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Assessment Of The Correlation Between Colony Stimulating Factor1 And Progesterone In Osteoporosis Postmenopausal Women.

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Abstract

Osteoporosis are an absolutes decline in mass of bone tissue. bestow to be a most public health problem .for they are associate with increase mortality and morbidity especially vertebral and hip fracture, which are a huge burden on the health system required to the high financial cost of this care fracture. The aim of research is to estimation the correlation between colony stimulating factor1 and progesterone from postmenopausal women ; the comparison of each parameters between osteoporosis in postmenopausal women and postmenopausal women without osteoporosis. Serum CSF1 and progesterone measured biochemical parameters were compared between the patients (140) and healthy (40). The significantly high concentration of progesterone and T-scores in patients with osteoporosis compared with the control group, and no significantly concentration of CSF1 in patients with osteoporosis compared with the control group Serum CSF1 were positively correlated (p =0.032) with(progesterone) for osteoporotic groups ,and negatively correlated(p=0.984) with progesterone for control groups. Progesterone levels can be predicted significantly using the most correlated with CSF1

Keywords: 0steoporosis, CSF1, M-CSF, progesterone.

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INTRODUCTION

Osteoporosis which actually mean porous bone, is a disease in the mass and quality of bones are reduce. As bone begin to be more porous and fragile, the risk of fractures is greatly increase.(1) The deprivation of bone occur silent and progressive. Often there are no symptom until the first fracture occur .(2)Progesterone although amenorrhea are obvious signs of hormonal dysfunction, the scenarios may be associated with reduced BMD. (3,4)Activation of the HPA axis, even in mild chronic stress, reduces gonadotropin-releasing hormone (GnRH) and could result in reduced hormone levels and subclinical ovulatory disturbances(5).These abnormal cycles can be detected through blood or salivary progesterone measurements. For example, suppressed progesterone during the second half of the cycle would indicate an anovulatory cycle(6).Topical progesterone creams made from diosgenin, extracted from Mexican yams, are frequently used for osteoporosis, but their ability to increase BMD remains controversial.(7) Much of the attention for the use of progesterone has been due to the conclusions of Lee on the efficacy of transdermal progesterone cream to increase BMD in postmenopausal women. (8)In a study by Leonetti et al there was no increase in BMD in menopausal women treated daily for one year with 20 mg progesterone cream.(9) Macrophage colony stimulating factor (M-CSF) is a member of the family of proteins referred to as colony stimulating factors(CSFs).M-CSF is a secreted or a cell surface glycoprotein comprised of two subunits that are joined by a disulfide bond with a total molecular mass varying from 40 to 90 kD. Similar to other CSFs, M-CSF is produced by macrophages, monocytes, and human joint tissue cells. M-CSF-related disease states include osteoporosis, in which monocytes/macrophages and related cell types play a role. For instance, osteoclasts are similar to macrophages and are regulated in part by M-CSF. Postmenopausal bone loss results from defective bone remodeling secondary to an uncoupling of bone formation from exuberant osteoclast mediated bone resorption as a consequence of estrogen deficiency.Multinuclear osteoclast formation induced by (M-CSF + RANKL) is completely abrogated by treatment with GM-CSF.According to the WHO, the definitions of osteopenia and osteoporosis only refer to DEXA measurements at lumbar spine, hip and forearm, and cannot be applied to other densitometry techniques, neither at other skeletal sites. Lumbar spine is the primary site for BMD measurement: total spine (from L1 to L4) and individual vertebral T-scores are obtained from several Regions of Interest. The T-score is a comparison of the patient's bone density with healthy, young individuals of the same sex. A negative T-score of –2.5 or less at the femoral neck defines osteoporosis(10).shown in Figure (2).

