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Epidemiology of osteoporotic hip fractures in Spain

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Abstract We conducted a multicentre study, divided into a retrospective and a prospective portion. The retrospective study evaluated osteoporotic hip fractures that occurred during 2002. The prospective study evaluated osteoporotic hip fractures that occurred during May 2003. The study was conducted in 77 hospitals in Spain and comprised patients 60 years of age and over. In the retrospective study we registered 13,195 hip fractures. Of the patients, 74% were women and 26% were men. The mean age was 80.7±8.4 years. The average incidence was 6.94±0.44 hip fractures per 1,000 inhabitants/year (95% CI, 6.07–7.82). In the prospective study, we registered 1,399 hip fractures. This represents a monthly incidence of 0.60±0.04 hip fractures per 1,000 inhabitants/year (95% CI, 0.51–0.69). Of the subjects, 74% were women and 26% were men. The mean age was 81.4±8.1 years. Using these data, we calculated the average annual prevalence in 2003 to be 7.20 fractures per 1,000 inhabitants. Thirty-three percent had previously suffered a hip fracture. Prior to the fracture, only

18% had received medical treatment for osteoporosis. After discharge from the hospital, only 26% were receiving pharmacological treatment for osteoporosis.

Résumé Nous avons conduit une étude multicentrique, divisée en une portion rétrospective et une portion prospective. L'étude rétrospective a étudiée les fractures de la hanche ostéoporotique qui se sont produites pendant l'année 2002. L'étude prospective transversale a évalué les fractures de la hanche ostéoporotique qui se sont produites pendant le mois de mai 2003. L'étude a été conduite dans 77 hôpitaux en Espagne et a inclus des patients de 60 ans et plus. Dans l'étude rétrospective nous avons enregistré 13195 fractures de la hanche. 74% étaient des femmes et 26% des hommes. L'âge moyen était 80,7±8,4 années. La fréquence moyenne était 6,94±0,44 fractures de la hanche par 1000 habitants/année (95% CI, 6,07–7,82). Dans l'étude prospective, nous avons enregistré 1399 fractures de la hanche. Cela représente une fréquence mensuelle de 0,60±0,04 fractures par 1000 habitants (95% CI, 0,51–0,69). 74% étaient des femmes et 26% des hommes. L'âge moyen était 81,4±8,1 ans. Utilisant ces données, nous avons calculé la prévalence annuelle moyenne en 2003 qui est de 7,20 fractures pour 1000 habitants. 33% avaient souffert d'une fracture de la hanche précédemment. Avant la fracture, seulement 18% avaient reçu un traitement médical contre l'ostéoporose. Après l'hospitalisation, seulement 26% avaient un traitement contre l'ostéoporose.

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Introduction

It is estimated that 480,000 osteoporotic fractures occurred in the European Union in 1999 [3]. In the United States of America, Riggs and Melton reported a total of 1,500,000 osteoporotic fractures in 1995: 250,000 of the proximal femur, 250,000 of the distal radius and 750,000 vertebral fractures [21]. In the United Kingdom, 300,000 osteoporotic fractures occur per year [13].

In Spain there are around 3 million patients suffering from osteoporosis, from a total population of approxi-

mately 40 million. Spain is an aging country, with a low birth rate, where osteoporotic fractures are expected to increase. Serra et al., in 2002, published a study on hip fractures in the elderly [23] using data from the Minimum Data Set of the Ministry of Health 1996 to 1999. The hip fracture rate was 517 cases per 100,000 elderly per year. Others have addressed the epidemiology of hip fractures in various Spanish regions showing different rates [7, 10, 16, 24].

This study was conducted by the Study and Research Group of Osteoporosis of the Spanish Society of Orthopaedic Surgery and Traumatology.

Materials and methods

This was a multicentre study, divided into a retrospective and a prospective part, to evaluate the incidence and prevalence of osteoporotic hip fractures in Spain. The retrospective part evaluated osteoporotic hip fractures that occurred during 2002. The prospective part evaluated the osteoporotic hip fractures that occurred during May 2003.

The study was conducted in 77 hospitals nationwide. Hospitals were selected randomly within every region. The number of hospitals selected per region was related to the regional population. To calculate the sample size we estimated, from a total of 545 hospitals (= number of hospitals in Spain with Orthopaedic Surgery units), a hypothetical 10% rate of hip fracture, with a $\pm 1\%$ relative error. On the basis of this assumption, the inclusion of 65 hospitals would result in a confidence level of 99%.

The study included only patients 60 years of age or older. The population data were provided by the National Census of 2001. There were 8,814,675 persons that were 60 years of age or older, 3,824,910 male and 4,989,765 female, being 21.58% of the total Spanish population.

The influence area of the 77 participating hospitals covered 3,057,197 inhabitants aged 60 years and older, representing 35% of the population aged 60 years and above.

The exclusion criteria were:

- Hip fractures in persons with disorders associated with an increased risk of osteoporosis (i.e. thyroid disorders, hyperparathyroidism, Cushing's syndrome, hypogonadism, malabsorption syndromes, rheumatoid arthritis, type I diabetes mellitus, multiple sclerosis, osteogenesis imperfecta, renal disease, ankylosing spondylitis, he-

patic diseases, multiple myeloma, chronic alcoholism, bone tumour and metastasis.

- Hip fractures in persons with secondary osteoporosis associated with long-term medication such as glucocorticoids, heparin, thyroid medication, tamoxifen, anticonvulsants, immunosuppressants or testosterone antagonists were also excluded.

