The influence of falling and fractures history on the quality of life in postmenopausal women

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Abstract

The quality of life (QOL) is an important aspect in the management of osteoporotic patients. The aim of our study is to estimate the QOL in postmenopausal women with low versus normal bone mass and to appreciate the impact of falling and fractures history on QOL. About 141 postmenopausal women were recruited from a tertiary endocrinology department. In all patients the vitamin D (VD) status and bone mass density were evaluated. The QOL was evaluated with a generic (EuroQoL) and a disease-specific questionnaire (OPAQ). The patients were divided in two groups: study group S (78 women with osteoporosis or osteopenia) and control group C (63 age-matched cases with normal bone mass). VD deficiency was highly prevalent in all cases (94.3%). OPAQ and the visual assessment scale (VAS) score (EuroQoL) were significantly worse in group S (22.53±6.21 and 68.16±4.61 versus 25.92±5.04 and 73.86±5.84, respectively; p=0.014 and 0.017). In group S, prevalent fractures were associated with decreased OPAQ (73.27±14.77 versus 79.75±12.34; p= 0.038) and patients with positive falling history had significantly affected body image (20.21±5.57 versus 23.38±6.26, p=0.05), fear of falling (26.31±8.54 versus 31.23±5.4, p=0.007) and OPAQ scores (71.64±13.85 versus 78.52 ±13.75, p=0.03). VD deficiency and positive falling history were identified by the multiple regression analysis as independent predictors for the fear- of- falling. In conclusion, in postmenopausal women, the presence of a low bone mass is associated with impaired global QoL and body image. In these patients, the presence of recurrent falling episodes, fragility fractures and VD deficiency further impairs the QoL.

Keywords: *quality of life, postmenopausal women, ossteoporosis, fractures, falling, vitamin D*

Introduction

Health-related quality of life (QOL) is decreased in postmenopausal osteoporosis and is an important aspect in the management of these patients[1]. Due to its high worldwide prevalence, postmenopausal osteoporosis is a major public health problem that imposes huge costs to the health systems all over the world. The disability induced by osteoporosis, measured in disability-adjusted life-years, is higher than that of most cancers or than that of the rheumatoid arthritis[2]. Therefore, understanding the factors that contribute to the impaired QOL of these patients is of paramount importance in improving the management of high-risk subsets of cases and decreasing the burden to public health. Impaired QOL in osteoporosis is multifactorial, with fear of falling and fractures or pain as a result of previous fractures playing a major role. In large observational studies of postmenopausal osteoporotic women, the fear of falling and previous vertebral fractures were associated with significant reductions in the QOL[3,4], and the magnitude of the effect increased with the number of previous fractures[5].

As the impact of the falling history on the QOL has been much less studied than that of the fractures history, and none of these were evaluated in our country, we aimed to estimate the QOL in a group of Romanian postmenopausal women with osteopenia and osteoporosis compared to postmenopausal women with normal bone mass and to appreciate the impact of falling and fractures history on the QOL.

Methods

Postmenopausal women were recruited from the cases reffered to a tertiary endocrinology Department of Pituitary and Neuroendocrine diseases, „C.I.Parhon" National Institute of Endocrinology for the evaluation of the bone mass. All patients had been reffered by the general practitioner and were evaluated between January and July 2014.

In all cases, the evaluation included total and ionised calcium and phosphorus as well as the serum concentration of 25-hydroxy vitamin D (25OHD) (by electrochemiluminiscence Elecsys 2010) in order to assess the vitamin D (VD) status. All patients were also assessed by central dual X-ray absorbtiometry (DXA) (lumbar spine L1-L4 and hip) using a GE Healthcare Lunar Prodigy machine.

The history of previous fragility fractures was carefully documented in all cases (based on clinical and radiological grounds). Vertebral fractures were diagnosed on plain radiographs recommended in selected cases based on the clinical suspicion (pain, kyphosis, height loss).The QOL was evaluated in all cases using both a widely validated generic questionnaire (EuroQoL 5D) and a disease-specific questionnaire, especially designed for osteoporotic patients (osteoporosis assessment questionnaire, OPAQ).

The EuroQoL questionnaire is a generic QOL instrument consisting of two parts. The first part evaluates 5 dimensions of health (mobility, self-care, usual activities, pain/discomfort and anxiety/depression). The answers

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to each dimension is quantified as level 1: no problems, level 2: moderate problems, level 3: severe problems. The second part asks the subject to estimate the overall current perceived health on a visual analogue scale (VAS) from 0 to 100 (from worse to best imaginable health, respectively)[6].

