

Frequency of Osteoporosis in Patients with Coronary Heart Disease

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ABSTRACT

Objectives: To explore and discuss the possible relationship between coronary artery disease and osteoporosis in men and in postmenopausal women in comparison with healthy control.

Patients and methods: Fifty patients with ischemic heart diseases, with positive catheterization results whose ages range between 45 - 65 years old were enrolled in the study and referred as Group A. Fifty apparently healthy subjects, matched for e with the patients group , were kept as control group and referred as Group B. We divided the patients understudy into two groups based on the mineral density they have; these groups are osteoporosis group and normal bone mass group .

Results: The frequency of bone density by using DEXA (T-score) in studied subjects in Group A were normal (T-score= 5.5 to -0.9) in 34 (68%) subjects, osteopenia (T• score= -1 to -2.4) in 11 (22%) subjects, and osteoporosis (T-score = -2.5) in 5 (10%) subjects. For Group B, 32 (64%) had normal DEXA results, 17 (34%) were osteopenic, and 1 (2%) had osteoporosis.

The study has found that the relationship between the two groups was not statistically significant when tested by the chi square test.

Conclusion: There was no relationship between osteoporosis and cardiovascular diseases. Gender had no effects on osteoporosis.

Keywords : Osteoporosis , Coronary Heart Disease .

تواتر هشاشة العظام لدى المرضى المصابين بأمراض القلب التاجية

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الخلاصة

الهدف من الدراسة: لاستكشاف ومناقشة العلاقة المحتملة بين مرض الشريان التاجي وهشاشة العظام لدى الرجال والنساء بعد انقطاع الطمث بالمقارنة مع السيطرة الصحية.

المرضى وطرق العمل : خمسون مريضاً يعانون من أمراض القلب الإقفارية ، مع نتائج القسطرة الإيجابية الذين تتراوح أعمارهم بين ٤٥ - ٦٥ سنة تم تسجيلهم في الدراسة ويشارون إلى المجموعة أ. ، مع مجموعة المرضى ، كمجموعة مراقبة و يشار إليها باسم المجموعة (ب). قسمنا المرضى إلى مجموعتين بناءً على الكثافة المعدنية لديهم ؛ هذه المجموعات هي مجموعة هشاشة العظام ومجموعة كتلة العظام الطبيعية.

النتائج : كان تواتر كثافة العظام باستخدام (Dexa) درجة (T) في المواد المدروسة في المجموعة (أ) طبيعيًا (درجة $T = 5.5$ إلى - 0.9 (في 34٪) من موضوعات ، هشاشة العظام • (نتيجة = 1- إلى - 2.4) (في 11 (22٪) الموضوعات ، وهشاشة العظام (T- درجة = 2.5-) في 5 (10٪) الموضوعات. بالنسبة للمجموعة B، كانت نتائج Dexa غير الطبيعية 32 (64٪) ، 17 (34٪) من العظام ، و 1 (2٪) مصاب بهشاشة العظام.

وجدت الدراسة أن العلاقة بين المجموعتين لم تكن ذات دلالة إحصائية عند اختبارها بواسطة اختبار مربع كاي. **الاستنتاج:** لم تكن هناك علاقة بين هشاشة العظام وأمراض القلب والأوعية الدموية. لم يكن للجنس أي تأثير على هشاشة العظام.

الكلمات المفتاحية : هشاشة العظام , امراض الشرايين التاجية .

INTRODUCTION

Both Cardiovascular disease (CVD) and osteoporosis(OP) are normally related with the age of the patient and they both have essential impacts especially on personal satisfaction and wellbeing of people everywhere throughout the world. Despite the fact that these two diseases are commonly known as various elements and their concurrence was credited to free age-related procedures, gathering proof shows that there are comparable pathophysiological systems behind the two diseases.

Other diseases often occur with OP bone metabolism that have recently attracted the attention of scholars locally and internationally specially those who are specialized in cardiovascular diseases.

This disease is not only related to age but there are other causes and factors contributing to its occurrence as suggested by scholars ; these reasons include dyslipidemia and diabetes¹ as well as other known disorders like stress and inflammation².

It has also been found that myocardial Ischemia, cardiovascular mortality, ardiovascular morbidity. and subclinical measures of atherosclerosis add to the occurrence of CVD as revealed by cross-sectional and longitudinal epidemiologic studies³.