Results

In the retrospective part of the study we registered 13,195 hip fractures. Of the patients, 74% were women and 26% were men. Their mean age was 80.7 ± 8.4 years. The type of fracture was cervical in 47.6% of the cases, trochanteric in 44.1% and subtrochanteric in 8.3%.

The average incidence was 6.94 ± 0.44 hip fractures per 1,000 inhabitants/year (95% CI, 6.07–7.82). The gender-adjusted incidence was 4.17 ± 0.26 per 1,000 inhabitants/year in men and 9.13 ± 0.66 per 1,000 inhabitants/year in women. The age-specific incidence is shown in Table 1.

By extrapolating the incidence, we concluded that a total of $61,173 \pm 3,878$ osteoporotic hip fractures in patients aged 60 years or older occurred in Spain in 2002.

In the prospective part of the study we registered 1,399 hip fractures, representing a monthly incidence of 0.60 ± 0.04 hip fractures per 1,000 inhabitants/year (95% CI, 0.51–0.69). The gender-adjusted incidence was 0.36 ± 0.05 in men and 0.80 ± 0.06 in women. Of the patients, 74% were women and 26% were men. Their mean age was 81.4 ± 8.1 years. The age-specific incidence is shown in Table 1.

Using these data, we calculated an average prevalence of 7.20 osteoporotic hip fractures per 1,000 inhabitants/year during 2003 in patients aged 60 years or older in Spain.

The type of fracture was cervical in 48.2% of the cases, trochanteric in 43.6% and subtrochanteric in 8.1%.

In 4.1% of the patients the treatment was non-operative; while 57.9% were treated surgically with internal fixation, and 38% with arthroplasty. Of the patients 33% had suffered a previous fracture; most commonly located in the wrist (34.8%), in the contralateral hip (21.1%) and in the spine (20.3%).

Prior to the fracture, only 18% of the patients had received pharmacological treatment for osteoporosis; of these patients, 6.1% received calcium and vitamin D, 4.6% calcium, 3.5% calcitonin, and 2.8% bisphosphonates. When patients were discharged from the hospital, 26% of them were receiving pharmacological treatment for osteoporosis: calcium and vitamin D in 7.3% of the cases,

Table 1 Age-specific incidence for age groups

Age (years)	Retrospective study			Transversal study		
	No. of cases	No. of cases per 1,000	Percentage	No. of cases	No. of cases per 1,000	Percentage
60–70	791	0.41	6	83	0.42	5.93
70–80	3,828	2.01	29	419	2.15	30
80–90	6,331	3.32	48	648	3.33	46.3
90–100	2,245	1.18	17	249	1.28	17.8

calcium in 2.6%, bisphosphonates in 9.1% and calcitonin in 4.6%.

Discussion

This study is the first nationwide study conducted in Spain, and the data were collected with the cooperation of public orthopaedic departments throughout the country. Consequently, we consider our figures to be representative of the incidence of osteoporotic hip fractures in Spain.

Many epidemiological studies of hip fractures conducted in various Spanish regions have shown variable results [4, 7, 10, 16, 24], with Cataluña being the region with the highest rates: 1,120 hip fractures per 100,000 inhabitants/year, similar to the Scandinavian rates, and La Rioja the region with the lowest rate (377 hip fractures per 100,000 inhabitants/year).

The average annual increase in hip fracture incidence reported in the literature ranges between 1% and 4% [6, 17]. Other authors [18] have, however, reported that, in recent years, the incidence is no longer increasing.

The incidence rates in this study are similar to previously reported European incidence rates [22], although slightly lower than the Scandinavian values [17, 18] and the rates from the United States of America [21]. However, the values are greater than those reported in the multinational study by Schwartz et al. [22] and to those from other parts of the world, such as the Mediterranean countries [1] or the African countries [25]. In the USA, the rates may differ within the same county between urban and rural populations, with the incidence of hip fracture being lower in rural areas [19].

The percentage of women suffering an osteoporotic hip fracture reflected in our study is consistent with that reported in other studies [4, 17–19]. This higher proportion of women has been explained by the higher incidence of osteoporosis among women and by aging. The incidence rates of hip fractures increase exponentially with age [1, 4, 18, 19, 22, 25]. In our study, almost 50% of hip fractures appeared in people aged 80–90 years.

Our findings show that a previous fracture can predict a subsequent fracture of the hip. This is consistent with previous reports, which suggest that osteoporotic fractures tend to occur in clusters and that the occurrence of a fracture usually indicates an increased risk of subsequent fracture at other sites [5, 14, 15].

The Spanish Society of Orthopaedic Surgery and Traumatology is interested in knowing the attitude of orthopaedic surgeons to the treatment of osteoporosis. This society and its members have participated in studies about osteoporosis and have published “Physician’s guides” and recommendations for the treatment of osteoporosis [8]. Our investigation revealed that only 18% of patients received medical treatment for osteoporosis, and after hospital discharge, only 26% of patients received medical treatment. These data may indicate that the orthopaedic surgeons pay little attention to the treatment of osteoporosis, a situation also found in other countries [11, 12].

The study suggests that the current physician practice is inadequate for the treatment of osteoporosis. Medical treatment of these patients [2, 9, 20] may have an important public health impact by decreasing the burden of osteoporotic hip fractures. Orthopaedic surgeons can play a major role in improving the treatment of osteoporosis and decreasing the morbidity of this condition.

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