The OPAQ questionnaire is a disease-targeted instrument evaluating a number of health dimensions (i.e. walking/bending ability, usual activities, transfer, fear of falling, back pain, body image and independence). Each dimension is assessed through specific questions and a final item score is calculated (with higher scores indicating better health status). The maximal scores for the dimensions listed above are: 70, 70,30, 50, 40,30 and 30 points, respectively. A global QOL score (from 0 to 100) is also calculated using a specific algorithm from all the dimensions subscores[7].

The data collected were included in a database and analysed using the SPSS version 17 software. The statistical analysis used non-parametric tests (Mann Whitney test) for comparisons across groups and the calculation of Spearman correlation coefficients. Also, linear multiple regression analysis was performed to identify potential independent predictors for an impaired QOL.

Results

About 141 postmenopausal women (age range 50-83 years, mean age of 63.43 years) were enrolled. The mean serum concentration of 25OHD was in the VD deficiency range (16.54± 7.87 ng/ml). Only 8 cases (5.7% of the whole group) had sufficient levels of 25OHD (i.e. ≥ 30 ng/ml), the others had various degrees of VD deficiency (Figure 1). After the DXA study, 78 of these cases were diagnosed with osteoporosis or osteopenia (and included in the study group S). The other 63 postmenopausal women with normal bone mass acording to the DXA study were selected from a number of 98 such cases in order to establish an age-matched control group C.

The body mass index (BMI) of the recruited patients were widely distributed, between 17.40 and 45.1 kg/m^2, with no significant difference between the two groups. In the group S, from the 78 cases, 37 had a positive history of vertebral or radius fractures, 19 had a history of repeated falling without prevalent fractures. In the group C, 6 patients had recurrent falling, without fractures.

The comparison between the QOL scores of the patients included in the two groups revealed that the OPAQ was significantly lower in the study group (22.53 versus 25.92 in group C, p=0.014) (Figure 2). Also, the visual assessment scale (VAS) score (EuroQoL) in group S was 68.16, significantly lower than in group C (73.86, p=0.017, Figure 3). The absolute bone mass density (BMD) value at the lumbar spine or hip was not correlated with the QOL scores but the T-score at hip level (and not the lumbar spine T score) was significantly correlated with the score of some QOL items (OPAQ bending, usual activities, independence, global QOL score). However, after controlling for age, falling and fracture history, the statistical significance of these correlations was lost. The BMI was also not corelated with any of the QOL items evaluated.

In the low bone mass group (group S), a positive history of fractures was associated with a decreased global QoL score (OPAQ) (73.27 versus 79.75, p=0.038). Also, in the study group, the cases with a positive falling history had significantly more affected body image (20.21 versus 23.38, p=0.05), fear of falling (26.31 versus 31.23, p=0.007) and global QoL (71.64 versus 78.52, p=0.03) than those with a negative falling history- see figure

