



GLOBAL JOURNAL OF MEDICAL RESEARCH: E
GYNECOLOGY AND OBSTETRICS
Volume 14 Issue 1 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Effect of Low Estrogen Level on Calcitriol and Other Bone Related Parameters in Postmenopausal Women

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GJMR-E Classification : *NLMC Code: WJ 190*



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I. INTRODUCTION

Menopause is a normal event of women's life associated with hormonal changes these changes¹ may lead to bone related problems. Abnormal mineral metabolism leads to bone related problem like osteoporosis, arthritis etc². This has led to hypothesis that can decrease calcium, phosphorus^{3,4}, which is responsible for bone related problem in post menopause^{5,6}. Scanty work has been done in order to

correlate low estrogen level with bone related parameters so present study was planned to evaluate effect of low estrogen level on calcitriol and other bone related parameters in postmenopausal women.

II. MATERIAL AND METHODS

This study was conducted in the department of Biochemistry M.G.M. Medical college Indore from Jan 2013 to Dec 2013. A total of 200 subjects were taken among them 100 postmenopausal women taken as cases and 100 normal premenopausal women were taken as control subject. 2ml blood samples collected from each subject and samples were analyzed for serum calcium, phosphorus, alkaline phosphatase by using fully automatic Biochemistry analyzer and calcitriol was estimated by using radio immunoassay method⁷.

III. STATISTICAL ANALYSIS

Data were analysed using SPSS version 10 mean, S.D., paired and unpaired 't' test were calculated and significance was expressed by 'p' values.

Table 1 : Comparison of serum calcium, phosphorus, alkaline phosphatase and calcitriol level in postmenopausal women and control group

| S.No. | Parameters | Control group n=100 | Postmenopausal Women group n=100 | p value |
|-------|-------------------------------|------------------------|--|---------|
| 1 | Calcium (mg/dl) | 10.8 ± 1.2 | 9 ± 1.6 | <0.05 |
| 2 | Phosphorus (mg/dl) | 3.5 ± 0.8 | 2.8 ± 0.6 | <0.05 |
| 3 | Alkaline phosphatase (U/L) | 52 ± 12 | 99 ± 26 | <0.05 |
| 4 | Calcitriol (pg/ml) | 29 ± 6.1 | 22.4 ± 5.7 | <0.001 |

IV. RESULTS

The significant decrease observed in serum calcium and phosphorus level in postmenopausal women when compared to control.

The significant decrease is observed in serum vitamin D3 (calcitriol) level in postmenopausal women when compared with control.

The significant increase was observed in serum alkaline phosphatase level in postmenopausal women when compared to control.

V. DISCUSSION

Decrease level of calcium and phosphorus observed in postmenopausal women is due to low level of estrogen in postmenopause leads to loss of calcium and phosphorus in urine². A longitudinal study of bone related parameter by Nordin et al conclude the menopausal fall in calcium indicates a change in PTH

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set point and which leads to fall in GI absorption and tubular re-absorption of calcium and phosphorus. This is because of low activity of estrogen at these 2 sites⁸. Vitamin D3 level were found to be decreased in patient of osteoporosis. The women by increasing the intake of vitamin D3 can significantly reduce the bone loss and improve net bone density^{8,9}. In the studies on hypervitaminosis D⁶ and impaired vitamin D metabolism in post menopausal women shows low serum calcium was found to be significant univariate predictor of hypovitaminosis D^{10,11}.

In present study significant correlation was observed between serum calcium, phosphorus, ALP level, and vitamin D level. A general awareness among the people is required to stress the importance of supplementary calcium with vitamin D. Preparation of intake of diets rich in calcium and vitamin D will be helpful to minimize the chances of osteoporosis and progression of osteoporosis in postmenopausal women.

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