



OSTEOPOROSIS AND "FRAGILITY FRACTURES" IN 110 CENTENARIANS LIVING AT THE NURSING HOME OF MILAN

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Introduction and Aim:

The world's demographics are changing. In the Occident, the fastest growing segment of the population is over 65 years old. While age is not the only determinant of osteoporosis or general bone health, longevity correlates in a highly reliable manner with diminishing bone mineral density. Osteoporosis often begins as a silent condition that, over time, is responsible for a variety of low-energy fragility fractures. General health of patients of advancing age and diminishing bone mass, and their rehabilitation potential, add to the complexity of their care and impact the quality of their treatment outcomes⁽¹⁾.

The aim of this study is to evaluate the frequency, type and age of onset of fragility fractures in 110 centenarians (≥ 98 years) admitted at Pio Albergo Trivulzio (PAT), the main geriatric institute in Milan.

Methods:

At PAT a retrospective study (1995-2012) was performed to evaluate among super selected population, i.e. centenarians (over 98 y), socio-demographic and clinico-pathological characteristics, in particular the incidence of osteoporosis and fragility fractures

Detailed informations was collected for every patient:

- 1) socio-demographic characteristics : birthday and birthplace, residence, marital status, year of death;
- 2) physiological history variables: education, profession, Body Mass Index (BMI), smoking history and alcohol consumption;
- 3) medical history variables :cardio-vascular, respiratory, cerebral, genito-urinary, muscle-skeletal, gastro-intestinal, tumoral diseases;
- 4) cognitive and functional state by Mini Mental State Examination (MMSE) and Barthel Index (IB).

Results:

Socio-demographic and pathological characteristics of 110 centenarians are reported (Table 1 and 2).

In particular, 92 patients had fractures, while 18 of them have never had any fragility fractures (Table 3). 31 had a single fracture (26 hip, 2 humerus, 1 pelvis, 1 knee, 1 vertebrae), while 61 multiple. 34 had a vertebral fracture, as reported in table 4.

N	Sex	Mean age±SD, range	Status	BMI	Education	Job	Marital status	Tobacco use and alcohol
110	105 F 5 M	100.52 y ±2.09 (98-109 y)	98 dead 10 alive 1 dismissed	13 moderately overweight 73 normal range 24 moderately underweight	2 University 36 Middle school 68 Elementary school 13 selfdiscisunderweight 4 illeterates	40 housewife 15 dressmaker 29 working-class 13 employee 13 Other	79 Married 31 Unmarried	1 smoker, 3 ex smoker 106 not smokers 56 moderately drinkers

Table 1: Socio-demographic and physiological characteristics of 110 centenarians

Pathology	N (%)
Osteoporosis	110 (100%)
Fractures	92 (84%)
Hypertension	71 (64%)
Pacemaker inserted	11 (10%)
Myocardial infarction	8 (7%)
Chronic cerebral vasculopathy	41 (37%)
Stroke	8 (7%)
COPD chronic obstruct pulmon dis	35 (32%)
Adult onset diabetes mellitus	11 (10%)
Hypothyroidism	13 (12%)
Alzheimer's disease	2 (2%)
Parkinson's disease	0
Cataract	70 (63%)
Malignant tumor	20 (18%)
Benign tumor	3 (3%)

Table 2: Clinico-pathological characteristics of 110 centenarians

Patients with at least one fracture	Single fractures	Multiple fractures	Without fractures
92 (84%)	31 (28%)	61 (55%)	18 (16%)

Table 3: Fractures in our patients

Vertebral fractures	Multiple fractures	D8 fracture	D12 fracture
34 (31%)	32 (94%)	1 (3%)	1 (3%)

Table 4: Type of vertebral fractures in 110 centenarians

The most frequent fracture sites were the following: hip in 57 cases (52%), both hips in 7 cases (6%), vertebra in 34 cases (31%), pelvis in 10 cases (9%), humerus in 13 cases (12%), tibia 6 (5%), humerus and hip in 5 cases (4%), ribs 5, knees 4 (4%), wrists 3 (4%), foot 3, elbow, fingers, hand, 2 (2%) each, other (shoulder, malleolus) 1(1%) each (Figure 1).

