

Study Level of Some Biochemical Markers in Male and Female Osteoporosis Patients

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ABSTRACT

Osteoporosis and consequent fracture are not limited to postmenopausal women. There is increasing attention being paid to osteoporosis in older men. Men suffer osteoporotic fractures about 10 years later in life than women, but life expectancy is increasing faster in men than women. Thus, men are living long enough to fracture, and when they do the consequences are greater than in women. The main purpose of this study is the measuring serum level of (CX3C, Bone sialoprotein, Gelsolin, Cathepcin K, Vitamin D, Calcium, Phosphorous and Alkaline phosphatase) in 100 patients (20 men and 80 women) and 50 as control group (19 men and 31 women). The statistical analysis of results showed that the serum level of (CX3C, Gelsolin and Cathepcin K) increase in female osteoporosis patients and no significant increase in male osteoporosis patients compared to control group. The results also showed a rise serum level of Bone sialoprotein and Alkaline phosphatase in male and female osteoporosis compared to control group. The results also showed no significant difference in serum level of (vitamin D, Calcium and Phosphorous) in male and female osteoporosis patients compared to control group. In conclusion The Cathepcin K, Gelsolin and Bone sialoprotein play an important role in bone metabolism and increase level in osteoporosis patients.

Key words: Osteoporosis, CX3C, Cathepcin K, Gelsolin, Bone sialoprotein

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INTRODUCTION

Osteoporosis is a progressive skeletal disorder whereby the bone strength (bone density and quality) is compromised thereby predisposing an individual to an increased risk of fractures which could occur spontaneously or after minor injuries. It is associated with low bone mineral density (BMD) and loss of structural and biomechanical properties that are vital for the maintenance of bone homeostasis [1]. Osteoporosis is the most prevalent bone disorder in humans and is a major global public health issue [2]. Osteoporotic fractures are associated with increased mortality [3]. In addition, fractures are associated with increased disability, reduced physical functions, and poor quality of life besides an increased financial burden [4]. Globally, approximately 9 million new and 56 million prevalent cases of osteoporotic fractures were estimated in the year 2000.5 In Taiwan, the prevalence of osteoporosis between 2001 and 2011 increased by about 7.6%.6. BMD is a valuable clinical

diagnostic index for osteoporosis and the best tool for osteoporotic fracture prediction. Osteoporosis is associated with several genetic and nongenetic factors [1], some of which include age [5], sex [2], Menopausal status [6], educational level [7], coffee drinking [5], smoking, exercise, alcohol consumption, diet [1], and body mass index (BMI) [8].

SUBJECTS AND METHODS

This study was carried out on patients attended to Bone Density unit in one hospital which is Marjan Medical City in Babylon Governorate. This study includes 150 females and males. They had been divided into two groups, the first group included 100 patients (80 females and 20 males) with OP and the second group included 50 relatively healthy (females and males), the age was of both groups was matched and ranged between (20- 80) years. Venous blood samples were drawn from patients and control subjects by using disposable syringes. Five ml of blood was obtained from each subject, 2 ml was placed into EDTA tubes and the remaining (3ml) pushed slowly into disposable gel containing tubes. Blood in the EDTA tubes was stored in (-20°C) in order to be used later in

genetic part of the study, while blood in the gel containing tubes was allowed to clot at room temperature for 15 minutes and then centrifuged at 3000 rpm for approximately 10-15 minutes, after that sera was obtained (Barbara and Anna, 2012) and stored at -20°C.

Biomarkers analysis

Quantitative detection of CX3C, gelsolin, cathepsin K and bone sialoprotein, in serum was done according to the industrial company (Bioassay Technology Laboratory (China), that depended on the technique of the quantitative sandwich enzyme immunoassay (ELISA) and (vitamin D) was assayed in serum according to the industrial company AccuBind ELIS Microwells (USA). that also depended on the technique (ELISA). Calcium and alkaline phosphatase was assayed in serum according to the industrial company BIOLABO (France).

Statistical analysis

Analysis of data was made by using Statistical Package for Social Science (SPSS) system/ version 20 Results expressed as mean \pm Standard Error S.E.

Table 1: Levels some of biochemical parameters in osteoporosis patients and healthy according to gender.

Parameters	Groups	Gender	Male	Female
			Mean \pm S.E	
CX3C(ng/ml)	Patient	Healthy	10.16 \pm 1.3	11.53 \pm 2.6
		Healthy	9.76 \pm 1.5	3.46 \pm 0.6
	p-value		0.121	0.02
Bone sialoprotein (ng/ml)	Patient	Healthy	47.53 \pm 6.7	45.36 \pm 12.4
		Healthy	31.45 \pm 5.1	19.32 \pm 9.8
	p-value		0.005	0.008
Gelsolin (ng/MLS)	Patient	Healthy	50.06 \pm 10.2	75.61 \pm 12.5
		Healthy	48.13 \pm 8.1	42.46 \pm 10.5
	p-value		0.09	0.02
Cathepsin K (ng/ml)	Patient	Healthy	3.07 \pm 0.2	4.77 \pm 0.6
		Healthy	2.99 \pm 0.1	1.25 \pm 0.8
	p-value		0.41	0.04
Vit. D3(ng/ml)	Patient	Healthy	18.44 \pm 4.3	15.26 \pm 2.2
		Healthy	20.48 \pm 4.4	20.66 \pm 3.4
	p-value		0.215	0.06
Ca (mg/dL)	Patient	Healthy	8.46 \pm 1.3	8.22 \pm 0.8
		Healthy	8.43 \pm 1.4	9.38 \pm 2.2
	p-value		0.687	0.311
PO4 (mg/dL)	Patient	Healthy	4.74 \pm 0.8	4.70 \pm 0.9
		Healthy	3.77 \pm 0.7	4.18 \pm 1.1
	p-value		0.567	0.244
ALP (Iu/L)	Patient	Healthy	93.07 \pm 15.2	114.5 \pm 17.8
		Healthy	79.00 \pm 11.7	69.85 \pm 12.1
	p-value		0.06	0.002

*Significant difference at (p \leq 0.05)

RESULTS

The levels of biochemical parameters in osteoporosis patients and healthy groups according to gender (mean \pm S.E)

In the Table 1 which describe levels of biochemical parameters showing that in osteoporosis patients markedly rise in level biochemical parameters that measured in the study, where the significant increase (p \leq 0.05) in CX3C in female, and significant increase in bone sialoprotein concentration for both genders when compared with healthy control group .and insignificant increase (p \leq 0.05) in gelsolin and cathepsin K level in female osteoporosis and no significant difference in male.

This study show no significant difference level of vitamin D, calcium and phosphorous in both gender while there is significant increase at (p \leq 0.05) in alkaline phosphatase in both gender (Figures 1A to Figure 1D).

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