractility and promoting vasodilatation. Interestingly women with a history of preeclampsia also have a higher risk for cardiovascular disease and hypertension later in life.

Material and Method

80 Patients diagnosed as having Pre-eclampsia with age between 18-37 years and 80 controls with similar age

group were studied at SSG Hospital, Vadodara, after taking their consent. Blood samples were collected under aseptic precautions in plain vacutainer for serum uric acid and serum total calcium estimation. Out of 80 patients, 26 were diagnosed as mild preeclampsia, 22 were labelled as severe preeclampsia and 32 patients were found with PIH. Patients with history of renal disease, chronic hypertension, cardiovascular disease, thyrotoxicosis, liver disease were excluded. Serum samples were analyzed for following parameters by MIURA-fully automated biochemistry analyzer. Total calcium estimation was done by Arsenazo III end point method. Serum urea and creatinine, Serum electrolytes (Na^+ & K^+), serum ALP, ALT, AST, albumin, total and direct bilirubin to rule out renal & liver disease.

Result and Data Analysis

The study was conducted at, SSG Hospital & Medical College Baroda, to estimate serum total calcium levels in 80 Patients suffering from preeclampsia and PIH and in 80 controls.

All the statistical calculations were performed using statistical software MedCalc®v11.5.0.

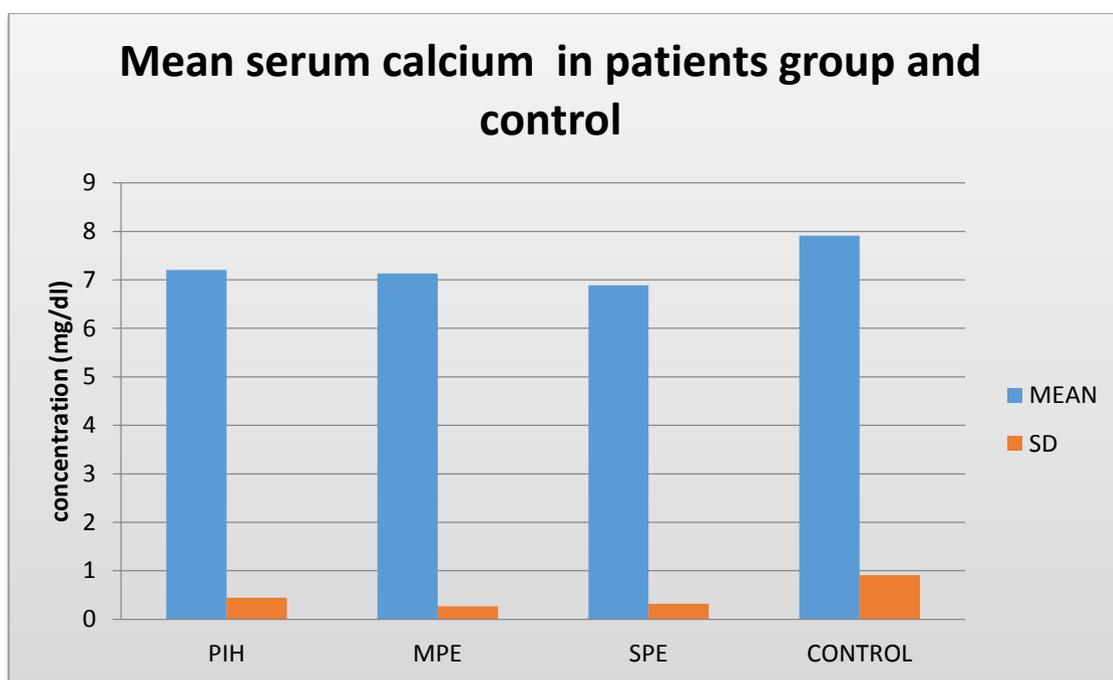
Table 1(a): Serum calcium level with Mean and SD

Parameter	Group	N	Mean	Std. Deviation	Std. Error Mean	p-value
Serum Calcium (mg/dl)	Case	80	7.0937	0.37798	0.04226	p < 0.0001
	Control	80	7.9113	0.91181	0.10194	

Table 1(b): Shows means serum calcium levels in different patients groups

	Cases	No.	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Serum Calcium (mg/dl)	PIH	32	7.2031	0.44176	0.07809	7.0439	7.3624	6.3	8.1
	MPE	26	7.1308	0.26798	0.05256	7.0225	7.239	6.7	7.6
	SPE	22	6.8909	0.31759	0.06771	6.7501	7.0317	6.4	8
	Total	80	7.0938	0.37798	0.04226	7.0096	7.1779	6.3	8.1

Graph-1: show mean serum calcium in patients group and control



Discussion

In the present study, 74% were primigravid as and 26% were multigravidas. The mean age of our patients was 26.03±2.73 year with range of 18-37 year and the mean gestational age 34.48±3.52 years. Calcium homeostasis needs to be maintained appropriately in pregnancy because its deficiency may lead to a state of convulsion. Change in blood pressure during preeclampsia are attributable to change in serum calcium levels which could

be best explained by the level of intracellular calcium. The increase in intracellular calcium or decrease in serum calcium levels leads to constriction of smooth muscle in blood vessels and subsequent increase in vascular resistance. Ionized calcium is also crucial for synthesis of NO and prostacyclin and hence calcium deficiency also aggravates oxidative stress.

The protective effect of calcium on blood pressure can be explained by the influence of calcitropic hormones on

intracellular calcium. 1, 25-dihydroxyvitamin D stimulates calcium influx in a variety of cells, including vascular smooth muscle cells. As a consequence, 1, 25-dihydroxyvitamin D exerts a pressor effect, serving to promote contraction and increase peripheral vascular resistance. Consequently, low calcium diets, which elicit a 1, 25 dihydroxyvitamin D response,

would be expected to increase blood pressure.

Conclusion

Serum calcium levels were significantly lowered in both preeclampsia and PIH patients & could be a useful indicator of the maternal and fetal complication in hypertensive patients.

References

1. Naser O. Malas, Ziad M. Shurideh. Does serum calcium in pre-eclampsia and normal pregnancy differ? Saudi Med J 2001; 22 (10): 868-871.
2. Abdelmarouf H. Mohieldein, Asma A. Dokem, Yousif HM. Osman, Hamza M.A Idris. Serum calcium levels as a marker of pregnancy-induced hypertension. www.sudjms.net/issues/2-4/html. cited 2013 July 17.
3. Aamer Imdad, Afshan Jabeen, Zulfiqar A Bhutta. Role of calcium supplementation during pregnancy in reducing risk of developing gestational hypertensive disorders. BMC Public Health .2011;11(3):18
4. Chanvitya Punthumapol MD, Boonsri Kittichotpanich DrPH. Serum Calcium, Magnesium and Uric Acid in Preeclampsia and Normal Pregnancy. J Med Assoc Thai .2008; 91 (7): 968-73.