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SHORT COMMUNICATION

Low rate of densitometric diagnosis and treatment in patients with severe osteoporosis in Colombia

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Abstract

Summary Our study describes the clinical characteristics of patients with fragility fractures. It also shows there is a low knowledge about osteoporosis and its relation to fractures, in addition to the very poor adherence to medical advice and treatment.

Introduction Osteoporosis is a systemic skeletal disease associated with an increased risk of fragility fractures and is a public health problem worldwide due to population aging. Early osteoporosis diagnosis and treatment is very important for reducing the incidence of fragility fractures and the resulting complications. Our study describes the clinical characteristics of patients with fragility fractures and their risk factors, evaluates the level of knowledge that patients have about osteoporosis, and follows-up on each case to establish if, after the fracture, a densitometric diagnosis was made and the patient received specific treatment in his outpatient follow-up through his health insurance plan.

Methods A descriptive cross-sectional study was carried out in a university hospital in Bogotá, Colombia. The data was collected by means of a questionnaire, administered to all patients admitted by the orthopedic emergency department with a diagnosis of fragility fracture. After discharge, a telephone follow-up was done every 3 months for 1 year, and patients were asked if they had already had the dual X-ray absorptiometry (DXA) scan and if they had begun osteoporosis treatment.

Results A total of 111 patients with an average age of 74.4 years (± 11.3 years), of which 84 (75.6%) were women, all consulted for osteoporotic fracture at the orthopedic emergency department of the hospital. Hip fracture was the most frequent (51.4%), followed by vertebral (23.4%), wrist (22.5%), and humerus (4.5%) fracture. A total of 49.5% ($n = 55$) of the patients did not know what osteoporosis is; 58.6% ($n = 65$) did not know that fracture is the main complication of this disease, and 62.2% ($n = 69$) did not associate fractures with osteoporosis. All patients were educated about osteoporosis and the importance of diagnosing and treating it. Patients were given a medical order to have a DXA scan upon discharge; however, only 24.3% ($n = 27$) had the DXA scan in the first year of the fracture. A total of 33.3% ($n = 37$) received calcium plus vitamin D, and only 9.9% ($n = 11$) received osteoporosis treatment (7 bisphosphonate patients and 4 denosumab). No patient received osteoformative therapy.

Conclusions Our study shows that Colombian patients have little knowledge about osteoporosis and its relationship with fragility fractures. It also shows that densitometries are not done and, what is worse, patients with a diagnosis of fracture have limited access to treatment after discharge.

Keywords Osteoporosis · Osteoporosis fracture · Fragility fractures · Colombia

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Introduction

Osteoporosis is a systemic skeletal disease characterized by a decrease in bone mineralization and a deterioration in the microarchitecture of bone tissue, which leads to bone resistance impairment and an increased risk of fragility fractures. Fragility fractures are produced by low-energy traumatic events or are within an osteoporotic profile; they frequently involve the spine, wrist, or hip [1]. Osteoporosis prevalence increases in direct proportion the aging of the population. The

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risk of fracture in women over age 50 has been estimated at 17%, and for each additional decade of life, the risk doubles. Global increases in the incidence of hip fracture are estimated from 1.7 million in 1990 to 6.3 million in 2050 [2, 3]. It is estimated that in Colombian women older than 50 years, there is a prevalence of spinal osteoporosis of 15.7% and of proximal femur osteoporosis of 11.4%. Annually, 8000 to 10,000 hip fractures occur in Colombia, of which, 90% are treated surgically. Projections suggest that the number of hip fractures in Colombian women will increase to 11,500 in 2020. It is estimated that the direct hospital cost of treating a hip fracture in Colombia is US$6457, with an average hospitalization of 10 days [4, 5]. Fracture-associated outcomes range from complications associated with exacerbations of underlying comorbidities to an increased risk of mortality, which can reach 20% in the first year in the case of hip fracture [6]. In addition, the patient's functional capacity decreases, leading to a loss of independence, increased use of health services, risk of admission to a nursing home, depression, cognitive impairment, and increased risk of re-fracture, which significantly increases costs for health systems [7]. Once the fragility fracture has been diagnosed, pharmacological treatment should be initiated, which should include antiresorptive or osteoformative medication and calcium and vitamin D supplement. In order to reduce the risk of re-fracture, the information should be provided to prevent falls. However, different studies have shown serious problems in the diagnosis and in the timely initiation of treatment and follow-up [8–10]. The present study seeks to describe the clinical and demographic profile of severe osteoporosis patients in our hospital, and assess what happened after the fracture regarding having a DXA scan and further treatment.

