

Original article

Rheumatology and osteoporosis (RETOSS): a vision of postmenopausal osteoporosis in rheumatology departments throughout Spain

Miguel Bernad Pineda,^{a,*} Carlos Manuel González Fernández,^b Manuel Fernández Prada,^c Jaime Fernández Campillo,^d Rosaura Maeso Martín,^e María Victoria Garcés Puentes^f

^aReumatología, Hospital Universitario La Paz, Madrid, Spain

^bReumatología, Hospital General Universitario Gregorio Marañón, Madrid, Spain

^cReumatología, Hospital de Guadalajara, Guadalajara, Spain

^dReumatología, Hospital de Torrevieja, Torrevieja, Alicante, Spain

^eDepartamento Médico, Laboratorios Fcos. ROVI, Madrid, Spain

^fServicios Integrales de Gestión Médica, Madrid, Spain

ARTICLE INFO

Article history:

Received December 26, 2009

Accepted March 7, 2010

Keywords:

Postmenopausal osteoporosis

Fractures

Calcidiol

Get up & go test

ABSTRACT

Objective: To know the characteristics of the postmenopausal women with osteoporosis consulting Rheumatology Hospital Divisions in Spain.

Methods: An epidemiologic, observational, transverse and multicentric study was performed from June to September 2008 in 63 rheumatology divisions in Spain. Six hundred and twenty nine osteoporotic postmenopausal women were studied using a questionnaire designed to get demographic, clinical, radiological, bone density, and functional information. Every physician had to choose only one patient per day, usually the first woman to come in and fulfill the inclusion and exclusion criteria.

Results: Mean age of included women was 66,6 [9,2] years, weight: 64,6 [10,1] kg and body mass index: 26,1 [4,1] kg/m². They were 3,1 [2,8] cm shorter than the maximal historical height. 35,7% of them had a family history of fracture and 40,7% had a past history of fracture, of which 54,8% were vertebral fractures. Patients who received calcidiol <20 ng/ml sustained more falls (P=.033) and fractures (P=.006) than women receiving calcidiol >20 ng/ml. Risk of falls and fractures increased with advancing age and 51,5% of women who fell, had a fracture. 75% of women had poor calcium intake (≤400 mg/day). The Get up & go test showed a linear trend to an increased probability of >20 s in relationship with the age as well as with an increased incidence of fractures. 71,8% of patients had back pain and in 85,3% it went from moderate to severe.

Conclusion: Most osteoporotic postmenopausal Spanish women have a low calcium intake, one out of three has a family history of fractures that increases fracture incidence and this shows a relationship with age and functional capacity; four out of ten have had any type of fractures, one out of three have fallen during the past year and half of these present back pain. Calcidiol levels have been evaluated in a small group of patients.

© 2009 Elsevier España, S.L. All rights reserved.

Reumatología y osteoporosis (RETOSS): osteoporosis posmenopáusica en la consulta de reumatología

RESUMEN

Objetivo: Conocer las características de las mujeres posmenopáusicas con osteoporosis que acuden a las consultas hospitalarias de reumatología en España.

Métodos: Desde junio a septiembre de 2008 se realizó un estudio epidemiológico, observacional, transversal y multicéntrico en 63 consultas de reumatología en toda España. Se evaluaron 629 mujeres posmenopáusicas con osteoporosis utilizando un cuestionario diseñado para recoger datos demográficos, clínicos, radiológicos, de densidad ósea y de función física. Cada médico participante escogió una paciente por día; la primera que cumplía los criterios de inclusión y exclusión.

Resultados: La media de la edad fue de 66,6 (9,2) años, del peso fue de 64,6 (10,1) kg y del índice de masa corporal (IMC): 26,1 (4,1) kg/m². La pérdida de talla media fue de 3,1 (2,8) cm en relación con la media de la talla histórica. El 35,7% tenía antecedentes familiares de fractura, el 40,7% había tenido alguna fractura, de las cuales el 54,8% eran fracturas vertebrales. En las pacientes que presentaban calcidiol < 20 ng/ml se ob-

Palabras clave:

Osteoporosis posmenopáusica

Fracturas

Calcidiol

Test Get up & go

*Corresponding author.

E-mail address: mbernadp@hotmail.com (M. Bernad Pineda).

servó una mayor frecuencia de caídas ($p = 0,033$) y de fracturas ($p = 0,006$), respecto al grupo con valores de calcidiol > 20 ng/ml. Se encontró un aumento significativo de la probabilidad de caídas asociadas a la edad, y el 51,5% de las mujeres que se había caído había sufrido algún tipo de fractura por fragilidad. El 75% de las mujeres tenía una ingesta baja de calcio (400 mg/d). El test Get up & go mostró un incremento significativo de la probabilidad de test > 20 segundos en relación con la edad, de forma lineal, y con un aumento de la incidencia de fracturas. El 71,8% de las pacientes tenía dolor de espalda y entre estas, el 85,3% presentaba dolor de moderado a severo.

Conclusiones: La mayoría de las mujeres españolas posmenopáusicas con osteoporosis que acuden a las consultas de reumatología tiene una ingesta baja de calcio y un tercio de ellas tiene antecedentes familiares de fractura. La incidencia de fracturas muestra una clara relación con la edad, la capacidad funcional y el dolor de espalda. La determinación de la concentración de calcidiol sérico se realiza en un bajo porcentaje de pacientes.