Moreover, other studies have shown that there are other metabolic relationships between, osteoporosis and vascular calcification: estrogen deficiency⁴, vitamin D excess⁵ and lipid oxidation products⁶ as well as, osteoprotegerin, which is a protein that regulates osteoclast activity and proliferation⁷.

In spite of the above mentioned findings, the question that is to be raised is whether the age is

the only factor that is to be taken into consideration as regard to this diseases, and if osteoporosis and coronary arterial disease are really related to each other or if they are independent processes. Thus more research is needed to find answers to the aforementioned questions in order to know how these two diseases are related to each other⁸.

Aim of the Study

The present study was aimed to seek the possible relationship between coronary artery disease and osteoporosis in men and in postmenopausal women in comparison with healthy control individuals.

Subjects, Materials and Methods

The current study was carried out during the period between Nov. 011 and Jun 2012 in the Rheumatology outpatient department in Ebn Sena teaching hospital after taking the consent and approval of both the regional research committee of Mosul health administration, and the scientific research committee of collage of medicine, university of Mosul, Mosul, Iraq,

Study design Case - control study Subjects

1) Patients group: Fifty patients with Ischemic heart diseases, with positive catheterization results whose ages range between 45 - 65 years old were enrolled in the study and referred as Group A.

A. Exclusion criteria.

1. Hyperthyroidism.
2. Steroid therapy for long period.
3. Alcoholism.
4. Chronic inflammatory diseases.
5. Patient under treatment for osteoporosis.

2) Control group: Fifty apparently healthy subjects, matched for age. with the patients group, were kept as control group and referred as Group B.

Data collection

In order to achieve the aims of the study ,the data of this study is collected by interviews and a questionnaire . The researcher has directly interviewed the subjects and designed a questionnaire that includes personal information such as age, sex, body weight in (kg), height in (m), BMI and biochemical profile (Appendix No.1).

Instrumens

1. Weight and height scale (secale) made in Germany. Body mass index (BMI) was calculated according to the equation: $BMI = \frac{\text{weight(kg)}}{\text{height}^2(\text{m}^2)}$.
2. Dual-Energy X-Ray Absorptiometry: Bone mineral density (BMD) was obtained at lumbar vertebrae in all subjects using dual energy x-ray absorptiometry (the name of the apparatus).

T- Score classification as following:

Normal	5.5 to -0.9
Osteopenia	-1 to> -2.5
Osteoporosis	< -2.5

Statistical Analysis

In order to be able to statistically analyze and test the results to find out the relationship between the parameters of the groups under study , we have used the following statistical means and tests : IBM SPSS Statistics Version 20.0 , Chi square and independent t-test .

RESULTS

Fifty patients in Group A their mean age + SD were 52.90 + 5.33, 28 (56%) of them were males and 22 (44%) were females. Fifty patients in Group B their mean age+SD were 52.22 6.36, 19 (38%) of them were males and 31 (62%) were females. No significant differences between mean age for studied groups by applying independent t-test for two means for each group Table 1 , and also There is no significant differences between both groups regarding gender by applying chi square test Table 2 .

Table1 : The age of the studied groups.

AGE	GROUP A	GROUP B	P- VALUE
Mean+/- SD	52 .90 +/- 5.33	52.22 +/- 6.36	0.084
Minimum	42	41	
Maximum	62	65	

Independent t-test for two means was used.

Table 2 : The gender of the studied groups.

Sex	GROUP A		GROUP B		P-VALUE
	N	%	N	%	
MALE	28	56%	19	38%	0.054
FEMALE	22	44%	31	62%	
Total	50	100%,	50	100%	

Chi-square test was used.

The mean and standard deviation of DEXA results by using T- score for Group A were -0.38 + 1.63, and for Group B were -0.35 +1.28. There was no significant differences (P value= 0.137) between two groups by applying independent t-test Table 3 .

Table 3: DEXA (T- Score) Mean+SD results for studied groups.

Bone density by DEXA (T-Score)	GROUP A	GROUP B	P-VALUE
Mean+/- SD	-0.38 +/- 1.63	-0.35 +/- 1.28	0.137
Minimum	-3.10	-2.5	
Maximum	5.50	3	

Independent t-test for two means was used.