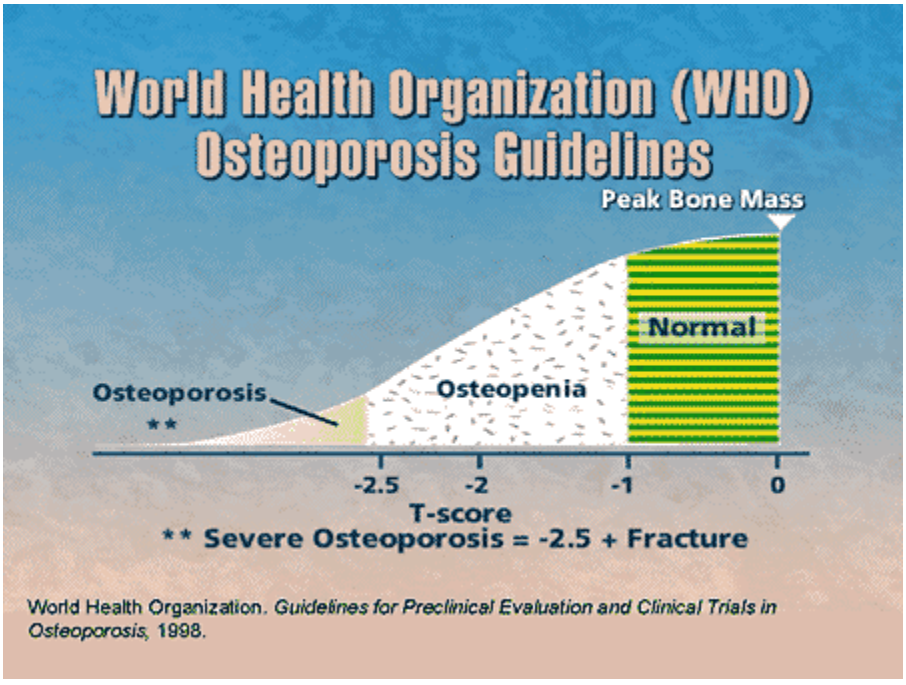

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Figure (2) WHO diagnostic T-score classification

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MATERIAL AND METHODS

According to cross-sectional dual center study was conducted at DEXA unit in radiology department in Al-Sader Teaching Hospital in AL-Najaf Province /Iraq from August 2015 till the end of April 2016 to know the prevalence of Osteoporosis in Iraqi postmenopausal women a total of 180 females from age of 50 year to age of 80year were randomly selected from the patients attending the out patients clinic. Osteoporosis was diagnosed according to WHO criteria. Women were excluded from the study if they had endocrine diseases, environmental factors, diseases with altered activity(like rheumatoid arthritis, cerebrovascular accidents, chronic obstructive pulmonary diseases) or received any anti-osteoporosis treatment, and/or hormone replacement therapy at the time of BMD measurement. A total of 180 women involved in this study with mean age 60.75 ± 10.24years .Blood samples had been taken from (140) osteoporosis women and (40) women apparently healthy as a control group .Consent was obtained from the patients' first-degree relatives. These patients were also informed that the results of the study would be provided to them as free useful laboratory tests. The patients were diagnosed with osteoporosis as DXEA scan. Diagnosis was established by observing clinical symptoms and conducting hematological . None of these controls was anemic or manifested an evident systemic disease.

Methods A-Assays. Estimation of serum CSF1 and progesterone quantitatively was performed using a solid-phase enzyme-linked immunosorbent assay (ELISA) supplied by (Bioassay®, china).

B-Statistical Analysis.The types of distribution of the variable results were examined using Kolmogorov-Smirnov test. The results of the analysis were calculated by dividing the variables into 2 classes depending on the statistical distribution: normally distributed and non-parametric variables. For normally distributed variables, the results were stated as mean ± standard deviation. Pooled t test was used to compare patients and the control groups. Pearson's correlation coefficient (r) was computed to determine the correlation between parameters. For non-parametric variables that are not normally distributed, the results were expressed as median in addition to mean ± standard deviation. Mann-Whitney U test was utilized to compare the patients and the control groups. Spearman's correlation coefficients (ρ, rho) were calculated to determine the correlation between parameters. Statistical analysis was performed in SPSS version 19.0.1 multilingual program (2010; IBM, USA). A forecasting study was performed using "Regression Forecasting Model" software (Business Spreadsheets, USA).

RESULTS

Comparison Between Patients with osteoporosis and Control Group (Table 1 , Figure 1) shows the expected status of osteoporosis associated with postmenopausal women as indicated by a decrease (p = 0.001) in progesterone concentration. Table 1 also shows the significantly high concentration of progesterone status parameter in patients with osteoporosis compared with the control group The mean of progesterone for patients group was (3.960 ± 1.116) and for healthy group was (4.929 ± 1.568) in (pg/ml) , (P=0.001).In present study there was a no significant in mean serum (CSF1 in(pg/ml)) in postmenopausal Women with osteoporosis was (717.679 ± 223.903), and for healthy group was (691.999 ± 308.896) , (P=0.596) respectively; significant high decrease in (T-score) from (osteoporosis) postmenopausal women (P=0.0001), the mean of T-score for patients group was (- 3.828 ± 0.298) and for healthy group was (1.900 ± 0.197)

Table 1 : Comparison Between Patients with osteoporosis and Control Group

Parameters	Patients(n=140) (Mean±SD)	Controls(n=40) (Mean±SD)	P value
Progesterone(pg/ml)	3.960 ± 1.116	4.929 ± 1.568	0.001**
M-CSF(pg/ml)	717.679 ± 223.903	691.999 ± 308.896	0.596
T-Scores	- 3.828 ± 0.298	1.900 ± 0.197	0.0001**