© 2009 Elsevier España, S.L. Todos los derechos reservados.

Introduction

Osteoporosis is a public health issue the world over¹ and in Spain in particular, affecting different population groups, although it reaches its highest incidence in post-menopausal women. All around the world, some 200 million individuals suffer from osteoporosis and every year 1.7 million hip fractures occur due to osteoporosis. In 2050, this figure may be multiplied by 52. In the United States and the European Union, approximately 30% of all post-menopausal women and one out of every 8 men over the age of 50 have osteoporosis. However, many cases of osteoporosis are not diagnosed and often go untreated despite the fact that the person has suffered a fracture.²

Osteoporosis is a disease that has no clinical manifestations until the first fracture occurs; this fracture may be spontaneous or due to low or minimal impact trauma. Fractures can occur in any location, although the most clinically relevant are vertebral fractures, fracture of the proximal femur, and Colles's fracture, resulting in decreased quality of life due to pain, disability, dependence, and even death, in the case of hip fracture. The prevalence of all osteoporotic fractures is higher in women than in men. The WHO estimates that 40% of women over the age of 50 can suffer a fracture at some point during their lifetime.¹ In Spain, the prevalence of vertebral fracture in this group of women varies between 15 and 27%. The yearly incidence of fractures of the femur in women over the age of 50 is 3 in 1,000, and the incidence of Colles's fractures is almost double.³ One out of every 4 patients with a vertebral fracture will suffer a second vertebral fracture over the course of the following 2 years⁴ and 26% will suffer a non-vertebral fracture during the following year, which goes to prove that fragility fractures, in particular vertebral fragility fractures, constitute an important risk factor that increases the presentation of new fractures in women,⁵ in addition to having been associated with increased mortality.⁶ A positive family history of fractures, and especially, fractures of the hip, are also associated with an increase in the risk of fracture due to osteoporosis in any location, independently of densitometric values.⁷

The most important clinical consequence of the vertebral fracture is pain, which can vary in intensity from unbearable pain to no pain at all. The acute pain resulting from vertebral fractures generally affects the patient's functional mobility for weeks or months. Another consequence of vertebral fractures is the change in the patient's physical appearance owing to a decrease in height. Generally speaking, the symptoms are related to the severity, type, and number of resulting vertebral deformities.^{8,9}

The personal history, including considerations such as eating habits are relevant in osteoporosis, since an inadequate intake of calcium, as well as scant exposure to the sun, sedentary lifestyle, and toxic habits, such as excessive alcohol intake and regular smoking have been pointed to as risk factors for low bone mass.¹⁰ The WHO recommends a daily intake of calcium of 1,300 mg for post-menopausal women; however, the results of a recently conducted

multi-centre study indicate that in this group of European women, calcium intake continues to be very low,¹¹ which has also been observed among post-menopausal Spanish women.¹²

The leading source of vitamin D is the vitamin D that is synthesized by the skin with exposure to sunlight; it also occurs naturally in food products. However, with age, due to various factors, natural sources of vitamin D are insufficient to maintain normal bone metabolism, leading to increased PTH values and rate of bone remodelling. The association between vitamin D deficit, determined by means of serum calcidiol levels, and decreased bone mass, continues to be subject to debate¹³; however, vitamin D deficiency is a common finding in post-menopausal women with osteoporosis around the world and also in Spain.¹⁴ On the other hand, vitamin D supplementation in elderly patients with a deficit of vitamin D and who often suffer falls has a beneficial effect on functional activity, lowering the incidence of falls.^{15–18}

Physical exercise plays a key role in the development of the skeleton during childhood and adolescence; certain exercises have also been proven to increase bone mass in the spinal column of post-menopausal women.¹⁹ One prospective study reveals that in post-menopausal women who walk for at least four hours per week, there is a 41% reduction in the risk of hip fractures in comparison with those who walk for less than one hour weekly, given that this activity improves balance and decreases the number of falls.²⁰ The most important thing is that physical activity prevents falls, and therein lies its relevance in this stage of life.

Various different tools are used with the aim of making it easier to prevent fractures, the purpose of all of which is to evaluate patients' functional capacity and their risk of suffering falls. In this regard, the Get Up & Go test,²¹ modified as the Timed Up & Go²² is a straightforward test that can be used in the physician's office and has shown adequate sensitivity and specificity in identifying patients at risk for falls, according to some studies.²³

Osteoporosis is a disease involving many factors and as a result, patients are seen by physicians of different specialties—rheumatologists, traumatologists, gynaecologists, rehabilitation specialists, endocrinologists, as well as specialists in internal medicine. Given that it has been supposed that the profile of these patients with osteoporosis might be different in each of different medical specialties, the objective of this paper has been to assess the current situation of post-menopausal osteoporosis in rheumatology clinics in Spain, by means of the information obtained regarding the profile of osteoporosis patients seeking care at these hospital clinics, generally referred by physicians of other specialties and/or primary care.