Method

A descriptive cross-sectional study was carried out in a university hospital in Bogotá, Colombia. The aim was to describe the clinical and demographic characteristics of patients with fragility fractures treated in our hospital, to evaluate the patients' knowledge on osteoporosis and its relationship with the fracture, to educate them and their relatives about this diagnosis, and to issue an order for an ambulatory DXA scan and follow-up with the patients to know whether, after the fragility fracture, they had the bone DXA scan and if they received specific treatment in outpatient follow-up through their health insurance plan. For 1 year, all patients admitted with a diagnosis of fragility fracture were included and a questionnaire was applied to each of them. Data were collected on demographic variables, clinical background, and risk factors for vertebral fracture; the level of knowledge they had about osteoporosis and its relationship with the fragility fracture was also evaluated. Later, an educational intervention was carried out in the patient's room, in which an internal medicine resident explained the basic concepts about osteoporosis and its relationship with fractures and the importance of receiving pharmacological and non-pharmacological treatment, issued an order for an ambulatory densitometry, and followed-up with the patients to know whether, after the fragility fracture, they had the bone densitometry and if they received specific treatment in outpatient follow-up through their health insurance plan. For 1 year, all patients admitted with a diagnosis of fragility fracture were included and a questionnaire was applied to each of them. The obtained data were described with measures of frequencies and percentage for qualitative variables, and with measures of central tendency with averages and dispersion for the quantitative variables. The work was approved by the Clinical and Ethical Research Committee of the Pontificia Universidad Javeriana in Bogotá, Colombia.

Results

The study included 111 patients with a confirmed diagnosis of fragility fracture. The average age was 74.4 years (± 11.3 years) and the majority were women (75.6%). Hip fracture was the most common (51.4%), followed by vertebral (23.4%), wrist (22.5%), and humerus (4.5%) fracture. Two patients had concomitant vertebral and wrist fracture. Twenty-three patients had a history of osteoporosis (20.7%) and 16 (14.4%) had a previous fracture (vertebral $n = 4$, hip $n = 7$, and wrist $n = 5$). One percent of patients had a history of fragility fracture in a first-degree relative. In the analyzed population, the following risk factors were found: use of glucocorticoids 7.2% ($n = 8$), antiepileptic drugs 3.6% ($n = 4$), and anticoagulation with warfarin 3.6% ($n = 4$). A total of 21.6% ($n = 24$) of the patients were smokers. A total of 77.5% ($n = 86$) had never had a DXA, despite the fact that they had the indication because of their age. Table 1 shows the characteristics of the population. A total of 49.5% of the patients ($n = 55$) did not know what osteoporosis is, 58.6% ($n = 65$) did not know that fracture is and its main complication, and 62.2% ($n = 69$) did not relate osteoporosis with the fracture for which he was hospitalized. Although all patients were educated about osteoporosis and the importance of its diagnosis and treatment, and were given an order for a DXA scan upon discharge, only 24.3% ($n = 27$) had the DXA scan in the first year of the fragility fracture. A total of 33.3% ($n = 37$) of them received calcium plus vitamin D, and only 9.9% ($n = 11$) received osteoporosis treatment: 7 patients with bisphosphonate and 4 with denosumab; none received osteoformative therapy. There were 2 deaths in the follow-up due to causes unrelated to the diagnosis of osteoporosis. Table 1 summarizes the characteristics of the patients included, and Fig. 1 shows the scheme of the study.

Table 1 Clinical characteristics of the population with fragility fractures

Population, $n = 111$	Woman	Man
Age (years)		
Average = 74.4	74.40	74.57
Sex	75.6% (84)	24.4% (27)
History		
Previous diagnosis of osteoporosis	20.7% (23)	
Previous densitometry	22.5% (25)	
Risk factors		
Use of glucocorticoids	7.2% (8)	
Use of antiepileptic drugs	3.6% [4]	
Use of coumarins	3.6% [4]	
Smoking	21.6% (24)	
Low body mass index (< 18)	4.5% [5]	
Previous fracture	14.4% [11]	
Fracture in parents	0.9% [1]	
Type of fracture		
Hip	51.4% (57)	
Vertebra	23.4% (26)	
Wrist	22.5% (25)	
Humerus	4.5% [5]	
Vertebra + wrist	1.8 (2)	

