

A Study on Pattern of Change in Serum Biochemical Profiles among Pre-Menopausal and Post-Menopausal Women

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Abstract

Aim: To study pattern of change in serum biochemical profiles among Pre-menopausal and post-menopausal women **Method:** Present study was carried out at Rajindra Hospital Patiala, Punjab. A total of 100 pre-menopausal and 100 post-menopausal women were participated in the study. Serum calcium and phosphorus level concentration was measured by automated analyzer **Results:** Serum calcium level was significantly lower in Post-Menopausal women than in Pre-Menopausal women (p-value < 0.0001). Serum Phosphorus level was significantly higher in Post-Menopausal women as compared to that in Pre-Menopausal women (p-value < 0.0001). **Conclusion:** In Post-Menopausal women, there is a drop in serum calcium level and serum phosphorus level significantly raised as compared to Pre-Menopausal women.

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Introduction

Menopause is defined as cessation of menstrual cycle resulting in permanent amenorrhea. It occurs between 40-61 years of age and usually begins with irregularity in menstrual cycle which may extend up to one year till permanent menstrual cessation (Padubidri & Daftary, 2008). During 10-15 years before menopause the shortening of follicular phase of the cycle starts. Thus inappropriate follicular development leads to insufficient estrogen production in menstrual cycle and a very little estrogen left to stimulate endometrium resulting in amenorrhea. It has positive correlation with genetic predisposition and smoking which induces premature menopause (Prabha et al., 2015). As there is an imbalance between bone formation and bone resorption, there occurs a rapid bone loss with the onset of menopause which results in osteoporosis (Ralston & McInnes, 2014). According to WHO, Osteoporosis is defined as degenerative bone disease characterized by low bone mineral density leading to enhanced bone fragility and a consequent increase in fracture risk. Osteoporosis is a late complication of menopause. The relation between osteoporosis and the menopause was first noted by Albright et al (1941) when they described 42 cases of spinal osteoporosis. Women lose bone density faster than men after the age of 45 years. This decline in bone loss is statistically related to menopause. Onset of menopause also involves imbalance between different hormonal & biochemical factors (Gupta, 1996). A hormonal factor like estrogen is responsible for calcium

absorption into the bones. During menopause there is a drop in the estrogen level which leads to abrupt decline in bone mineral density (Prabha et al., 2015). Biochemical factors may involve change in bone and mineral metabolism. Thus, decrease in estrogen level gradually causes the alteration in intestinal absorption, bone resorption and renal re-absorption of calcium and phosphorus (Ralston & McInnes, 2014). The aim of the present study is to evaluate the pattern of change in serum biochemical profiles among pre- menopausal and post-menopausal women.

Materials and Methods

The present study was conducted on 100 Pre- Menopausal and 100 Post-Menopausal women from outpatient department of Rajindra Hospital Patiala, Punjab. The subjects with any history of hormonal dysfunction, hormone replacement therapy, hypertension, diabetes mellitus, hysterectomy and any other gynecological abnormality were excluded from the study. The purpose of the study was explained to the subjects and informed written consent taken. 5 ml of fresh blood sample was collected under aseptic condition from ante-cubital vein of each subject with an empty stomach. Then the blood sample get transferred into sterile plain vacuum tube and allowed to clot, centrifuged at 6000 rpm for 5 minute at room temperature. The clear serum was separated from blood, kept at 20⁰c and used for biochemical analysis (Bhale & Ansari, 2014). Serum calcium concentration was calculated with automated analyzer by the method of Trinder (1960) and Serum phosphorus estimation was done by Fiske and Subbarow method (1925).

The data was analyzed using Statistical Package for the social sciences (SPSS) 22 version software. Paired t test was used to determine the change in serum calcium and serum phosphorus level among pre menopausal and post menopausal women.

Results

The results revealed that Post-Menopausal women had significantly lower serum calcium level than in Pre-Menopausal women (p-value < 0.0001). Serum Phosphorus level was significantly higher in Post-Menopausal women as compared to that in Pre-Menopausal women (p-value < 0.0001). (Table 1 and Figure1).

Table 1. Levels of serum calcium and serum phosphorus among Pre-Menopausal and Post-Menopausal women

Parameters	Pre-Menopausal women (n=100)	Post-Menopausal women (n=100)	p-value	t-value
Serum Calcium (mg/dl)	10.05 ± 0.166	9.41 ± 0.126	< 0.001	32.49
Serum Phosphorus (mg/dl)	3.69 ± 0.0948	4.62 ± 0.1708	< 0.001	56.33

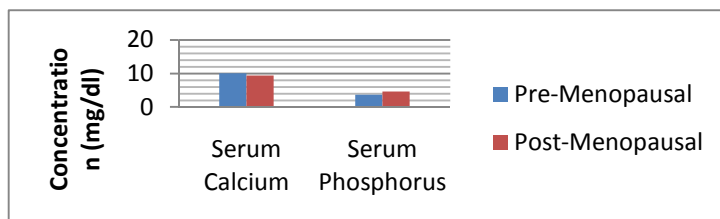


Figure 1. The pattern of change in serum calcium and serum phosphorus among Pre-Menopausal and Post-Menopausal women

Discussion

The aim of the study was to investigate the pattern of change in serum biochemical profiles among Pre-Menopausal and Post-Menopausal women. The results indicated that serum calcium levels were reduced significantly in Post-Menopausal 9.41 ± 0.126 mg/dl (mean \pm S.D) as compared to Pre-Menopausal women 10.05 ± 0.166 mg/dl with a p-value of < 0.0001 and serum phosphorus level was significantly raised in Post- Menopausal 4.62 ± 0.1708 as compared to Pre-Menopausal women 3.69 ± 0.0948 with a p-value of < 0.0001 . Results of the present study are in support with a study conducted by Prabha et al (2015) who reported that serum calcium levels were decreased in Postmenopausal with osteoporosis $8.80+0.89$ mg/dl when compared to Pre-Menopausal women $10.07+0.66$ mg/dl (mean+SD) with a statistically significant p-value of <0.0001 . Serum phosphorus levels were increased in Postmenopausal $4.07+1.09$ mgs/dl compared to that of Pre-Menopausal women $3.72+0.56$ mgs/dl with a p-value of <0.001 . Young and Nordin (1967) describe certain differences in serum calcium and phosphorus between pre-menopausal and post-menopausal women which may be related to the increased bone resorption due to the loss of osteogenic activity after the menopause. In Post-Menopausal women, there is abrupt fall in bone density due to estrogen deficiency and also when the rate of osteoclasts exceeds the osteoblasts formation. Sachdeva et al (2005) in his study postulated that after menopause, a woman loses around 3% bone mineral density in each subsequent years resulting in osteopenia and ultimately osteoporosis. Before 10-15 years of menopause, the ovarian function begins to decline which is usually associated with reduction in bone density and altered calcium metabolism.

Conclusion

The results of the present study concluded that serum calcium level was significantly reduced in Post-Menopausal women and serum phosphorus level was significantly raised in Post-Menopausal group as compared to Pre-Menopausal women. However, more additional studies are needed to estimate the levels of serum calcium and serum phosphorus among Pre-Menopausal and Post-Menopausal women to empower the evidence.

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Conflict of Interest: None declared