Patients and methods

An observational, descriptive, cross-sectional, multi-centre study was carried out between the months of June and September, 2008,

with the participation of 63 rheumatologists from around the entire country. Six hundred and twenty-nine post-menopausal women with a diagnosis of osteoporosis based on bone densitometry and/or the presence of fragility fracture (vertebral, Colles or hip) were included in the study. For the purpose of randomization, it was stipulated that each physician was to evaluate only one patient each day and that this patient was to be the first one to meet the inclusion and exclusion criteria.

Patient inclusion criteria for this study were: to be assigned to a rheumatology department and menopausal with a diagnosis of osteoporosis. Exclusion criteria included women who had or had previously had a diagnosis of diseases affecting bone metabolism such as hypogonadism, liver disease, kidney disease, hyper or hypothyroidism, hyperparathyroidism, malabsorption syndrome, neoplasms, and those who were or had been under treatment with drugs that affect bone metabolism, i.e. corticosteroids, thyroid hormones, anti-epileptic drugs, anticoagulants, and cytostatic medications.

A questionnaire was filled in for each patient that included age, weight (kg), and both historical and current height (cm), and the subject's BMI was calculated (kg/m^2). The clinical interview collected data with regard to gynaecological history (age at menarche and menopause, number of children), level of educational studies (no qualifications, primary school, secondary school, and university level), and a family history of fracture (mother, sister, or father). Intake of dairy products was determined on the basis of intake the previous day, considering a dose as: 1 glass of milk or 2 yoghurts or 1 yoghurt plus cheese, equivalent to 200 mg of calcium. Doses of alcohol (g/day) were defined as beer: 40 g/L, wine: 96 g/L, and spirits: 320 g/L; the individual was considered to be a "drinker" if she had more than 7 doses or 170 g per week.

Exposure to sunlight was evaluated as being adequate if the patient went out almost every day (at least 4 days per week) and physical activity was deemed adequate if she took walks or exercised at least 3 times per week and more than 3 hours per week. Current or prior smoking was quantified in terms of packs/year, multiplying the number of cigarettes smoked per day by the number of years the patient smoked; the result was divided by 20. The frequency of falls was ascertained with and without fractures during the preceding 12 months. The patients were asked about the incidence and location of the fractures.

Information was obtained from the clinical history about the method and time elapsed since the diagnosis of osteoporosis and history of fractures; densitometric values were also collected, as were serum calcidiol concentrations at the time of diagnosis and recent values.

The modified Get Up & Go test²² was used to evaluate functional capacity. Patients were asked to get up out of their seats (without using their hands), walk 3 metres, and to sit down again. If the time needed to complete these tasks was > 20 seconds, functional capacity was considered to be limited and there was a greater risk of suffering falls.

The intensity of back pain was quantified using the Visual Analogue Scale (VAS, scoring from 0 to 100), pain was rated as being mild if the score was <40, moderate if rated between 41 and 70, and severe if scored 71 to 100. Pain was deemed to be chronic if it persisted for more than 6 weeks. Finally, the patients were questioned to determine if they lived alone or with others and if they were dependent or independent.

The diagnosis of osteoporosis was based on densitometric values (T-score <-2.5) determined by DXA or in the presence of vertebral fractures by means of semi-quantitative analysis of lateral X-rays. A vertebral fracture was defined as a reduction in height of 20% or more as compared to the adjacent vertebrae.²⁴

The results were analyzed using the SPSS software package version 13.0. A descriptive analysis was made of the central tendency (mean

and standard deviation) for quantitative variables and frequency for qualitative variables. After checking that the data followed normal distribution, statistical tests were conducted to compare the means of paired data (T-test) and to evaluate the association of qualitative variables (Chi squared). The results are expressed as the mean and standard deviation (SD).

The study protocol was approved by the corresponding local Ethics Committees in accordance with the directives of the Declaration of Helsinki.

All the patients included in the study received sufficient information and gave their informed consent in writing to participate in the study.

Results

Most of the patients were referred to the rheumatologist by primary care physicians (66.3%), by gynaecologists (13.8%) or by traumatologists (10%). Table 1 illustrates the characteristics of the 629 patients with ages ranging from 41 to 91 years. Eighteen per cent of the patients had no formal qualifications; 48% had had a primary school education; 27% had completed secondary school, and 7% had university degrees. The time elapsed since the diagnosis of osteoporosis was 4.0 (4.31) years; (95% CI 3.66-4.33). The difference between their current height and their historical height indicates that they had lost a mean of 3.1 (2.8) cm in height (95% CI 2.86-3.36).

The diagnosis of osteoporosis was made in 51.4% of the patients on the basis solely of bone densitometry (BMD); in 27.3%, the diagnosis was based on BMD as well as by the presence of vertebral fractures, and in 13.4%, the diagnosis was made on the basis of only vertebral fractures. At the time of current data collection, BMD had been performed in 52.1% of the patients during the last year and all had received treatment for their osteoporosis for at least 12 months. The average time elapsed between the 2 BMD determinations was 4.4(3.5) years (95% CI 4.02-4.77).

A predominance of osteoporosis in the lumbar spine was seen in the first BMD determination carried out for the diagnosis (T-score=-2.90); additionally, there was also a significant increase in densitometric values in both the lumbar spine and in the femoral neck at the time the data for this study were being collected (Table 2).

