

**Estimation the levels of Osteopontin , Endothelin-1
in women patients of osteoporosis and Heart diseases in Samarra city**

Muhannad E. Majeed / Collage of Education / University of Samarra

Muhaned.em@ntu.edu.iq

Assist. Prof Dr. Wijdan I. A. Abd-alwahab / Collage of Education / University of Samarra

Wijdan80@uosamarra.edu.iq

Prof Dr. Mousa M. Marbut / Al-Frabi University College

Mossa 1995p@ yahoo.com

Abstract :

A Cross Sectional study that includes assessment of the relation of the hormonal in among post-menopausal women with osteoporosis and heart diseases who attended Samarra General Hospital in Salah AL-Din Governorate The study, which involved 100 women with ages ranging from 45 to 70, was conducted from January to November of 2022. Of these, 25 were in good health and constituted the control group, and the remaining 75 were represented by patient groups that were divided into three primary groups: There are three categories of women: twenty-five with osteoporosis only, twenty-five with heart disease only, and twenty-five with both osteoporosis and heart disease. Both patients' and healthy volunteers' blood samples were collected, and the serum was separated for analysis. The aim of the current study was to better understand the changes in hormonal levels in female patients with osteoporosis, heart disease, such as osteopontin and Endothelin-1, function in the blood of female patients with heart and osteoporosis the following outcomes of hormonal parameters: In compared to the control group, osteopontin and Endothelin-1 significantly increased ($P \leq 0.05$) in the patient groups.

The study's objective :-

is to look into the physiological association between Osteopontin and Endothelin-1 in Samarra city patients who suffer from heart disease and osteoporosis.

In summary: - there were notable reductions in blood levels of Osteopontin 1 ($P \leq 0.05$) when comparing the sick group to the control group and Endothelin-1 showed had no significantly differences ($P \geq 0.05$) in group of osteoporosis in comparison with control group and showed significantly increased ($P \leq 0.05$) in groups of heart disease, and osteoporosis with heart disease in comparison with control group.

Key words:- Osteopontin, Endothelin-1, cardiovascular disease, osteoporosis .

**تقييم مستويات هرمون الأوستيوبونتين والاندوثيلين - 1
لدى النساء المصابات بهشاشة العظام وأمراض القلب في مدينة سامراء**

مهند عماد مجيد / كلية التربية / جامعة سامراء

أ.م. د وجدان إبراهيم عباس / كلية التربية / جامعة سامراء

أ.د. موسى محمود مربط / كلية الفارابي الجامعة

مستخلص

تضمنت الدراسة تقييم علاقة بعض الهرمونات لدى النساء المصابات بهشاشة العظام وأمراض القلب بعد سن اليأس اللواتي حضرن إلى مستشفى سامراء العام في محافظة صلاح الدين حيث بدأت الدراسة من شهر كانون الثاني 2022 إلى تشرين الثاني 2022 على مجتمع دراسة تراوحت أعمارهم من 45-70 سنة كان عددهم الكلي 100 امرأة، 25 منهن نساء سليماً اعتبرت كمجموعة سيطرة و 75 تمثلت بمجموع المرضي وقسمت إلى ثلاث مجاميع 25 امرأة مصابة بأمراض القلب تشمل فقط إحتشاء عضلة القلب و 25 امرأة مصابة بهشاشة العظام و 25 امرأة مصابة بأمراض القلب و هشاشة العظام وتم جمع عينات المرضي ومجموعة السيطرة وتم فصل المصل لتحليله وكان الهدف من الدراسة هو التغيرات الهرمونية لدى النساء المصابات بأمراض القلب وهشاشة العظام مثل هرمون و أوستيوبونتن Osteopontin والاندوثيلين Endotheline-1 أظهرت النتائج في مجاميع المرضي هناك زيادة معنوية ($P \leq 0.05$) في مستوى هرمون Osteopontin بالإضافة الى Endotheline-1 مقارنة بمجموعة السيطرة السليمة باستثناء مجموعة مرضي هشاشة العظام لم تكن هناك زيادة معنوية ($P \leq 0.05$) لمستوى هرمون Endotheline 1- مقارنة بمجموعة السيطرة .

The Introduction

Osteoporosis (OP) is a prevalent illness that is prevalent worldwide, particularly as people age. The decrease of bone mineral density that results in osteoporosis increases the risk of fragility fractures. Osteoporosis is primarily thought of as a metabolic bone disease (Azeez, 2023). The major causes of osteoporosis, a chronic condition, are estrogen insufficiency and age-related bone loss. Atherosclerosis and osteoporosis have been the subject of some clinical research, and declines in estrogen levels have been linked to an increased risk of cardiovascular disease in older women. Certain pathophysiological processes that might prevent bone loss may also slow down atherosclerosis in certain illnesses. (Wu *et al*., 2020). Furthermore, cells that have a role in bone morphogenesis, including osteoblasts and osteoclasts, create OPN. It'd be fascinating to learn what role osteopontin plays in each of the distinct bone cell types, and if release always leads to bone resorption via signaling to osteoclasts, or if production by a different cell type results in alternative biological activities. To enhance bone resorption, osteopontin expres-

sion in osteocytes may trigger sclerostin expression or vice versa. In the situation where sclerostin is required to begin osteoclast differentiation via increase of RANKL expression, followed by signaling by osteopontin to enhance osteoclast-mediated bone resorption, there may be a link between these proteins. (Si *et al.*, 2020).

Materials and Procedures:

Samarra General Hospital conducted cross-sectional research on Samarra patients in the Salah-Alddin governorate. The research population's age varied from 45 to 70 years old, and it ran from January to November of 2022. A total of 100 female participants—25 in the control group and 75 in the sick group—were recruited and divided into four primary groups to participate in the study. These groups were as follows:

Group 1: Twenty-five participants who seemed to be in good health as a control.

