



CORRELATION BETWEEN SERUM CALCIUM AND VITAMIN D IN POST MENOPAUSAL WOMEN

Biochemistry

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ABSTRACT

Background- The postpartum period is a particular time, which refers to the stage of women after baby's birth. During this period various physiological and metabolic changes occurs in a woman's body. Calcium is an essential mineral in the human body, especially for postpartum women. Also Vitamin D has several functions including, helps in calcium metabolism, phosphorus homeostasis, immunity etc. **Aims and objective-** The current study was designed to compare between the levels of serum calcium and vitamin D in post-menopausal women and normal women of same age group, and also to correlate the values of Vitamin D and Calcium in postpartum women. **Materials and method-** This case control study was conducted in NRSMCH. Blood sample of 100 patients i.e postpartum women were taken as case and 100 non-pregnant women of reproductive age were taken as control. Vitamin D3 values & Serum Calcium concentrations were quantitatively estimated by standardized reagent. **Result:** Values of cases and controls were expressed in Mean and Standard Deviation. The significance of the value of 25-OH Vitamin D among the Case and Control samples were analysed. The P value was found to be <0.001 which implies that the data were statistically significant. Also correlation between Vit. D and Calcium was done and a positive correlation was found between the two parameters. **Conclusion:** The present study shows the comparative statistical significance of both Vitamin D and serum Calcium between cases and controls, and also most of the postpartum women were found to have the vitamin D insufficiency and calcium deficiency.

KEYWORDS

Post-menopausal women, Serum Vitamin D, Serum Calcium.

INTRODUCTION:

The postpartum period is a period which refers to the stage of women after the birth of a baby, i.e. the time after the childbirth. During this time there are various physiological and metabolic changes that occur in a woman's body from the pregnancy period. In this present study, we are estimating the levels of Vitamin D and serum Calcium levels in postpartum women who were admitted to NRS Medical College and Hospital. Vitamin D is an essential fat-soluble vitamin and also a steroid hormone that is synthesized in our body from 7-dehydrocholesterol with the exposure of sunlight, (UVB radiation). It is present as two isomers, Ergocalciferol or Vitamin D2 and Cholecalciferol or Vitamin D3. The later one is transported to liver and kidney and converted to its active form Calcitriol. It is the key modulator of Calcium homeostasis. It helps in the absorption of the Calcium from the intestine by stimulating the production of a protein called Calbindin. Vitamin D has several functions including, helps in calcium metabolism, phosphorus homeostasis, immunity etc. On the other hand, Calcium is an essential mineral in the human body, especially for postpartum women. Calcium mainly obtained from the diet, and absorbed in our body with the help of Calcitriol. Calcium is present in our body as various forms, such as most of the Calcium present in bones and teeth. In serum, it is mainly present as ionized form and protein bound form. Calcium plays many important roles such as bone and teeth metabolism, it also acts as co-factor of enzymes, muscular contraction, coagulation cascade, etc. This study aims to determine the values of Vitamin D and Calcium from the serum of postpartum women and how they vary from non-pregnant women of reproductive age. We have also tried to establish a correlation between Vitamin D and Calcium.

MATERIALS AND METHOD-

This hospital-based, case control study was conducted at the Department of Biochemistry, Nil Ratan Sircar Medical College and Hospital. Blood sample of 98 patients i.e postpartum women whose delivery occurred within a week were taken as

of blood samples were collected using the aseptic measure. The blood samples of the controls were collected from the Central Laboratory, NRS Medical College Hospital. 25-OH Vitamin D and Serum Calcium levels were quantitatively estimated by using standardized reagent kits in the Department of Biochemistry, NRS Medical College and Hospital. The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional) and with the Helsinki Declaration of 1975, as revised in 1983.

STATISTICAL ANALYSIS:

Statistical analysis was performed using SPSS Statistics 20 Windows. All values were expressed as mean $\pm$ Standard Deviation (SD).