More than thirty-five per cent (35.7%) of the patients stated that there was a family history of fracture; of these, 54.6% had hip fractures; 22.7% were vertebral fractures; 18.2%, Colles's fractures, and 4.6% were fractures in other locations. When evaluating the association between the existence or not of a family history of fractures and the presence of fractures in the patients, we found that the relative risk of fractures is twice as high in women with a positive family history for fracture than in those who had no such history (RR=2.03; 95% CI 1.45-2.84).

Six per cent (6%) of the patients stated that they did not consume dairy products; 31% only consumed the amount equivalent to 200 mg/day of calcium; 38% consumed the equivalent of 400 mg/day, and 25%, consumed the equivalent of 600 mg/day or more.

Table 1
Characteristics of study sample^a

	Mean	SD	95% CI
Age, years	66.6	9.2	65.9-67.3
Weight, kg	64.6	10.1	63.8-65.4
Height, cm	157.6	6.9	157.1-158.9
BMI, kg/m^2	26.1	4.1	25.7-26.4
Age at menarche, years	12.6	1.6	12.5-12.8
Age at menopause, years	47.9	4.6	47.6-48.3
Number of children	2.4	1.5	

CI indicates confidence interval; SD, standard deviation.

^an=629 post-menopausal women with osteoporosis.

Table 2
BMD and calcidiol values at the time of diagnosis (D) and most recent (R)^a

	Mean	SD	95% CI	% of variation	P
Calcidiol, ng/ml					
(D)	28.6	19.7	-14.77; -7.27	38.8	.000
(R)	39.7	25.1			
BMD, g/cm²					
Lumbar spine L ₂ -L ₄					
(D)	0.752	0.12	-0.053; -0.015	4.5	.001
(R)	0.786	0.12			
Femoral neck					
(D)	0.699	0.13	-0.059; -0.009	5.0	.008
(R)	0.734	0.13			
Total hip					
(D)	0.766	0.10	-0.034; 0.186	1.0	.546
(R)	0.774	0.09			

BMD indicates bone densitometry; CI, confidence interval; (D), diagnosis; (R), recent; SD, standard deviation.

^an=629 post-menopausal women with osteoporosis.

Just over ten per cent (10.9%) were smokers; 6.9% were former smokers, and 5.4% used alcohol. More than sixty-three per cent (63.5%) were exposed to the sun on a regular basis, and 47.1% did some kind of physical exercise.

A statistically significant difference was observed between the baseline concentration of serum calcidiol at diagnosis determined in only 20.3% of the patients and the current value, collected in 25.1% ($P<.0001$). Of all the women who participated in the study, 82.8% received treatment with supplements of calcium+vitamin D. In the oldest age groups, an increase was seen in the frequency of patients with concentrations of calcidiol <20 ng/mL (Figure 1). The X-ray of the spine revealed the presence of deformities and/or fractures in 39.8% of the patients. The frequency of fractures increases significantly with age. Starting at 71 years of age, more than half of the patients presented fractures, reaching 66.7% in subjects over the age of 75. The most common locations were vertebrae T12 and L1.

Almost forty-one per cent (40.7%) of the patients studied had a history of fractures, most commonly vertebral fractures (54.8%); 27.1% had suffered a Colles's fracture; 7.9% had a history of hip fractures, and 10.2% had had fractures in other locations. Some patients had had more than one fracture.

The mean value of the Get Up & Go test score was 16.2 (11.3) seconds (95% CI; 15.21-7.17). A value of <15 seconds was observed in 58.2% of the patients; in 25.1%, the values were between 15 and 20 seconds, and in 16.7%, it was more than 20 seconds (Figure 2a). In this last group with the worst Get Up & Go test results, 45.9% of the women had fallen in the preceding 12 months. They also presented

a significantly higher incidence of fractures in comparison with the other two groups (63.5% vs 35.2% and 34.8% in the groups with values from 15 to 20 seconds and <15 seconds, respectively) ($\text{Chi}^2=24.241$; $P<.0001$) (Figure 2b).

As patients aged, the probability of falls increased significantly ($P=.001$). Over the course of the preceding 12 months, 31.2% of the patients had suffered at least one fall, resulting in fracture in 51.5% of the cases. The frequency of location of the fractures that were a direct consequence of the fall was: 39.6% Colles's fracture, 33.7% vertebral fractures, and 20.8% were fractures of the hip. Of those patients

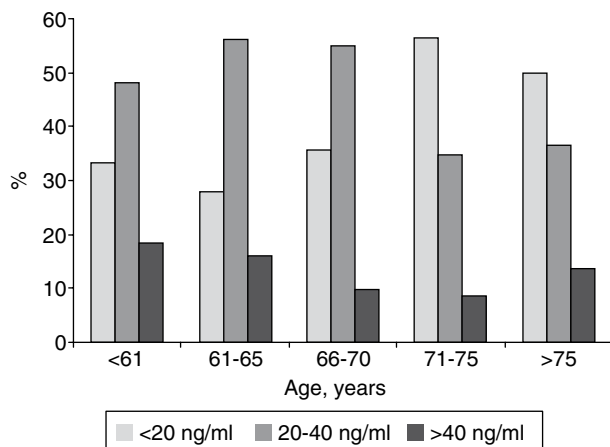


Figure 1. Levels of calcidiol (ng/ml) by age groups.

