

Effect of Menopause on Serum Calcium Levels

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Abstract:

Menopause is a condition in which there is permanent cessation of menses resulting from reduced ovarian hormone secretion that occurs naturally. In postmenopausal women, the two major causes of bone loss are oestrogen deficiency after menopause and age related processes. This study was carried out to evaluate calcium status in pre-menopausal and post-menopausal women. Cross sectional study was conducted in 25 pre-menopausal women (27-45 years of age) and 25 post-menopausal women(46-65 years of age). Serum calcium was measured. Mean serum calcium levels in Post-Menopausal women were less as compared to Pre-Menopausal women and this difference was significant. It can be recommended that calcium supplementation can be given as prophylaxis to prevent the long term bone loss and to decrease the risk of fracture and osteoporosis in postmenopausal women.

Keywords: Menopause, Serum calcium.

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Introduction

Menopause is a condition in which there is permanent cessation of menses resulting from reduced ovarian hormone secretion that occurs naturally. Natural menopause is not associated with a pathologic cause and is recognized after 12 months of amenorrhea. [1] Menopause typically occurs in middle age, 45-61 years of age, signalling the end of the fertile phases of life[2]. Menopause is characterised by hot flushes, night sweats and various other psychological and biochemical changes . It also leads to metabolic bone disorders. With the onset of menopause, rapid bone loss occurs which is believed to average 2 to 3 % over the following 5 to 10 years, being greatest in the early post-menopausal

years [3,4]. Calcium ion is an essential structural component of skeleton. Body cannot synthesize it. Nutrition imbalance with endocrine abnormalities may be involved in osteoporosis [5]. Extracellular calcium ion concentration is determined by the interaction of calcium absorption from intestine, renal excretion of calcium and bone uptake and release of calcium, each of which is regulated by parathormone, vitamin D and calcitonin [6]. Estrogen deficiency is present in post-menopausal women. Estrogen deficiency results in longer life span of osteoclasts [7] .This estrogen deficiency is reason for osteoporosis seen after menopause. The female sex hormone diminish to almost

none after menopause. Bone turnover increases to high levels in women soon after menopause. The 2 main causes of bone loss are estrogen deficiency after menopause and age related process [8]. Intestinal calcium absorption decreases in post-menopausal women [9].

Osteoporosis is a late complication of menopause. It is a degenerative bone disorder where there is thinning and weakening of the bone and a general decrease in bone mass and density. So susceptible to fractures. Fractures related to osteoporosis are estimated to affect around 30% of women in developed countries and are a major health problem. Normally bone will go through a process where old bone is replaced by new bone cells. This study was carried out to evaluate calcium status in pre-menopausal and postmenopausal women.

Material and Methods

Cross sectional study was conducted in 25 pre-menopausal women (27-45 years of age) and 25 post-menopausal women (46-65 years of age) in department of Physiology.

Subjects were selected from general population according to the inclusion

criteria. Consent was taken from subjects and procedure was explained to subjects.

Inclusion criteria: Post-menopausal women between age 46-65 years.

Exclusion criteria:

1. Surgical menopause due to hysterectomy.
2. Post-menopausal women on estrogen therapy.
3. Women having Diabetes / Hypertension.

Five ml of venous blood was drawn aseptically from each subject. It was centrifuged at 3,000 rpm for 10 minutes and serum was separated. Serum calcium was measured by colorimetric method. Mean \pm SD of all the variables was determined.

Student's t-test was applied to see the significance of difference of parameters between two groups. Pearson's correlation coefficient was determined to evaluate correlation between different parameters.

The interpretation of P value are as follow

P > 0.05 - not significant

P < 0.05 – significant.

Results:

Table 1: Serum Calcium levels

	Serum calcium levels. mg/dl Mean \pm SD	P value
Pre-Menopausal women n=25	9.86 \pm 0.43	0.03**
Post-Menopausal women n=25	8.02 \pm 0.24	Significant

Mean serum calcium levels in Post-Menopausal women were less as compared to Pre-Menopausal women and this difference was significant.

Discussion

Health and menopausal problems among post-menopausal women are numerous and draws the attention of health authority. [10] Bone turnover leading to poor health consequence is increasingly common in both developing and developed world. Calcium status was evaluated in pre-menopausal and postmenopausal women in

the present study. Mean serum calcium levels in Post-Menopausal women were less as compared to Pre-Menopausal women and this difference was significant. Postmenopausal women had significantly lower serum calcium levels than in pre-menopausal women. Declining ovarian function before menopause is accompanied by reduction in bone mass and altered calcium metabolism. Oestrogen deficiency may induce calcium loss due to decreased intestinal calcium absorption and decreased renal calcium conservation. [11,12]

Calcium ion is an essential structural component of the skeleton. Estrogen deficiency after menopause induces calcium loss by indirect effects on extra skeletal calcium homeostasis as well as decreased intestinal calcium absorption. When estrogen is deficient, there is an increase in the activation of new bone remodeling units. Both formation and resorption are altered with the result that resorption exceeds formation, producing a negative balance. Estrogen deficiency may induce calcium loss due to decreased intestinal calcium absorption and decreased renal calcium conservation. The results of the present study indicated that the level of serum calcium declined significantly in post-menopausal women.

In this study serum calcium was evaluated in premenopausal and postmenopausal women. Serum calcium was significantly lower in postmenopausal women as compared to premenopausal women. Lower calcium levels after menopause lead to osteoporosis. Osteoporosis is late complication of menopause. Osteoporosis causes thinning and weakening of bone and general decrease in bone mass and density. So menopausal women are susceptible to fractures. Fractures related to osteoporosis are estimated to affect around 30% of women both in developing and developed countries and are major health problem [13]. During menopause there is drop in estrogen levels which caused decreased calcium levels in postmenopausal women. All women will experience acceleration in bone density reduction as their estrogen levels drop. Thus serum calcium could be used as indicator of increased bone turnover, to enable early intervention so as to minimize fractures due to osteoporotic changes [14].

Conclusion

Mean serum calcium levels in Post-Menopausal women was less as compared to Pre-Menopausal women and this difference was significant. It can be

recommended that calcium supplementation can be given as prophylaxis to prevent the long term bone loss and to decrease the risk of fracture and osteoporosis in postmenopausal women.

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