Group 2: Twenty-five patients who have osteoporosis and heart problems.

Group 3: Twenty-five individuals only had myocardial infarction (MI).

Group 4: 25 individuals only suffering from osteoporosis.

Serum sample handling

Each subject (patients and controls) provided about 5 milliliters of their fasting blood, which was then placed into sterile test tubes and allowed to clot at room temperature for 30 minutes. The sample was then centrifuged for 15 minutes at 3000 revolutions per minute, and the serum was separated and kept at -20 degrees Celsius until it was needed for the preparation of Osteopontin and Endothelin-1.

determination of Osteopontin and Endothelin-1 in serum:- The Enzyme-Linked Immunosorbent Assay (ELISA) kit protocol used to assess the vitamin OPN and ET-1 content in the serum of patients with osteoporosis and heart disease is from Bioassay Technology, China.

Technology, China.

Analytical statistics

The ANOVA test yielded the mean \pm standard deviation for all the data, and the Duncan multiple range test was used to compare the means of the various variables. P value ≤ 0.05 is the threshold for significance.

Results and Discussion

Osteopontin (OPN) :-

Table 1 showed significantly increased ($P \leq 0.05$) in groups of osteoporosis, heart disease, and osteoporosis with heart disease in comparison with control group.

Table. (1): Osteopontin (ng/ml) in control and Patient groups .

Groups	No. of Individuals	Osteopontin(ng/ml) Mean \pm SD
Control	25	0.81 \pm 0.10 d
Osteoporosis	25	3.45 \pm 0.90 b
Heart disease	25	2.91 \pm 0.60 c
Osteoporosis with Heart disease	25	4.40 \pm 1.10 a

In the present study, (Table 1), there was significant elevation in Osteopontin (OPN) hormone concentration in postmenopausal Osteoporosis women, heart disease only and Osteoporosis and Heart disease as compare with normal healthy control subjects.

The results of current study agree with previous study which found a significant elevation in concentration of serum OPN in postmenopausal Osteoporosis women. Also, the same study found a estimate of significant predictors of osteopenia and osteoporosis was done by logistic regression analysis, (Dimic *et al.*, 2012).

Previous Iraqi study found there was a significant ($P \leq 0.05$) increase in the mean value of osteopontin hormone level in the patients as compared to the control, (Shamsulddin *et al.*, 2020).

Hypocalcemia and hypophosphatemia in addition to increase in PTH, lead to increases in OPN transcription, translation and secretion. This is due to the presence of a high-specificity of vitamin D response in the OPN gene promoter. OPN serves to initiate the process by which osteoclasts develop their ruffled borders to begin bone resorption, (Portales- Castillo and Simic, 2022).

Menopause and aging are correlated

with accelerated loss of cortical bone, which happens when the balance between formation and resorption is deregulated and when the resorption is excessive, (Dimic *et al.*, 2012).

Previous study proved that individuals with increased bone turnover markers lose their bones at a faster rate than normal people do. (Shamsulddin *et al.*, 2020).

Also, the current studies found a significant increase in osteopontin level in osteoporotic postmenopausal women, which indicates that the process of bone resorption by the activity of osteoclasts is the major component of bone metabolism, (Fodor *et al.*, 2013; Portales- Castillo and Simic ,2020).

High levels osteopontin in the serum of and low levels of some biochemical markers such as vitamin D3, calcium, Phosphorus and high-Density Lipoprotein can be used in the diagnosis of osteoporosis, (Salman , 2021).

2- Endothelin-1 (ET-1)

The results in table (2) showed had no significantly differences ($P \geq 0.05$) in group of osteoporosis in comparison with control group and showed significantly increased ($P \leq 0.05$) in groups of heart disease, and osteoporosis with heart disease in comparison with control group.

Table.(2): Endothelin-1 (ng/ml) in control and Patient groups .

Groups	No. of Individuals	Endothelin-1 (ng/ml) Mean \pm SD
Control	25	17.40 \pm 2.40 a
Osteoporosis	25	9.30 \pm 1.70 b
Heart disease	25	7.90 \pm 1.20 c
Osteoporosis with Heart disease	25	4.80 \pm 0.90 d

In the present study, Serum levels of Endothelin-1 (ET-1) were significantly increased ($P \leq 0.05$) in postmenopausal heart disease women and in women with Osteoporosis and Heart disease when compared with control group.

Previous studies have showed an elevated intra coronary levels of endothelin I (ET-I) in some patients with heart diseases (Altieri *et al.*, 2005). This elevation of AngII and EI will activate angiotensin II receptor type 1 (AT1) and produce inflammatory cytokines, increase macrophage chemo-attractants and activate reactive oxygen species that produce oxidative stress in myocytes and smooth muscle cells. This elevation of ET- I will activate angiotensin II receptor type 1 (AT1) and produce inflammatory cytokines, in-

crease macrophage chemo-attractants and activate reactive oxygen species that produce oxidative stress in myocytes and smooth muscle cells, (Heeneman *et al.*., 2007) .

The risk of cardiovascular disease is increased with aging, previous studies have revealed that many elderly patients with osteoporosis were associated with cardiovascular diseases such as hypertension, coronary heart disease. Osteoporosis and various cardiovascular diseases have a common path physiological basis (Drechsler *et al.*, 2015; Drake *et al.*, 2017). This result in study indicated that Chinese postmenopausal women with osteoporosis had a higher prevalence of hypertension. Hypertension was significantly associated with osteoporosis, (Chai *et al.*, 2021)

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