RESULTS:

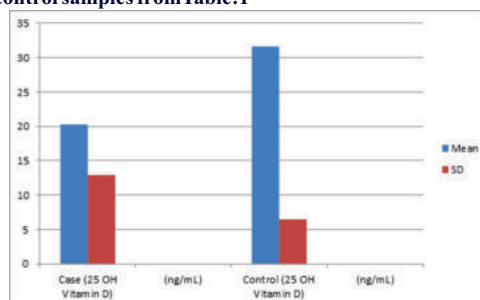
Blood samples of 98 postpartum women were collected and 100 samples of healthy non-pregnant women were collected. Values are expressed in Mean and SD. The significance of the values of 25-OH Vitamin D and serum Calcium among the Case and Control samples were analysed by student t- test in SPSS software. The P value was found to be <0.001 which implies that the data were statistically significant.

Comparison of 25-OH Vitamin D levels between Postpartum women (Case) and non-pregnant women (Control) group:

Table: 1

Biochemical Parameter	Mean	SD	P Value	T Value
Case (25 OH Vitamin D)(ng/mL)	20.2417	12.897	<0.001	-7.940
Control (25 OH Vitamin D) (ng/mL)	31.6831	6.425		

Comparison of Serum 25-OH Vitamin D between Case samples and control samples from Table:1



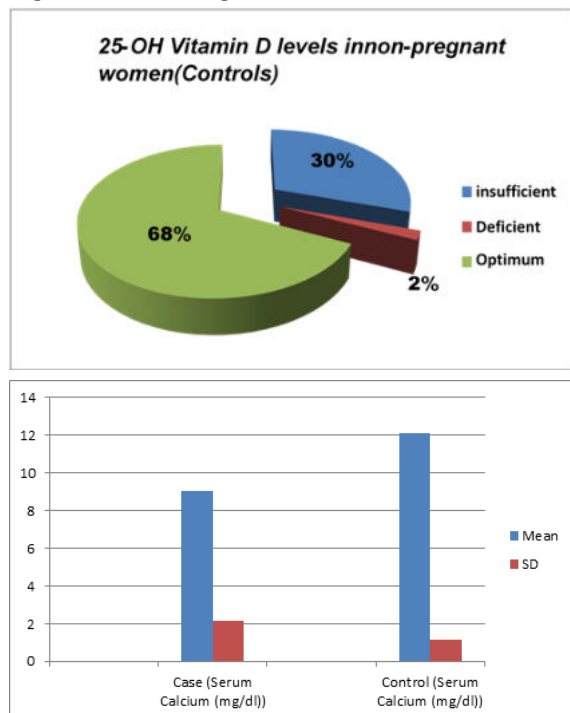
Blood samples of 100 non-pregnant women of reproductive age were used as a Control sample for the present study. Women were excluded if they had a history of current or past chronic medical diseases such as diabetes, hyperthyroidism, hypothyroidism, collagen disease, Cushing's diseases, gastrointestinal diseases, lung diseases, or ovarian tumour, cancer. Those women were also excluded if they had a history of medication with drugs interfering Calcium and vitamin D metabolism anticonvulsant, corticosteroids, and heparin. Blood samples of the postpartum women (case samples) were taken after 12-48 hours of delivery from the Postpartum Ward of the Department of Gynaecology and Obstetrics NRS Medical College and Hospital. 3 ml

Comparison of serum Calcium level between Case postpartum women (Case) and non-pregnant women (Control)group:

Table: 2

Biochemical Parameter	Mean	SD	P Value	T value
Case (Serum Calcium (mg/dl))	9.03664	2.154	<0.001	-12.5
Control (Serum Calcium (mg/dl))	12.0999	1.177		

Comparison of serum Calcium levels (mg/dL) between Case samples and Control samples from Table:2



Correlation between Serum Vitamin D and Serum Calcium levels in postpartum women:

Correlation test was performed between serum Calcium and 25-OH Vitamin D and a positive correlation was found with correlation coefficient of 0.755, P value was found <0.001 which implies that the study was statistically significant.