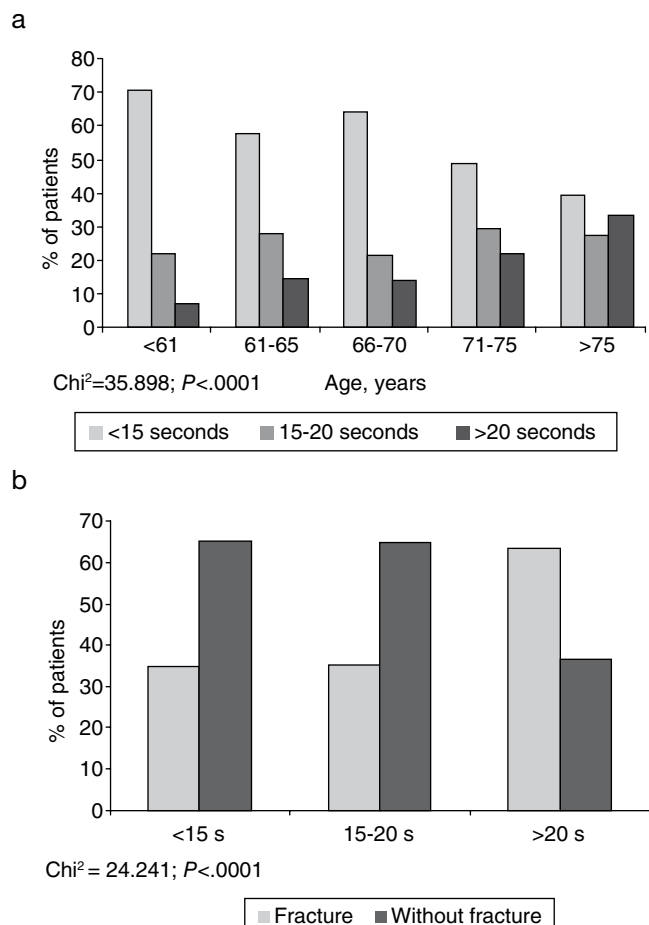


Figure 2. a) Get Up & Go test by age ranges. b) Frequency of fractures vs Get Up & Go test.

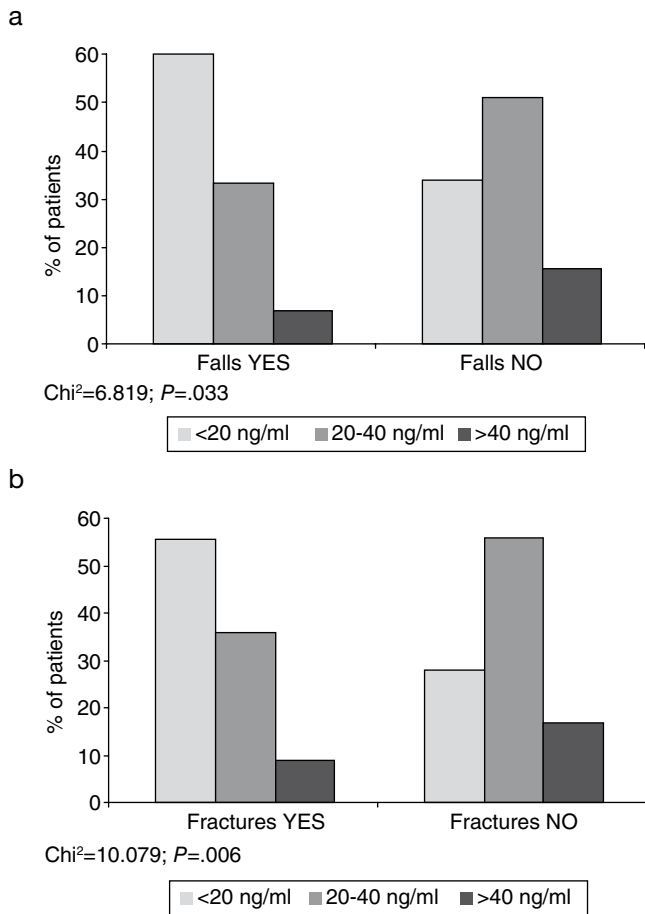


Figure 3. a) Baseline calcidiol vs incidence of falls. b) Baseline calcidiol vs incidence of fractures.

who had a history of a fall in the last 12 months, 66.3% of them also presented at least one fragility fracture. In contrast, the incidence of fragility fractures in the patients without a history of falls was lower, 29.2% (RR: 4.8; 95% CI 3.34-6.89).

A significant, inverse relation ($P=.033$) was found between the level of calcidiol at baseline and the proportion of patients who suffered falls, with the greater proportion of them occurring in the group with a baseline level of calcidiol <20 ng/mL. Likewise, the group of patients with calcidiol values <20 ng/mL presented a greater frequency of fractures versus the group of subjects with calcidiol values >20 ng/mL ($P=.006$) (Figures 3a and 3b).

