Undiagnosed Vertebral Fractures Prevalence Among Hospitalized Patients at San Juan de Dios Hospital in Costa Rica

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Background

Osteoporosis is the most frequent skeletal disorder. Its prevalence reaches 20% in people older than 50 years old in the United States. [1] Fractures at the vertebral site are the most common complication and it increases both morbidity and mortality. It is estimated that 40% of American Caucasian women and 13% of men will suffer an osteoporotic fracture in their lives.[2]

In the United States, the vertebral fracture prevalence is 20% in people older than 55 years old as established by the Fracture Intervention Trial[3], and it increases with age, reaching 32% in women 75 years or older. Only 34% of those women with vertebral fractures knew they had it. In a population based study made on Europe with 15011 males and females of more than 50 years, showed that vertebral fractures prevalence is higher in women than men (10.7 vs 5.7 cases per 1000 persons per year) and it increases to 13.6 and 29.3 cases per 1000 persons per year in the 75-79 age groups.[4]

There has been some controversy regarding how to diagnose a vertebral fracture. In the qualitative way, a radiologist evaluates the X-ray film and decides if there is a fracture based on vertebral deformities. Using the quantitative or semi quantitative method, vertebral deformities are defined using vertebral diameters and comparing it with the population media. In Costa Rica we have no data on population media to compare with. The EPOS Study compared these methods to evaluate the prevalence of vertebral deformities in the population and they found correlation was 0.8 so either one can be used[4]. Black et al compared both methods (morphometric and qualitative) to evaluate vertebral fractures and found no difference between these methods in 503 patients enrolled in the Study of Osteoporotic Fractures. [5]

Until now, we have no data on the osteoporosis prevalence neither in Costa Rican population nor on any of its related complications including fractures. This study will determine the vertebral fracture prevalence in a hospitalized population.

Materials & Methods

This is an observational transversal study that took place from March 1st 2002 until April 30th 2002. We enrolled all patients older than 60 years old that were at the Internal Medicine, Gastroenterology, Endocrinology and Dermatology wards (72 hospital beds, 36 in men and 36 in women) during these two months. The patients were included in the study after obtaining an informed consent. We excluded those patients that were bedridden, if their condition wouldn't let them be taken to the Radiology Department or if they died in the first 24 hours of inpatient before the X-rays could be taken. After the patient agreed to participate in the study, we obtained some clinical data by direct patient interview or using the patient's charts. After the data was obtained, the patient was taken to the Radiology Department where a plain anterior-posterior lumbar X-ray focused on L2 and a lateral lumbar X-ray was obtained. At the end of the study, all X-rays films were read by a radiologist who was blind to the patient's clinical data. The radiologist would define the presence of vertebral fractures using morphologic criteria and would record the amount and sites of vertebral fractures. All data were analyzed using SPSS 8.0 (SPSS Inc.).

Results

108 patients fulfilled the inclusion criteria for the study. Of these patients, only 96 patients gave the informed consent to participate in the study. After analyzing the x-ray films, vertebral fractures were detected in 19 patients (19.8%). The most common site of fracture is L2 followed by L4.

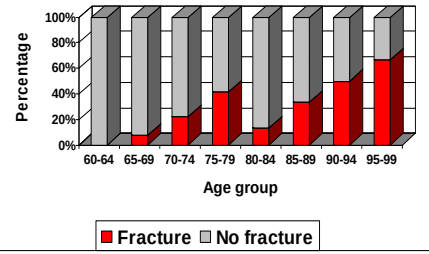
Of those patients with vertebral fractures, 31.57% had multiple vertebral fractures (21.07% had 2 fractures, 5.26% 3 fractures and 5.26% 4 fractures). 3 of these patients had fracture on T12 and 4 patients had fracture on L4. When we compared the characteristics of those patients having one fracture with those having multiple fractures, none of the characteristics differed significantly.

Table 1. Characteristic comparison between patients with and without vertebral fractures

Characteristic	Fracture (%) N = 19	No fracture (%) N=77	P
Age ± SD	79.37 ± 9.51	72.62 ± 8.18	.459
Sex male/female	8/11	50/27	.068
HTN (%)	8 (42.1)	33 (42.9)	.953
DM (%)	6 (31.6)	33 (43.9)	.370
COPD/asthma (%)	2 (10.5)	23 (29.9)	.085
Osteoporosis (%)	1 (5.3)	3 (3.9)	.789
CHD (%)	6 (31.6)	19 (24.7)	.539
Hyperthyroidism (%)	0	1 (1.3)	.618
Chronic steroid use (%)	0	6 (7.8)	.209
Stroke (%)	7 (36.8)	7 (9.1)	.002
CRF (%)	1 (5.3)	3 (3.9)	.789
Cirrhosis (%)	0	6 (7.8)	.209
Cancer (%)	1 (5.3)	3 (3.9)	.789
History of any fracture (%)	4 (21.1)	13 (16.9)	.670
History of trauma (%)	4 (21.1)	12 (15.6)	.567
Back pain (%)	0	3 (3.1)	.382
Smoking (%)	8 (42.1)	42 (54.5)	.331
Alcohol use (%)	5 (26.3)	25 (32.5)	.757
Active physical activity (%)	0	4 (5.2)	.522

HTN = hypertension, DM = diabetes mellitus,
COPD = chronic obstructive pulmonary disease,
CHD = coronary heart disease, CRF = chronic renal failure

Graph 1. Percentage of patients with vertebral fracture evaluated by age group



Discussion

An interesting data is the very low prevalence of osteoporosis (assessed by medical history), when compared with the published data.[1,2] This is probably related to underdiagnosis of osteoporosis in our population and not because there is a lower prevalence of osteoporosis because the vertebral fracture incidence is very similar to those reported around the world.

This study shows a vertebral fracture prevalence of 19.8%. This data is similar to those reported around the world.[3] It is reported also that as age increases, the prevalence increases reaching around 32% in those older than 75 years old. We obtained similar data. However, our study is made in hospitalized patients and the other studies are made among ambulatory populations.[3,4] Since our study is made in hospitalized patients, our sample of patients could be sicker, have less physical activity, and have more probability that their nutritional status is inadequate. Also, these patients take more medication so their risk of falls is greater.

The only characteristic that differed between those patients with and without vertebral fractures is stroke. This finding has not been reported previously. We think that stroke is not necessarily a risk factor but a marker of sicker patients. Because of stroke, these patients could have had falls or trauma. Also, these patients have less physical activity, less solar exposition, less calcium intake and usually take more anticonvulsivants (that could lead to secondary osteoporosis). All these factors could make these patients more prone to have osteoporosis and vertebral fractures.

Summary

The prevalence of vertebral fractures in patients older than 60 years old admitted at the San Juan de Dios Hospital is 20%. This prevalence increases with age. Also, patients with vertebral fracture are at higher risk for multiple vertebral fractures. The only risk factor for vertebral fractures in our study is the presence of stroke.

References

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