

Correlation of Serum Cholesterol and Bone Mineral Density in post Menopausal Women

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Abstract

Background: To find a correlation between serum cholesterol and Bone mineral density in post menopausal women

Methods: The experimental group consisted of 100 females at postmenopausal age, in which by the DEXA method was diagnosed osteoporosis while the control group consisted of 100 females in a postmenopausal age but without diagnosed osteoporosis who served as controls.

Results: Postmenopausal women in the BMI range 18.5 to 25 (normal) were only included in the study. Others were excluded from the study to avoid confounding factors. The mean BMI in women with osteoporosis was 22.03 ± 1.54 kg/m² and in Group-II was 21.09 ± 2.12 kg/m². The results were statistically insignificant. Analyzing the average values of serum cholesterol in our study, we found that the mean cholesterol level in group-I was 216.32 ± 33.12 mg/dl and 182.32 ± 52.10 mg/dl in group-II. The mean cholesterol level was significantly higher in women with osteoporosis.

Conclusion: On the decrease in bone mineral density and osteoporosis in postmenopausal women influence many risk factors. Preventive strategies for development of osteoporosis should be initiated in women with elevated serum cholesterol levels.

Keywords: Osteoporosis, Menopause, Lipid Profile, BMI.

Introduction

Osteoporosis is a disease which affect the population of so-called “third age”, or the elderly, while it more affect females as a result of the fact that they have a 30% lower bone mass than men, and that among them there is a rapid process of losing bone mass after entering the menopause and the occurrence of ovarian insufficiency.¹⁻²

The emergence of this disease involves number of factors (genetic and environmental factors), as well as other pathological entities that can lead to rapid loss of bone mass, while recent studies indicate that there is no association between low bone mineral density (osteopenia, osteoporosis) and hyperlipidemia in obese people and that this correlation was probably the result of increased

mechanical pressure on the bone, especially in postmenopausal women, or the direct effects of lipids on the function of bone cells.^{3,4}

Material and Methods

Women fulfilling the following inclusion and exclusion criteria were enrolled for the study.

Inclusion criteria- All postmenopausal women (1-5 years after the last menstrual cycle) with BMI 18.5-25 who are willing to participate in the study.

Exclusion criteria -Diabetes, chronic renal disease, inflammatory arthritis, diseases of thyroid and para thyroid glands, liver disease, malignancy, GIT disease like Crohn's disease

and malabsorption, Use of drugs like statins, corticosteroid, hormone replacement therapy, diuretics, drugs for osteoporosis, Secondary osteoporosis due to endocrine diseases.

Study group A consisted of 100 postmenopausal females who had been diagnosed with osteoporosis in the Cabinet for Osteodensitometry by determining bone mineral density by DEXA method at the lumbar spine (L2-L4).

Group B consisted of 100 females in the postmenopausal age which after determination of bone mineral density by DEXA method, has not been diagnosed with osteoporosis.

All the examinees underwent biochemical analysis of blood. Samples were taken from a peripheral vein after 12 hours of fasting and were immediately centrifuged at four degrees Celsius

(4° C). Plasma was used to analyse the lipid profile (total cholesterol, LDL cholesterol, TG, HDL cholesterol).

Data analysis- Data were presented as mean \pm standard error values for continuous variables and as percentage \pm standard error for categorical variables. Statistical analysis was performed. A p value < 0.05 was considered to be statistically significant.

Results

Maximum number of women in both the groups were in the age group 51-60 years suggesting that it is the age in which women attains her menopause mostly. The mean age of this study was 53.21 ± 5.01 in group-I and 53.62 ± 5.02 in group-II. No significant difference was observed according to age between both the groups (p-value > 0.05).

Table 1: General characteristics

Variable	Group-A	Group-B	p-value
BMI(Kg/Mt ²)	22.03 \pm 1.54	21.09 \pm 2.12	>0.05
Total Cholesterol(mg/dl)	216.32 \pm 33.12	182.32 \pm 52.10	0.01

Postmenopausal women in the BMI range 18.5 to 25 (normal) were only included in the study. Others were excluded from the study to avoid confounding factors. The mean BMI in women with osteoporosis was 22.03 ± 1.54 kg/mt² and in Group-II was 21.09 ± 2.12 kg/mt². The results were statistically insignificant. Analyzing the average values of serum cholesterol in our study, we found that the mean cholesterol level in group-I was 216.32 ± 33.12 mg/dl and 182.32 ± 52.10 mg/dl in group-II. The mean cholesterol level was significantly higher in women with osteoporosis.

Discussion

Postmenopausal women in the BMI range 18.5 to 25 (normal) were only included in the study. Others were excluded from the study to avoid

confounding factors. The mean BMI in women with osteoporosis was 22.03 ± 1.54 kg/mt² and in Group-II was 21.09 ± 2.12 kg/mt². The results were statistically insignificant. Analyzing the average values of serum cholesterol in our study, we found that the mean cholesterol level in group-I was 210.32 ± 34.21 mg/dl and 183.21 ± 56.32 mg/dl in group-II. The mean cholesterol level was significantly higher in women with osteoporosis.

Sadat-Ali M et al (2005)⁷ observed that the mean BMI in group A with women of > 6 children was 31.95 kg/m² and in group B with women of < 5 children was 29.14 kg/m². The BMD of the lumbar spine of group A was 0.850 g/cm² (SD ± 0.112) compared to group B in which it is

0.699 g/cm² (SD±0.141), p<0.005. This difference was statistically significant.

Skrzek A et al (2014)⁸ suggested the optimal values of the body mass index (BMI) which would indicate the most favourable preservation of the bone mineral density in postmenopausal women is 26.9 kg/m².

Shukla J et al (2013)⁹ found that postmenopausal women with osteoporosis had significantly increased values of total cholesterol (Mean 137.11 mg/dl SD 7.28). This is in accordance with the result in the above study. Adami and colleagues¹⁰ found no significant association of elevated serum cholesterol with a decrease in bone mineral density at the hip level in women aged 68-75 years. Y.-Y. Chen et al¹¹ found that postmenopausal women with osteoporosis had a significantly higher total cholesterol level compared to those with the normal bone mineral density. Li et al¹² worked on relationship between lipid profiles and bone mineral density and observed no correlation between total cholesterol level and osteoporosis susceptibility in postmenopausal women. M.K. et al¹³ observed that BMD at femur (0.887±0.152) decreased significantly with increasing quartiles of total cholesterol (<200mg/dl) (P = 0.024) in highest quartile in postmenopausal women.

Conclusion

After analysing the results of the study, it can be concluded that serum cholesterol is associated with bone mineral density in postmenopausal women. Hence a lipid profile is recommended in postmenopausal women as an atherogenic lipid profile is a risk factor for the development of osteoporosis in the elderly postmenopausal females. Thus, preventive measures can be instituted in the form of lifestyle modifications, diet and drugs to improve the quality of life in this group of females.

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