More than seventy per cent (71.8%) of the patients reported having back pain and in 85.3% of the cases, the pain was chronic. The intensity of pain was rated as moderate to severe in 65.4% of cases. Likewise, almost all the patients who had worse scores on the Get Up & Go test also had back pain, probably related to the presence of fracture(s). The presence of vertebral fracture has a decisive influence on the existence of back pain ($\text{Chi}^2=29.106$; $P=.0001$). Patients with vertebral fracture have a RR=2.877 (95% CI 1.943-4.260) of suffering from back pain.

Discussion

We are interested in gaining greater insight into the profile of post-menopausal patients with osteoporosis who seek help at rheumatology clinics around the country, generally referred by physicians of other specialities. This is due to the deep-seated belief

that the more we know about our patients, the better prepared we will be to respond to their request for treatment. Moreover, we will also be able to advise them properly as to how to alleviate or prevent the problems that cause osteoporosis, insofar as possible.

For the most part, patients seeking care at rheumatology clinics already have a diagnosis of osteoporosis. Some have had one or more fragility fractures and, in many cases, have not received appropriate treatment for their osteoporosis. In all likelihood, they have been treated only with calcium and vitamin D for a period of time and have been referred to a specialist because they have failed to achieve adequate response or because they have suffered a fracture.

It cannot be overemphasized that, since osteoporosis is such a common and predictable disease, because it is well known that one third of women over the age of 50 will have osteoporosis and since it can be prevented in a majority of cases, treatment and preventive measures should begin much sooner. Furthermore, attractive campaigns must be carried out to reach the entire population so as to encourage people to take measures to increase peak bone mass starting in adolescence, thereby making them responsible for their own bone health in an attempt to reduce the risk of osteoporosis.

In this study, we confirmed that the diagnosis of osteoporosis was made by bone densitometry in most patients. This enabled us to compare baseline densitometric values with those at the time of data collection, observing a significant increase in both lumbar spine and in the femoral neck. This finding probably corresponds to the initiation of treatment for osteoporosis in all these patients.

In the group studied, we observed that the presence of a positive family history of fracture doubled the risk of fragility fracture, which corroborates what was published in a meta-analysis carried out with a sample of close to 35,000 patients. The authors revealed that this association is independent of BMD values and that this risk is even greater when the family history of fracture involves the hip.⁷

The intake of calcium was insufficient in almost all the women in the study. Pérez et al. recently found that low calcium intake in Spanish women is commonplace,¹² but the result of a meta-analysis indicates that intake of less than one glass of milk per day, does not appear to be associated with an increased risk of osteoporotic fracture.²⁵

In the sample studied toxic habits were seen to be uncommon; nevertheless, this aspect must not be overlooked in the future, since we know that in the last several years, Spanish women have increased their consumption of alcohol and tobacco considerably; hence, it may be a risk factor to bear in mind as studies performed in both men and women have suggested.¹⁰

In general, the usual physical activity the post-menopausal women included in the study claimed to have might be sufficient for the older women, but not so in the case of the younger women. It appears that the importance of the physical activity osteoporosis patients get is underemphasized. Although still controversial, the results of a systematic review indicate that the combination of aerobic exercise, weights, and stamina exercises benefits the BMD of the spine and that aerobic exercise increases the BMD of the wrist in post-menopausal women.¹⁹ On the other hand, a meta-analysis recently conducted concludes that regular walking has positive effects on the bone mass of the femoral neck in post-menopausal women.²⁰ Regular physical exercise is necessary to maintain the body's flexibility, to maintain muscle strength, and to prevent falls. As patients age, so too does the probability of falls as observed in our study, which comprises one of the most important risk factors for fracture.

The average concentration of serum calcidiol in the women who participated in this study is slightly higher than what has been found in other studies performed in post-menopausal women in Spain, such as those attending a rheumatology clinic

in Madrid,²⁶ and elsewhere, such as the participants in the EVOS Study (European Vertebral Osteoporosis Study).²⁷ This is probably due to the fact that most of our patients were receiving calcium and vitamin D supplements prior to being referred to the rheumatology clinics. On the other hand, it must be noted that only 20.3% of the post-menopausal patients with osteoporosis referred to rheumatology clinics had had a serum calcidiol measurement. It is also true that at the time of data collection, the situation had not varied much, since this value was only obtained in 25.1% of the patients. Correcting vitamin D insufficiency should comprise an absolute priority for all public health systems since vitamin D, in addition to being essential for bone health, has a beneficial effect on the health of the entire body.²⁸ Consequently, quantifying calcidiol levels, at the very least in the populations at risk such as post-menopausal women, should be a recommendation to be taken into account.

