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Periodontal Status of Postmenopausal Women

Timur V. Melkumyan*, PhD, ScD; Lola E. Khasanova, PhD;
Khaidar P. Kamilov, PhD, ScD

Tashkent Medical Academy, Tashkent, Uzbekistan

Abstract

The objective of this study was to compare the periodontal status in postmenopausal women with osteopenia and osteoporosis.

Material and Methods: We examined 43 postmenopausal women aged from 55 to 74 years. Material assessment of bones in every patient was performed by means of dual energy X-ray absorptiometry (DXA) from two points on the skeleton – part of the femur neck and between the first and fourth lumbar vertebrae. A lipid blood test was done for patients of both groups. All patients were divided into two groups (the 1st with osteopenia, and the 2nd with osteoporosis). All patients were subjected to an oral clinical examination: the periodontal examination was composed of Plaque Index (PI), Pocket Score (PS), and Papillary Bleeding Index (PBI). X-ray analysis was performed for every patient.

Results: The results of the clinical periodontal examination demonstrated that the mean PBI in patients in the 1st group had no significant differences from the PBI in patients in the 2nd group. PI value and PS findings in patients with general osteoporosis also had no statistical differences from the same parameters in patients with osteopenia.

Conclusion: Under the circumstances of these patients' characteristics and within the limits of the present study, we concluded that there is no significant difference in the periodontal status of postmenopausal women with systemic osteopenia and with osteoporosis.

Keywords: *osteopenia; osteoporosis; periodontal disease.*

Introduction

According to some authors, osteoporosis is not considered to be just one disease, but a multifactorial disorder with a number of causes [1]. The disease develops primarily in women and is mainly observable in the postmenopauseal period [2]. During this period, osteoporosis is often associated with peridontal disease.

Several risk factors directly contribute to the development of periodontal diseases [3]. However, some systemic diseases may be concomitant and act indirectly as predisposing and aggravating factors. As indicated by many authors, general osteoporosis is one of these factors [4-7]. Some studies indicate that osteoporosis does not increase the incidence of periodontal diseases because it affects alveolar bone quality rather than quantity [8,9]. In osteoporosis, calcium deficiency and increasing age lead to decreased physical activity that may be the cause of a patient's worsened oral hygiene condition. Thus, in accordance with the results of these studies periodontal pathology is mostly presented by gingival bleeding and gingivitis [10].

Along with other pathologic conditions associated with senescence, atherosclerosis is a common finding in old people [11]. According to numerous studies, vascular calcification may predispose a person to the development of osteoporosis in bones, and structural aging changes periodontal tissues from pathogenetic and morphologic viewpoints [12]. Although the relationships between these pathological conditions are clinically inconclusive, shared contribution to the progression of periodontal ailment is undisputable [13,14].

Thus, the objective of this study was to compare the periodontal status in postmenopausal women with osteopenia and osteoporosis.

Material and Methods

We examined 43 postmenopausal women aged from 55 to 74 years. Informed consent was obtained from each patient. The study was approved by the Tashkent Medical Academy Ethics Committee. Material assessment of bones in every patient was performed by means of dual energy X-ray absorptiometry (DXA) from two points on the skeleton – part of the femur neck and between the first and fourth lumbar

***Corresponding author:** Timur V. Melkumyan*, PhD, ScD. Tashkent Medical Academy. Tashkent, Uzbekistan. E-mail: t.dadamov@gmail.com*

vertebrae. The total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and triglyceride (TG) levels were determined in the venous blood using «Roche Reflotron Plus» analyzer (Germany). Low-density lipoprotein cholesterol (LDL-C) was calculated according to Fridvald's formula.

All patients were divided into two groups (the 1st with osteopenia, and the 2nd with osteoporosis). The baseline characteristics of patients are presented in Table 1.

Table 1.

Clinical characteristics of patients

Variable	1st group (n=22)	2nd group (n=21)
Mean age ± SD (years)	62.9±8.5	63.3±9.2
Medical history:		
Thyroid pathology	3 (31.2%)	2 (9.5%)
Coronary heart disease	7 (34.2%)	9 (42.9%)
Active way of life:		
Aerobic activity (AA)	9 (40.9%)	10 (47.6%)
AA + Muscle strengthening	8 (36.4%)	4 (19.0%)
No regular activity	5 (22.7%)	7 (33.3%)
Alcohol consumption (occasionally)	100%	100%
Tobacco smoking	0	0
Medications		
Sesame oil	100%	100%
Alendronates	100%	100%
Statins	100%	100%

All patients were subjected to an oral clinical examination: the periodontal examination was composed of Plaque Index (PI), Pocket Score (PS), and Papillary Bleeding Index (PBI). X-ray analysis (orthopantomogram) was performed for every patient. Based on the orthopantomogram results, the presence of infrabony pockets was taken into account.