Table 3:

Biochemical Parameter	Correlation Coefficient (R*)	P Value
25 OH Vitamin D (ng/mL) & Calcium (mg/dL)	0.755	<0.001

➤ Graphical representation of the correlation of serum Vitamin D and serum Calcium levels in postpartum women from Table: 3

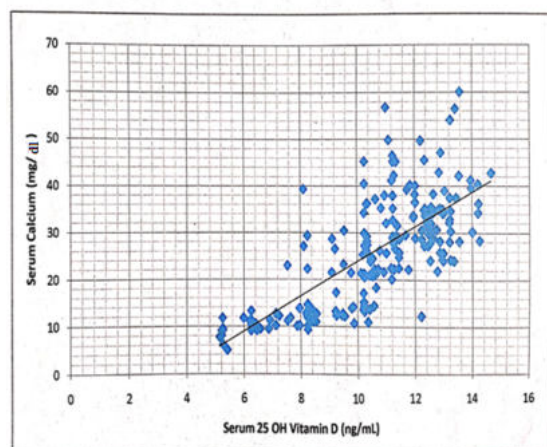


Fig: Scatter plot of serum 25 OH Vitamin D Vs serum Calcium levels in postpartum women

DISCUSSIONS-

A comparative study between postpartum women and non-pregnant women of reproductive age group has been done by quantitatively measuring their serum Vitamin D and serum Calcium levels. In this study estimation of 25-OH Vitamin D between 98 postpartum women (case) and 100 non-pregnant women (control) has been done and the mean $\pm$ SD values are (20.24 ± 12.89) ng/mL and (31.68 ± 6.42) ng/mL respectively with the P-value <0.001, which shows the statistical significance. Also estimation of serum calcium levels between postpartum women (case) and non-pregnant women (control) has been done and the mean $\pm$ SD are (9.04 ± 2.15) mg/dL and (12.01 ± 1.18) mg/dL respectively, with the P-value <0.001 which demonstrates the statistical significance. By estimating the correlation between 25-OH Vitamin D and serum Calcium among the postpartum women a positive correlation was found with correlation coefficient (R*) value of 0.755, and the P-value of <0.001. The statistical data shows that women with Vitamin D deficiency is associated with Calcium insufficiency.

Many studies have been done on the low vitamin D level of postpartum women. Decreased level of serum vitamin D has important clinical significance. The identification of postpartum deficiency/insufficiency of vitamin D may represent a window of opportunity for vitamin D supplementation aiming at raising vitamin D concentrations in women. According to Maria Eliana Pierre Martins et al (2018), postpartum vitamin D insufficiency was observed in 74% of women. The maternal postpartum 25(OH) Vitamin D concentrations correlated directly those of Calcium ($r=0.173$, $p=0.009$) and alkaline phosphatase ($r=0.149$; $p=0.025$). Multivariate analysis showed that each increase of 1 ng/mL in 25(OH) Vitamin D concentrations was associated with an increase of 0.16 mg/dL (95% CI 0.19 to 2.02, $p=0.018$) for Calcium.

The main finding of the present study is that the Vitamin D value is deficient in most of the postpartum women who admitted at NRS Medical College and Hospital during a certain period. They mainly belong to the Eastern region of India. Now the level of Vitamin D depends on various factors in a human. Most important of which is the sufficient exposure to the sunlight or UVB radiation that promotes the Vitamin D synthesis in the human body. Also, insufficient dietary intake and abnormal renal excretion and reabsorption of Calcium and Phosphate, malabsorption of Vitamin D, high phytate may also reduce the absorption of the vitamin D.

Vitamin D is a key modulator of dietary Calcium absorption in humans. So, women with vitamin D deficiency are more prone to serum Calcium deficiency. Vitamin D induces the expression of the gene that codes the Calbindin carrier protein that helps in Ca absorption from the duodenum. In the case of postpartum women, other certain factors modulate Ca deficiency. The typical daily loss of Calcium in breast milk has been estimated to range from 280–400 mg, although daily losses as great as 1,000 mg Calcium have been reported.

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