The frequency of bone density by using DEXA (T-score) in studied subjects in Group A were normal (T-score= 5.5 to -0.9) in 34 (68%) subjects, osteopenia (T• score= -1 to -2.4) in 11 (22%) subjects, and osteoporosis (T-score = -2.5) in 5 (10%) subjects. For Group B, 32 (64%) hBfi normal DEXA results, 17 (34%,) were osteopenic, and 1 (2%) had osteoporosis.

The chi square test (P value= 0.067) has shown that the relationship between the groups was not statistically significant. Table 4 .

Table 4: DEXA (T- Score) frequency for studied groups.

Bone density by DEXA (T-Score)	Group A		Group B		p-value
	N	%	N	%	
Normal (5.5 to -0.9)	34	68%	32	64%	0.067
Osteopenia (1to2.4)	11	22%	17	34%	
Osteoporosis (2.5)	5	10%	1	2%	
Total	50	100%	50	100%	

Chi-square test was used.

There was no effect of gender on DEXA results in both groups by using independent t• test for two means for each group. In Group A., the mean+SD of T-score in males were -0.217 + 1.798 and in females were - 0.595 +1.388 (P value=0.588) (Table-5). In GroupB, the mean+SD of Tscore in males were -0.631 + 1.505 and in females were -0.218 +1.163 (P value=0.1) Table 6 .

Table 5: The effect of gender on the DEXA results in Group A

Gender	NO	T-score MEAN +/-SD	P- Value
Male	29	0.217 +/- 1.798	0.588
Female	21	0.595 +/- 1.388	

Independent t-test for two means was used.

Table 6: The effect of gender on the DEXA results in Group B

Gender	NO	T-score MEAN +/-SD	P Value
Male	16	0.631 +/- 1.505	0.1
Female	34	0.218 +/- 1.163	

Independent t-test for two means was used.

DISCUSSION

Osteoporosis is one of the main diseases that cause health disorders universally. It is linked with fractures and consequently leads to death. Vascular calcification has been identified to be a disease that is not dependent risk factor for cardiovascular disease (CVD)⁹ and these two diseases concurrently happening to aging process. It has been demonstrated that there are similar regulatory mechanisms between the common characteristics of atherosclerotic plaques, calcification, and those seen in bone metabolism¹⁰.

The sort of the supposed relationship between osteoporosis and cardiovascular disease is still not clear enough. Conventionally it is known that they are not related and their development was due to processes which are not related to age¹¹.

On the other hand, new studies have shown that the relationship between osteoporosis and cardiovascular ailment is not only due to the age factor, which is traditionally found in older populations. Thus there is a need to investigate the role of age factor in younger populations.^{11,12}

Despite of high percent (10%) of patients with cardiovascular problem had osteoporosis in comparison with control (2%), statistically! there was no significant association between cardiovascular disease and osteoporosis represented by low bone density. This finding was consistent with others reported by ,

This study corresponds with Ayoagi et al who conducted a study on Japanese – American women and found out that osteoporosis and coronary atherosclerosis are two unrelated processes where age is one of the influencing

factors in postmenopausal women and in men as well^{11,12}.

Also there was no significant association between osteoporosis and sex in this study, although the present study showed that females had a low mean of bone density than males but still statistically not significant. This can be explained by the fact that women are physically less active than men, and the instances of overweight and obesity can be found more in women than men

as well as the sample size of this study was not enough to show this relation.

This can be explained by the fact that women are physically less active than men, and the instances of overweight and obesity can be found more in women than men

furthermore, the association between cardiovascular disease and osteoporosis has been observed almost only in women^{13,14,15}, raising further uncertainty

whether the two disease processes are truly linked.

Moreover, both osteoporosis and cardiovascular diseases increase with age¹¹ and, in some studies, an association between bone mineral density (BMD) and cardiovascular diseases was lost once age was adjusted for¹⁶.

The present study showed normal mean level for T4 and TSH in both women and men regardless the result of T-score and was statistically not significant in both males and females. This result inconsistent with other studies that showed a positive relation between osteoporosis in postmenopausal women.

Conclusion & Suggestion

1. There was no relationship between osteoporosis and cardiovascular diseases.
2. Gender had no effects on osteoporosis.
3. More research is demanded to study this relationship both in men and women with larger sample size and more diagnostic measurements for osteoporosis and atherosclerosis of coronary arteries.

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