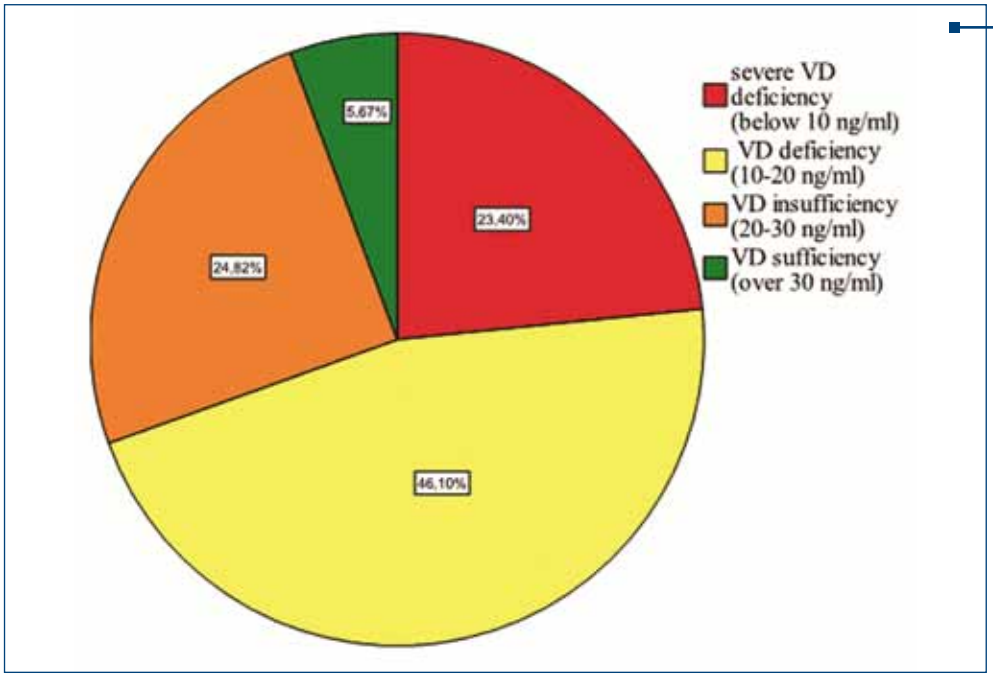

Figure 1. VD status of the patients studied

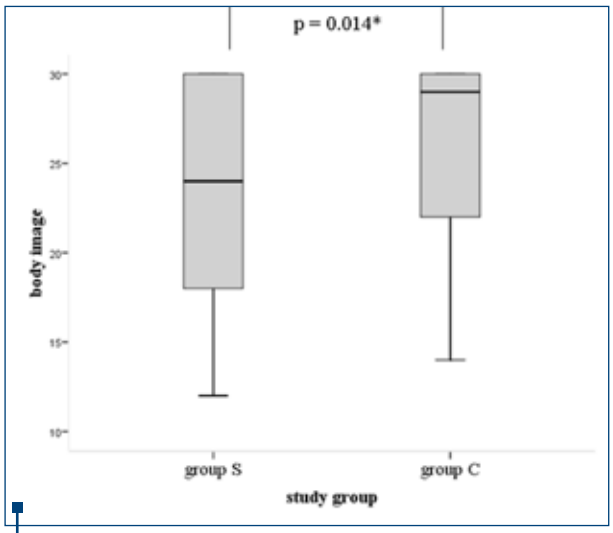

Figure 2. Significant difference between the body image score of the OPAQ questionnaire of the patients with low bone mass (group S) compared to those with normal bone mass (control group C)

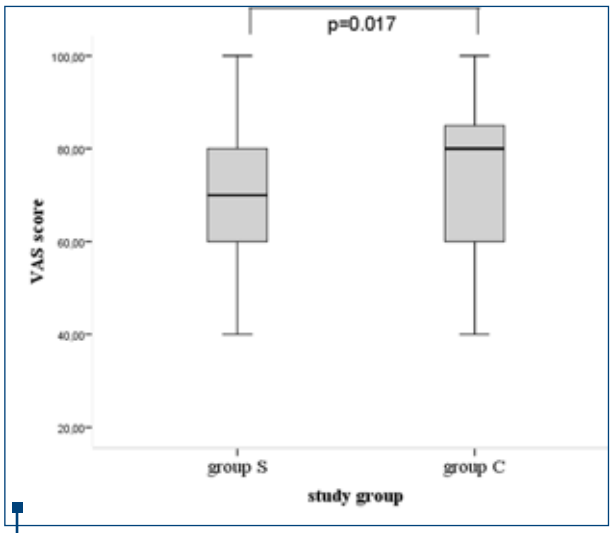

Figure 3. Significant difference between VAS score (EuroQoL) of the patients included in the two groups studied (S and C)

nr.4. These relations were not found in the control group. Therefore, in both groups, there was a weak correlation between the serum 25OHD concentration and the fear of falling (OPAQ). The correlation coefficient (after correcting for age and falling history) was 0.237 in group S and 0.458 in group C, with a statistical significance coefficient p of 0.050 and 0.025 in group S and C, respectively. None of the other QOL items assessed was found to be significantly correlated with the VD status. Both serum 25OHD level and previous falling history were identified by the linear multiple regression analysis as independent predictors for the fear of falling (OPAQ): the β coefficients were 0.237 (p=0.02) and -5.6 (p=0.005), respectively.

Discussion

We evaluated a cohort of Romanian postmenopausal women, divided into a study group with low bone mass and a control group with normal bone mass. Due to the lack of national QOL reference data, we could not compare the QOL scores of our patients with those in the general Romanian population.

The prevalence of VD deficiency in our patients was very high (94.3%), and although a selection bias could also contribute, this high prevalence is in line with the results published by others in various groups of subjects from our country[8-12].

In our study, the serum 25OHD concentration was not correlated with the overall QOL score. This result is in contrast with that of another study on elderly (i.e. over 70 years-old) postmenopausal women with osteoporosis at high risk for fractures, which reported that a low serum concentration of 25OHD was correlated with an impaired QOL score and was confirmed as an independent predictor of affected QOL[13]. A possible explanation for this discrepancy with other published results is that in our group, almost all cases had VD deficiency. The lack of a significant number of cases with sufficient VD concentrations could have masked a possible correlation between this marker and other evaluated parameters.