**: high significant.

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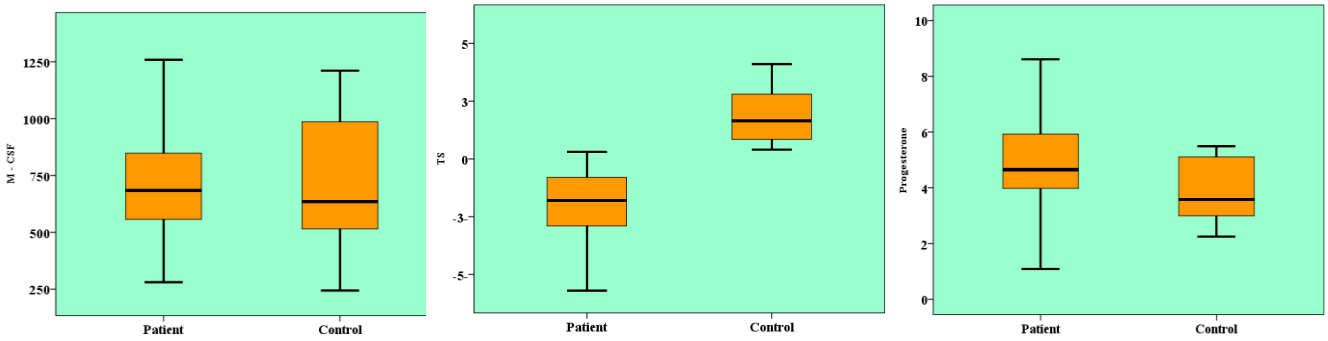

Figure 1: Box Plot Distribution of Studied (Progesterone,T-scores and CSF1) shows Upper limit, Lower limit, and Median.

Correlation Between CSF1 and progesterone. The results in Table 2 presented the correlation coefficients (p) and p-values for the relationship between CSF1 state and progesterone in osteoporosis patients. The results in Table 2 are very interesting. CSF1 showed a significant positive correlation with progesterone (p = 0.032, r = 0.195), and negative relation between M-CSF and progesterone (r = -0.004, p = 0.984).

Table 2 : Correlation Between CSF1 and progesterone .

Parameters.	Patients(n=140)		Control(n=40)	
	Correlation Coefficients(r)	P (value)	Correlation Coefficients(r)	P (value)
(Progesteron)VS(M-CSF)	0.195*	0.032	-0.004	0.984

*** P<0.05, ** P<0.005**

DISCUSSION

Comparison Between Patients with osteoporosis and Control Group.The present research revealed DEXA measured of osteoporosis women is a better test than any other factor measured in the diagnosis of the disease, with incidence of low T-score in osteoporosis women more than controls women, and this result is supported by other workers(11,12,13,14).In present study there was a no significant in mean serum CSF1 in(pg/ml) in postmenopausal Women with osteoporosis was (717.679 ± 223.903), and for healthy group was (691.999 ± 308.896) , (P=0.596), respectively.This finding were in accordance with results obtained by(15) study. CSF1 related disease states include osteoporosis, destructive arthritis, atherogenesis, glomerulonephritis, Kawasaki disease, and HIV-1 infection, in which monocytes/macrophages and related cell types play a role. For instance, osteoclasts are similar to macrophages and are regulated in part by CSF1. Growth and differentiation signals induced by CSF1 in the initial stages of osteoclast maturation are essential for their subsequent osteoclastic activity in bone.(15)Postmenopausal bone loss results from defective bone remodeling secondary to an uncoupling of bone formation from exuberant osteoclast mediated bone resorption as a consequence of estrogen deficiency.Multinuclear osteoclast formation induced by (CSF1 + RANKL) is completely abrogated by treatment with CSF2.(16). The results of current study show a significant decrease in mean serum(Progesterone) in postmanopausal Women with osteoporosis was (3.960 ± 1.116) and for healthy group was (4.929 ± 1.568) in (pg/ml), (P=0.001) .This finding were in accordance with results obtained by(3,17,18) studied. There are a variety of ways by which progesterone can affect bone metabolism. For example, the hormone appears to stimulate new bone formation. (19) Urinary calcium excretion decreases during progesterone administration. Progesterone also partially antagonizes dexamethasone-induced osteoblast growth inhibition, indicating that it binds to the glucocorticoid receptor in osteoblasts, and thus it may be especially useful in corticosteroid-induced osteoporosis. (4) In addition, progesterone appears to increase levels of insulin- like growth factor-1, which promotes bone formation.(18) In premenopausal women, the mean length of the luteal phase (when endogenous progesterone levels are normally highest) correlates positively with the percentage annual change in vertebral mineral density. In

other words, women with shorter luteal phases had more severe osteopenia than did those with longer luteal phases.(4,17)

Recommendations. These facts through our study and clarification of these relations for progesterone raise the get answers: Is it actually estrogen loss that is responsible for bone loss, or is progesterone involved? I recommend studying the real cause of osteoporosis if it is caused by progesterone

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