The greater frequency of falls observed in the group of patients with insufficient levels of calcidiol is in line with evidence-based studies concluding that, in the elderly, serum calcidiol concentrations are inversely associated with falls.¹⁸ A review of randomized, controlled trials prove that vitamin D supplementation to adequate doses significantly reduces falls,²⁹ thanks to the fact that vitamin D supplementation enhances neuromuscular and neuroprotective functions in seniors, decreasing reaction time and improving postural balance.¹⁵

The frequency of fragility fractures increases with age to the point where, after the age of 70, more than half the patients had suffered one, two, or more vertebral fractures most often located in T12 and L1. A positive history of fragility fractures has been proven to be one of the most important risk factors for fractures in women over the age of 65, as confirmed by several studies conducted in Spanish women.^{5,6}

Our results on the Get Up & Go test to appraise functional mobility are consistent with other previous studies,³⁰ revealing a significant, direct association in those patients who had worse results on the test and the incidence of falls and fractures. A recent publication shows good sensitivity³¹ and specificity for the Get Up & Go test in predicting the probability of falls in seniors.²³ Bearing the aforementioned in mind and considering how simple and convenient it is to carry out this test, as well as its practical usefulness, it would be of interest to perform the Get Up & Go test routinely in all patients over the age of 65, so as to observe the probable decline in their physical conditions increasing the risk of falls and, hence, of fractures.

The great number of patients with vertebral fractures suffering from chronic back pain is statistically relevant with respect to those who have not suffered fractures, and this may be having quite a considerable impact on their quality of life. Sudden onset back pain characterized by intensity and consequential disability may be due to severe vertebral fracture or deformity (decrease in the height of the vertebra of 4 standard deviations or more, below the mean according to the Osteoporotic Fractures Research Group).⁹ However, in patients with vertebral fractures in this study, back pain was not necessarily due solely to fractures, but might also have been caused by other concomitant pathologies.

In conclusion, the profile of post-menopausal women with osteoporosis in Spain seeking care at rheumatology clinics is characterized by low intake of calcium, a positive family history of fracture, a prior personal history of fractures, insufficient concentrations of calcidiol, predominantly in women over the age of 70, and a high incidence of back pain.

Conflict of interest

None of the authors has any conflict of interests potentially affecting the results of this paper.

Acknowledgements

Laboratorios ROVI collaborated in sending out and collecting the questionnaires that rheumatologists administered to patients all over the country.

Annex

The following physicians participated in patient assessment in this study at the participating rheumatology clinics:

M Acasuso Díaz, J Aguilar del Rey, F Álvarez Reyes, E Amigo Díaz, J Aparicio Rodríguez, A Aragón Díez, C Barbazán Álvarez, J Beltrán Fabregat, J Belzunegui Otaño, A Bermúdez Torrente, M Buades Soriano, M Caamaño Freire, J Calvo Catalá, M Campillo Ibáñez, C Campos Martínez, E Campoy Reolid, N Caro Fernández, E Casado Burgos, S Castañeda Sanz, M Cortegera Coro, M de la Hera Martínez, M del Castillo Montalvo, A Escudero Contreras, E Fernández Lecina, J Fernández Sánchez, T Font Gayá, J García Borrás, J García Llorente, A García Manzanares, A García Monforte, F García Velasco, E García-Mancha Arévalo, J González Domínguez, M González Gómez, J Gracia Estévez, R Gutiérrez Polo, R Hortal Alonso, E Judez Navarro, D López Peiteado, J Martos Fernández, J Marzo Gracia, M Matías de la Mano, C Montilla Morales, M Moreno Zazo, D Pérez Vilches, M Pericas Alemany, R Queiro Ilva, J Quijada Carrera, D Reina Sanz, B Ribas López, J Riutort Gaya, J Rodríguez Barrera, M Rodríguez Gómez, M Rodríguez Pérez, M Rodríguez Picón, A Romero Pérez, J Rosas Gómez de Salazar, A Rosas Romero, L Roselló Aubach, J Ruiz Díaz, J Salaberri Maestrojuan, J Salazar Vallinas, C Tornero Ramos, J Torre Alonso, M Trabado Vila, R Valls García, M Valverde Romera, J Vesga Carasa.