However, the VD status was an independent predictor of the fear of falling (with lower VD levels predicting an increased fear of falling, independent of falling history). The explanation could reside in the well-recognised association between VD deficiency and impaired muscular strength, physical performance(14) and balance(15) which could increase the fear of falling. Since the increased fear of falling is in itself a significant risk factor for falling (by incompletely understod mechanisms)[16], the correction of VD deficiency becomes an important step in decreasing the falling risk. Indeed, a metaanalysis of the published studies confirmed that correcting the VD deficiency significantly reduces the odds-risk for falling by 22%[17]. The mechanism is probably multifactorial but a possible effect on the fear of falling is likely and deserves further investigation.

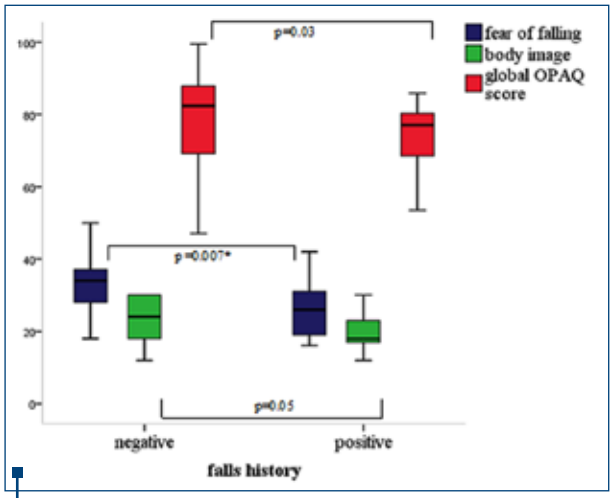

Figure 4. The QOL items (OPAQ) that are significantly impaired in osteoporotic women with a positive history of falling compared to those without such history

Our results showed an impaired QOL in osteoporotic patients with prevalent fractures (both vertebral and non-vertebral) and, even more, in those with repetitive falling. The results concerning the effect of fractures are comparable with those published in the literature. In a large subanalysis of the patients included in the Multiple Outcomes of Raloxifene Evaluation (MORE) study, increased vertebral and non-vertebral fractures were associated with impaired QOL in postmenopausal osteoporotic women[1]. In another subanalysis of the MORE study, women with a prevalent vertebral fracture had significantly lower OPAQ scores on physical function, emotional status, clinical symptoms, and overall QOL score compared with women with a negative fracture history[5]. In our group, only the overall QOL score was adversely influenced by the prevalent fractures. Furthermore, in our study we could not take into account the time that elapsed since the last fracture, as the greatest impact on the QOL is expected to occur early after a fractures assessing this parameter might have further refined the results[18].

The impact of falling history was much less examined in the literature. Repetitive falling were associated with impaired EuroQoL scores in elderly individuals[19]. The association of low bone mass and repetitive falling is likely to select a high-risk population of osteoporotic women. Recently the concept of „sarco-osteopenia" was proposed, combining low bone mass and low appendicular muscle mass and/or grip strength and decreased QOL was documented in individuals with this condition(20). Although the falling risk or falling history have not been assessed in these individuals, it is highly likely that a great percentage of postmenopausal osteoporotic women with repetitive falling would fall into this category.

The measured BMD or T-score did not show significant correlation with any of the QOL dimensions, if the impact of other contributing factors was excluded. This points toward a significant and specific adverse effect of the falling and fracture history on the QOL, irrespective of the severity of osteoporosis as indicated by the DXA parameters.

We were not able to find in our group any impact of the BMI on the QOL, in contrast to another study reporting BMI- related worse physical function and overall vitality in obese osteoporotic postmenopausal women[21]. However, in that study, only patients with fractures were included and in these patients a higher impact of obesity (reflected in impaired postoperative rehabilitation or increased complications) could be expected.

Conclusions

In postmenopausal women, the presence of a low bone mass is associated with impaired global QOL and body image. In these patients (but not in those without osteoporosis or osteopenia), the presence of recurrent falling episodes and fragility fractures as well as of VD deficiency further impairs the QoL. These adverse effects should be accounted for in the management of postmenopausal women with low bone mass and patients with prevalent fractures or repetitive falling should be intensively treated and actively supplemented with VD in order to prevent further decreases in QOL. ■

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