Discussion

Osteoporosis is an increasingly prevalent public health problem worldwide, due to population aging. Early osteoporosis diagnosis and treatment are very important to reduce the incidence of fragility fractures and the resulting complications; it is also important to improve fracture treatment and avoid re-fracture [12]. Our article shows there is a lack of knowledge about osteoporosis among patients who already had fractures as the main complication of this entity. There are few studies evaluating the knowledge that recently fractured patients have about osteoporosis. One was carried out in Puerto Rico, which documented findings similar to those of our study. A survey was conducted with 54 patients who had suffered a first osteoporotic fracture and consulted the Hospital Universitario de San José, and it showed that 61.1% had little knowledge about osteoporosis. Another study was conducted in Ontario, Canada, in which a telephone survey was conducted on 177 patients with fragility fracture; it showed that 75% of patients gave the correct definition of osteoporosis, but only 39% passed the osteoporosis knowledge test [13, 14]. Our study reports a profile similar to that of the literature with respect to gender, where fragility fracture is estimated at 40–50% in women vs. 13–22% in men. Hip fracture was the most common in our study, unlike global reports that show a higher frequency of vertebral fracture. However, this could be due to the clinical context of our study, which was carried out in a hospital that treats patients with trauma-related fragility fractures; in all the patients of this study, these were low-energy traumas that caused osteoporotic fractures [4, 11, 15].

All patients were educated about the diagnosis of osteoporosis and the importance of a timely treatment, and received an order to have a DXA scan after discharge; in addition, a quarterly telephone follow-up was done during the year after the fracture. However, less than a third of the patients had the DXA scan during that year. This result coincides with the findings of a study in which 2021 orthopedists in Iran were surveyed about aspects related to the diagnostic approach of fractured patients. This study reported that less than 10% of the orthopedists request a DXA scan at the discharge of fractured patients and that there is a low adherence to treatment among fractured patients; in addition, only 32% of the orthopedists reported initiation of calcium plus vitamin D to their fractured patients [16]. Problems have also been reported for prescribing and achieving compliance of osteoporosis patients [17]. It is important to emphasize that, in Colombia, the main obstacle for patients with osteoporosis is the functioning of the health system, where despite to issue an order for a DXA scan and the need receiving treatment for osteoporosis after hospital discharge, it depends solely on the health coverage of the patient and not of the hospital that handled the fracture. The Colombian health system presents problems in the follow-up of patients due to delays in medical appointments and exam scheduling and medication delivery.

There are studies on the importance of providing education to patients and the effect of this education on treatment compliance, also on educating health personnel through bone health programs. These studies have shown a reduction of up to 40% in the incidence of hip fracture and of up to 51% in the risk of re-fracture through a follow-up program [12, 18, 19]. This shows the importance of interdisciplinary prevention and promotion programs and, in the event of a fracture, a strict follow-up to ensure the treatment in the context of prevention of re-fracture.

This study provides the scientific community with more statistical information about patients with fragility fractures in the Colombian population. One limitation of our work is that it was carried out in a single hospital in Bogotá, which

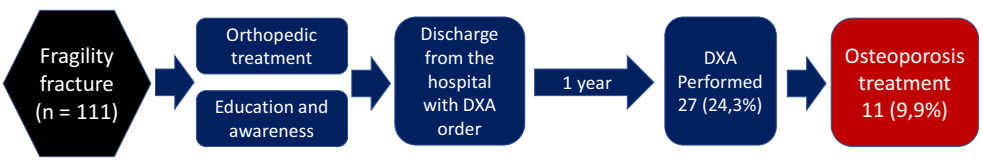

Fig. 1 Summary algorithm of the study. DXA, dual X-ray absorptiometry

may not represent the Colombian population. However, fracture patients from Bogotá and other cities near the center of the country are referred to our hospital. Thanks to this study, our hospital is currently in the process of entering as an invoice capture center to the FLS (Fracture Liaison Service) program, promoted by the International Osteoporosis Foundation (IOF).

Conclusions

The present study demonstrates the little knowledge about osteoporosis that a group of fragility fracture patients have, the lack of performing bone DXA scan despite the clear indications of the management guides, and, more seriously, it is evident that only 10% of patients have access to treatment upon discharge. A public health policy is required to improve timely osteoporosis diagnosis, ideally before the first fracture, as well as the access to treatment for severe osteoporosis patients, in order to decrease the likelihood of re-fracture with secondary prevention measures.

Compliance with ethical standards The work was approved by the Clinical and Ethical Research Committee of the Pontificia Universidad Javeriana in Bogotá, Colombia.

Conflicts of interest None.

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