

Effects Study of Serum Adiponectin Level in Osteoporosis Disease

Nour Taqi Khudair¹, Rusul Thabit Hamid^{2*}, Dhabyia Ihssan Abdulrazaq³

^{1,2,3}Medical Technical College, Al-Farahidi University, Baghdad, Iraq

Email: rusulthabit@gmail.com

Abstract

Subject: Osteoporosis (OP) is a skeletal system disorder that suffers from low bone mass, occurs defect of microarchitectural of bone tissue results in bone fracture. OP is common frequent in old age persons. Adiponectin is the peptide hormone produced mainly by adipose tissues, that acts for various functions for example mediator at many metabolic pathways in the human body.

The objective of the Study: Study the role of serum Adiponectin hormone level in Osteoporosis patients.

Materials and Methods: This study was done on 20 patients with OP disease and 20 healthy persons (control), all subjects' age in this study was more than 50 years of both genders. After obtaining serum, immediately used quantity method (immunoassay) for the measured level of Adiponectin concentration.

Results: This study shows the elevation of serum Adiponectin concentration level in the OP group compared with the healthy control group.

Conclusion: This study confirms that serum Adiponectin concentration level can act as a stimulation factor in OP disease to activate osteoblast and prevent bone fracture.

Keywords: Osteoporosis (OP), Adiponectin, and osteoblast.

INTRODUCTION

Osteoporosis (OP) is a bone disorder (disease) that lead to weak bones becoming easily of a break because the loss of strength is due to decrease bone mineral density (BMD), the common bone affected are the wrist, hip, and spine, OP does not appear any symptoms or signs until break occur therefore called silent break disease (Ward et al., 2020). There are three causes of OP considered as main and commonly causes reduction of estrogen hormone with age, a decrease in serum calcium (Ca) or vitamin-D3 levels, and lifestyle. Symptoms of OP include stooped posture, easily bone break, back pain, and others. OP diagnosis is mainly dependent on the radiological study, especially the measurement of bone density by dual-energy X-ray absorptiometry scans (DXA).

The laboratory investigations used for OP diagnosis are serum Ca, PO₄, vitamin- D₃, and others (Zou et al., 2020). Adiponectin is one of the adipokines peptide hormones family secreted by adipocytes as the main source but there are other cells also able to produce it such as myocytes and skeletal cells (Krause et al., 2019). Adiponectin's action needs specific receptors to recognize it for example AdipoR1 & 2, these receptors can result in direct action of adiponectin's action on specific cells like hepatocytes and vascular cells.

Address for correspondence: Rusul Thabit Hamid
Medical Technical College, Al-Farahidi University, Baghdad, Iraq
Email: rusulthabit@gmail.com

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Adiponectin has various functions in the human body, it involves in many metabolic disorders such as related to glucose metabolic regulation and related with oxidation of fatty acids (Choi et al., 2018). This study focuses on the relationship between bone density loss that leads to OP disease with adiponectin level in serum, which acts as a protective factor for OP.

MATERIALS AND METHODS

The current study was designed according to a case-control study, and it involved a collection of 20 individuals suffering from OP cases consider group 1, and 20 individuals of healthy individuals consider group 2 (control). All objects in this study were collected from both genders of age above 50 years after taking their approval. The OP cases were diagnosed according to the American College of Rheumatology (ACR) depending on clinical examination and DXA scan with some laboratory examination such as Ca and vitamin-D3. The blood samples collected from all study individuals were used to measure adiponectin levels after separation of a blood sample without any anticoagulation factors for obtaining a pure serum sample via centrifuge instrument. This study applied the ELISA technique as an immunoassay method to measure the serum adiponectin level of all study individuals. Also, the t-test method was used in this study for statistical analyses to compare groups 1 & 2.

RESULTS

The current study show comparison between the OP group (group 1) and control group (group 2) according to serum adiponectin hormone level. The results in this study explain significant variation between the OP group and control group according to serum adiponectin hormone level and by using mean, standard deviation (SD), and P-value. A study result confirms elevation of serum adiponectin hormone level in the OP group (63.8+6.1) when compared with the control group (23.4+8.9) with a P value less than 0.05. Shown table 1 and Figure 1.

Table 1: Comparison of serum Adiponectin hormone level between OP and control groups according to mean ± standard deviation (SD)

Parameters	OP group (No. =20) Mean+SD	Control group (No. =20) Mean+SD	P-value
Adiponectin (ng/ml)	63.8 ± 6.1	23.4 ± 8.9	<0.05*

*Significant value

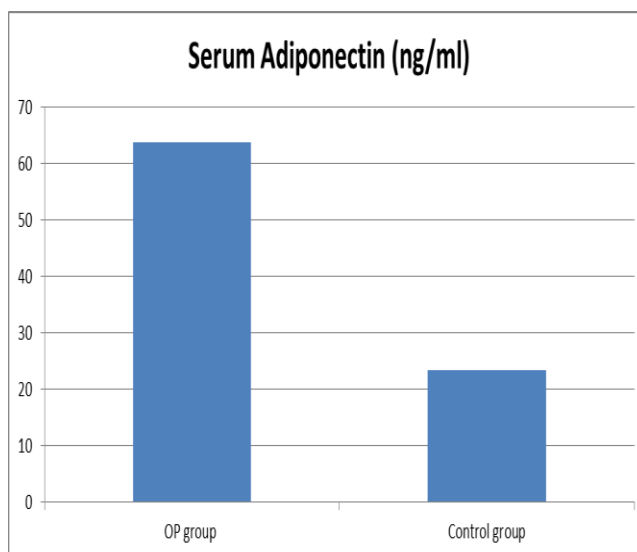


Figure 1: Comparison of serum Adiponectin hormone level between OP and control groups according to mean ± standard deviation (SD)

DISCUSSION

Osteoporosis (OP) is a skeletal system disorder that suffers from low bone mass, occurs defects of microarchitectural bone tissue results bone fracture. OP is common frequent in old age persons. Adiponectin is the peptide hormone produced mainly by adipose tissues, that acts for various functions for example mediator at many metabolic pathways in the human body (He et al., 2022).

In the present study appear role of Adiponectin in try to prevent bone fracture, this study shows an elevation of adiponectin level in the OP group compared with the control group. The bone density loss with aging in both genders occurs because increase adipose tissues and reduction in osteoblast differentiation with aging (Herrmann, 2019). Adiponectin has a role to prevent bone loss therefore note the elevation OP group, therefore seem must be present adiponectin and its receptors (AdipoR1 & 2) in osteoblasts cells. Exist of adiponectin and its receptor in osteoblasts can result in stimulation of Osteoblast genesis and differentiation. This stimulation depends on increased AMP-activated protein kinase (AMP kinase) and PPARα ligand activity by exist of adiponectin and its receptor, this leads to activation of osteoblast that acts to decrease of suspension of bone density loss (Lubkowska et al., 2014).

This study confirms the role of adiponectin in reducing the possibility of bone density loss with aging via elevation it in the bloodstream, the study's results agree with SHAHRAKI, Azadeh Saber, et al. 2021 that also demonstrated increased serum adiponectin hormone level with OP disease as the tries factor to prevent bone density loss and bone fractures with aging (Shahraki et al., 2021).

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