Results were statistically processed using the *software* package Statistica 6.1 for Windows. The mean (M) and standard deviation (SD) were deduced. Analysis of the distribution of values obtained was performed using the Kolmogorov-Smirnov test. For data with normal distribution, inter-group comparisons were performed using Student's t-test. A value of $P<0.05$ was considered statistically significant.

The results of the DXA examination are presented in Table 2. As shown in Table 2, the parameters of the T-score and BMD were significantly worse in patients with systemic osteoporosis. Data of the lipid profile between two study groups were not significantly different (Table 3).

Table 2.

The results of the DXA examination

Parameters	I group	P	II group
L1-L4			
T-score	-1.56±0.51	0.000	-2.89±0.32
BMD	0.851±0.053	0.000	0.724±0.041
Hip			
T-score	-0.87±0.78	0.001	-1.73±0.86
BMD	0.78±0.08	0.002	0.693±0.092

Table 3.

Parameters of the blood lipid profile in patients

Parameters	I group	P	II group
TC mmol/L	5.17±0.6	>0.05	5.29±0.68
TG mmol/L	0.96±0.18	>0.05	1.14±0.20
LDL mmol/L	3.45±0.54	>0.05	3.68±0.73
HDL mmol/L	1.27±0.16	>0.05	1.1±0.24

Results and Discussion

The results of the DXA examination are presented in Table 2. As shown in Table 2, the parameters of the T-score and BMD were significantly worse in patients with systemic osteoporosis. Data of the lipid profile between two study groups were not significantly different (Table 3).

All patients had different types of alveolar bone resorption (Table 4). The X-ray analysis of orthopantomograms established that every patient in both groups had a few local infrabony pockets, which from the periodontal point of view were associated with improper tooth alignment, abnormal occlusal loading, or parafunctional habits. There was no clinical case of numerous infrabony pocket formations, which were considered as indicators of exacerbated periodontal pathology. The number of patients with infrabony pockets was equal in both groups.

Table 4.

Periodontal status of postmenopausal women

Parameters	I group(n=22)	P	II group(n=21)
Horizontal resorption (%)	86.4	>0.05	90.5
Combined resorption (%)	13.6	>0.05	9.5
PBI	0.53±0.5	>0.05	0.7±0.59
PLI	0.7±0.48	>0.05	0.82±0.56
PS	0.15±0.41	>0.05	0.16±0.43

The results of the clinical periodontal examination demonstrated that the mean PBI in patients in the 1st group had no significant differences from the PBI in patients in the 2nd group. PI value and PS findings in patients with general osteoporosis also had no statistical differences from the same parameters in the patients with osteopenia.

The loss of alveolar bone is the most significant sign in the pathogenesis of periodontal disease, and this pathological process is, in fact, irreparable in periodontitis [3]. That circumstance could be explained by various mechanisms and, in the end, any etiological factor leads to the activation of osteoclasts resorbing the bone and degradation of noncollagenous matrix [15,16].

Whether or not osteoporosis affects the severity of periodontal disease remains controversial [17-19]. Various studies indicate that osteoporosis or low systemic bone mineral density can be a risk factor for periodontal disease progression and increased alveolar bone loss [20-22]. Other studies could not find any significant correlation [23-26]. Periodontitis is

very prevalent in the general population, as is osteoporosis, and usually affects people of the same age range. It is obvious that the alveolar bone destruction seen in periodontitis can be amplified in the presence of general osteoporosis [17,19]. The inflammatory process of osteoporosis is now beginning to be understood, and both periodontitis and osteoporosis show the same cytokines involved, implying that osteoporosis is also a disease controlled by osteoimmunological responses [16].

Conclusion

Thus, the examination of the study participants established that despite the statistical absence of differences in the patients performing regular aerobic activities, being under similar medication, and having a similar lipid profile and periodontal conditions, significant differences in the parameters of T-score and BMD between two groups were evident. Under the circumstances of these patients' characteristics and within the limits of the present study, we concluded that there is no significant difference in the periodontal status of postmenopausal women with systemic osteopenia and with osteoporosis.

Competing interests

The authors declare that they have no competing interests.

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