References

- Lin JT, Lane JM. Osteoporosis: a review. *Clin Orthop Relat Res.* 2004;126-34.
- Reginster JY, Burlet N. Osteoporosis: a still increasing prevalence. *Bone.* 2006;38(Suppl 1):S4-9.
- Grupo de Trabajo de la Sociedad Española de Investigaciones Óseas y Metabolismo Mineral (SEIOMM). Osteoporosis postmenopáusica. Guía de práctica clínica. *Rev Clin Esp.* 2003;203:496-506.
- Roux C, Fechtenbaum J, Kolta S, Briot K, Girard M. Mild prevalent and incident vertebral fractures are risk factors for new fractures. *Osteoporos Int.* 2007;18:1617-24.
- González-Macías J, Marín F, Vila J, Díez-Pérez A, Abizanda M, Álvarez R, et al. Risk factors for osteoporosis and osteoporotic fractures in a series of 5,195 women older than 65 years. *Med Clin (Barc).* 2004;123:85-9.
- Naves M, Díaz-López JB, Gómez C, Rodríguez-Rebollar A, Rodríguez-García M, Cannata-Andía JB. The effect of vertebral fracture as a risk factor for osteoporotic fracture and mortality in a Spanish population. *Osteoporos Int.* 2003;14:520-4.
- Kanis JA, Johansson H, Oden A, Johnell O, De Laet C, Eisman JA, et al. A family history of fracture and fracture risk: a meta-analysis. *Bone.* 2004;35:1029-37.
- Ross PD. Clinical consequences of vertebral fractures. *Am J Med.* 1997;103:305-42S.
- Ettinger B, Black DM, Nevitt MC, Rundle AC, Cauley JA, Cummings SR, et al; The Study of osteoporotic fractures research group. Contribution of vertebral deformities to chronic back pain and disability. *J Bone Miner Res.* 1992;7:449-56.
- Kanis JA, Johnell O, Oden A, Johansson H, De Laet C, Eisman JA, et al. Smoking and fracture risk: a meta-analysis. *Osteoporos Int.* 2005;16:155-62.
- Bruyere O, De Cook C, Mottet C, Neuprez A, Malaise O, Reginster JY. Low dietary calcium in European postmenopausal osteoporotic women. *Public Health Nutr.* 2009;12:111-4.
- Pérez JA, García FC, Palacios S, Pérez M. Epidemiology of risk factors and symptoms associated with menopause in Spanish women. *Maturitas.* 2009;62:30-6.
- Brannon PM, Yetley EA, Bailey RL, Picciano MF. Overview of the conference "Vitamin D and Health in the 21st Century: an update". *Am J Clin Nutr.* 2008;88:483S-90S.
- Aguado P, Del Campo MT, Garcés MV, González-Casaús ML, Bernad M, Gijón-Baños J, et al. Low vitamin D levels in outpatient postmenopausal women from a rheumatology clinic in Madrid, Spain: their relationship with bone mineral density. *Osteoporos Int.* 2000;11:739-44.
- Dhesi JK, Jackson SHD, Bearne LM, Moniz C, Hurley MV, Swift CG, et al. Vitamin D supplementation improves neuromuscular function in older people who fall. *Age and Ageing.* 2004;33:589-95.
- Flicker L, Mead K, Mac Innis RJ, Nowson C, Scherer S, Stein MS, et al. Serum vitamin D and falls in older women in residential care in Australia. *J Am Geriatr Soc.* 2003;51:1533-8.

17. Bischoff HA, Stähelin HB, Dick W, Akos R, Knecht M, Salis C, et al. Effects of vitamin D and calcium supplementation on falls: a randomized controlled trial. *J Bone Miner Res.* 2003;18:343-51.
18. Cranney A, Weiler HA, O'Donnell S, Puil L. Summary of evidence-based review on vitamin D efficacy and safety in relation to bone health. *Am J Clin Nutr.* 2008;88(Suppl):513S-9S.
19. Bonaiuti D, Shea B, Iovine T, Negrini S, Robinson V, Kemper HC, et al. Exercise for preventing and treating osteoporosis in postmenopausal women. *Cochrane Database Syst Rev.* 2002;CD000333.
20. Martyn-St James M, Carroll S. Meta-analysis of walking for preservation of bone mineral density in postmenopausal women. *Bone.* 2008;43:521-31.
21. Mathias S, Nayak US, Isaacs B. Balance in elderly patients: the "get-up and go" test. *Arch Phys Med Rehabil.* 1986;67:387-9.
22. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *J Am Geriatr Soc.* 1991;39:142-8.
23. Shumway-Cook A, Brauer S, Woollacott M. Predicting the probability for falls in community-dwelling older adults using the Timed Up & Go Test. *Phys Ther.* 2000;80:896-903.
24. Genant HK, Wu CY, Van Kuijk C, Nevitt MC. Vertebral fracture assessment using semiquantitative technique. *J Bone Miner Res.* 1993;8:1137-48.
25. Kanis JA, Johansson H, Oden A, De Laet C, Johnnek O, Eisman JA, et al. A meta-analysis of milk intake and fracture risk: low utility for case finding. *Osteoporos Int.* 2005;16:799-804.
26. Aguado P, Garcés MV, González-Casaús ML, Del Campo MT, Richi P, Coya J, et al. High prevalence of vitamin D deficiency in postmenopausal women at a rheumatology office in Madrid. Evaluation of 2 vitamin D prescription regimens. *Med Clin (Barc).* 2000;114:326-30.
27. Gómez-Alonso C, Naves-Díaz ML, Fernández-Martín JL, Díaz-López JB, Fernández-Coto MT, Cannata-Andia JB. Vitamin D status and secondary hyperparathyroidism: the importance of 25-hydroxyvitamin D cut-off levels. *Kidney Int.* 2003;85:S8-44.
28. Quesada-Gómez JM, Sosa-Henríquez M. Vitamina D: más allá del tratamiento de la osteoporosis. *Rev Clin Esp.* 2008;208:173-4.
29. Cranney A, Horsley T, O'Donnell S, Weiler H, Puil L, Ooi D, et al. Effectiveness and safety of vitamin D in relation to bone health. *Evid Rep Technol Assess.* 2007;158:1-235.
30. Khazzani H, Allali F, Bennani L, Ichchou L, El Mansouri L, Abourazzak FE, et al. The relationship between physical performance measures, bone mineral density, falls, and the risk of peripheral fracture: a cross-sectional analysis. *BMC Public Health.* 2009;9:297.
31. Giné-Garriga M, Guerra M, Marí-Dell'Olmo M, Martín C, Unnithan VB. Sensitivity of a modified version of the 'timed get up and go' test to predict fall risk in the elderly: a pilot study. *Arch Gerontol Geriatr.* 2009;49:60-6.