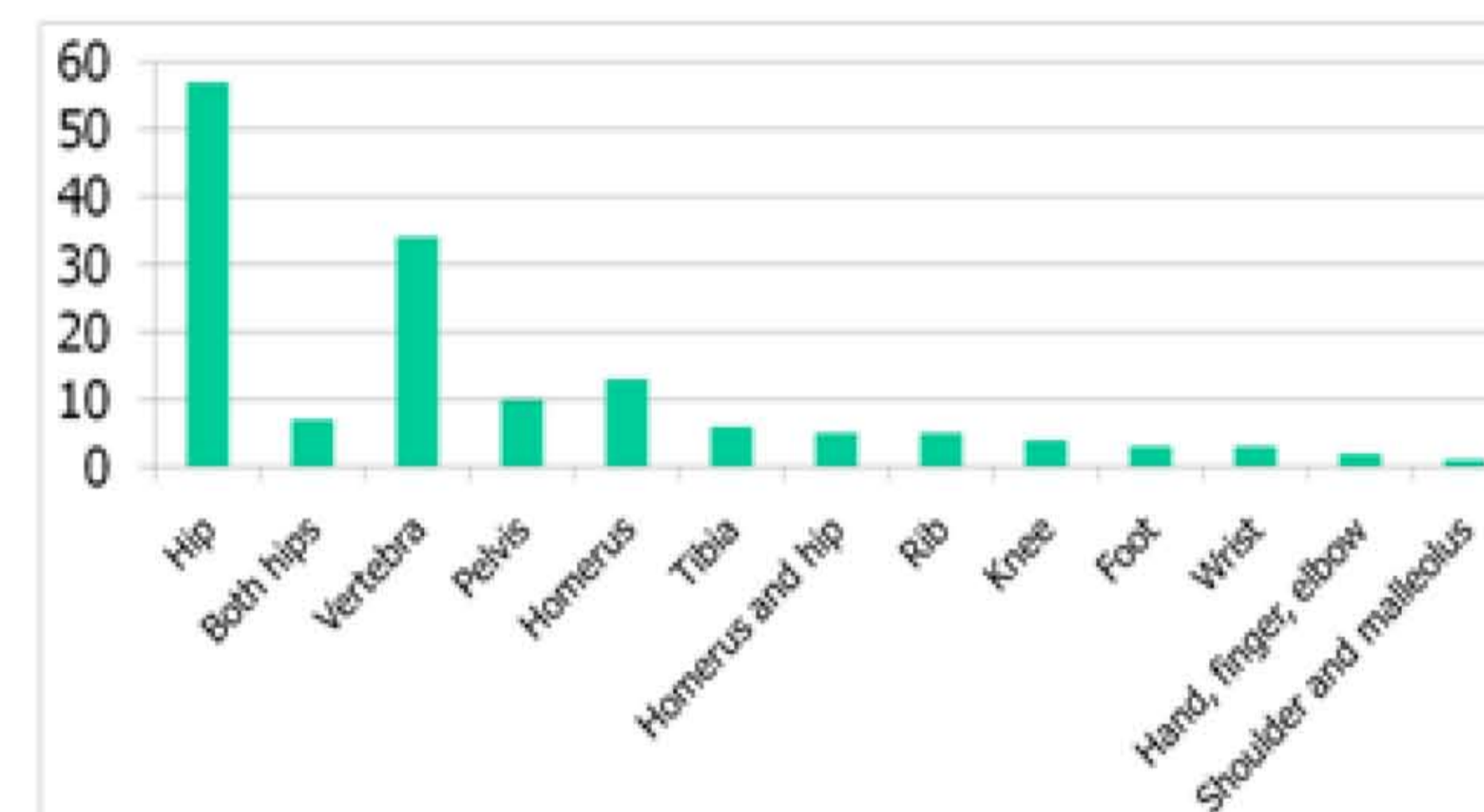


Figure 1: Type of fractures in our patients

Within the group of patients who had severe osteoporosis with multiple fragility fractures, it is to mention the case of a female patient, with a pelvic fracture at 91 years, a right shoulder fracture at 92, a fracture of the left hip at 93 and one of the left elbow at 99 years. Another female patient had a left hip at 89 yrs, a left humerus fracture at 90 and a fracture of the right hip at 91, followed by a vertebral fracture of D12 (Table 5).

Patient	Birthday	Type of fracture	Age
1)	1908	- Pelvis	91 y
		- Shoulder	92 y
		- Left hip	93 y
		- Left elbow	99 y
2)	1909	- Left hip	89 y
		- Left humerus	90 y
		- Right hip and D12	91 y

Table 5: Two patients with multiple fractures

Conclusions:

Our data show high prevalence of osteoporosis associated with fragility fractures (84%) and of severe osteoporosis associated with multiple fragility fractures (56%). Age is a risk factor of great importance for osteoporosis fractures and it is independent from mineral bone density. Our results show the importance of primary and secondary prevention, independently from age. In the ageing population contest, prevention and treatment of osteoporosis is a major public health concern.

(1) Lowe JA, Friedlaender GE. Orthop Clin North Am. 2013;44(2)

Authors disclose any commercial or financial interest and/or any other relationships with pharmaceutical manufacturers related to the Contribution.