EVALUATION OF SECONDARY OSTEOPOROSIS WITH BONE MINERAL DENSITOMETRY AND BONE TURNOVER MARKERS

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Abstract

Osteoporosis is as a very complex multi-factorial pathogenesis; thereby any doctor facing a case of osteoporosis must be very careful. Diagnostic procedures are complex and include careful monitoring of the history of patient, physical examination and some laboratory analysis. In this study, 201 patients aged between 50 and 95 years were selected from 4872 patients consulting orthopedic clinics. This group (201 patients: 168 women, 33 men) showed evidence of osteoporosis: BMD_DXA with reduced bone

mineral density,T-score: greater than -2.5 SD, or X-ray signs of non traumatic fractures. Patients also underwent biochemical and instrumental investigations for an assessment of bone metabolism. Age, gender, medical history as well as tests of rheumatic metabolism, calcium-phosphorus and some indices of bone turnover were determined for each patient. Interestingly, our data showed that 104 patients had a vertebral fracture without trauma, 22 hypothyroid patients were undergoing treatment with levothyroxine, 3 patients were suffering from autoimmune thyroiditis, 3 patients were suffering from secondary hyperparathyroidism with vitamin D deficiency, 2 patients were suffering from adenoma with primary hyperparathyroidism, 20 were diabetic patients, 7 patients had monoclonal gammopathy, 7 women had hystero- ovario salpingectomy, 7 patients were HCV positive, 4 patients with rheumatoid arthritis had been treated with corticosteroids, 2 patients were suffering from multiple myeloma, and 1 patient had Crohn's disease. There was also 1 suspected case of ulcerative colitis, 5 patients were suffering from celiac disease and other cases described in the paper.

As a result of this diverse association, the approach to treating osteoporotic patients should be then accurate and multidisciplinary. It is then important to perform laboratory tests and investigations for correct diagnosis and adequate treatment.

Keywords: Bone mineral density (BMD), Celiac disease (CD), Standard deviation (SD), Dual-energy X-ray Absorptiometry (DXA), Hepatitis C virus (HCV), and Erythrocyte sedimentation rate (ESR), C- reactive protein (CRP), Tuberculosis (TB).

Introduction

Diagnostic procedures of osteoporosis are complex; they include accurate documentation of the history of the patient, and carrying out physical examinations and laboratory analysis. This approach is the only way to differentiate between primary and secondary osteoporosis (reaching 35% of the cases in women and 20 -50% in men). Moreover, it allows a proper diagnosis for a subsequently correct treatment. The clinical relevance of secondary osteoporosis can be understood as an event in the course of a disease or an epiphenomenon already manifested clinically as primary manifestation of systemic diseases.

The classification of secondary osteoporosis cannot be done without taking into consideration the different nosographic groups. This helps to emphasize the multidisciplinary approach of this event in particular caused by endocrine, iatrogenic consequences, rheumatologic, dysmetabolic, gastroenterological, celiac disease, proliferative hematological cancer, or

proliferative diseases in addition to pharmacological treatment. Several varied conditions can potentially support secondary osteoporosis like, hormonal imbalances (hyperadrenalism, hyperparathyroidism, hyperthyroidism, hypogonadism, hyperprolactinemia, diabetes), intake of certain categories of drugs (corticosteroids, ethanol, phenytoin, tobacco, barbiturates, heparin), in addition to circumstances that favor the development of the disease, such as prolonged immobilization, chronic kidney failure, liver disease, malabsorption syndromes, pulmonary chronic obstructive pulmonary disease, rheumatoid arthritis, sarcoidosis, malignant tumors, or prolonged absences of gravity.

Secondary osteoporosis is clinically common to many diseases and can be the first manifestation of several diseases. It may then become a good diagnostic key in all patients suffering from osteoporosis at a young age, or a bone disease not related to menopausal status and / or age. Therefore, an imperative clinical screening associated with laboratory tests is necessary to determine the cause of the disease or the associated conditions and give the necessary treatment.

Aim of the research:

Based on the considerations outlined above, the purpose of this study is to demonstrate the high incidence of secondary osteoporosis; the importance of a correct diagnosis and a proper multidisciplinary approach in patients with radiographic signs of vertebral collapse and / or bone fractures (femur, humerus, radius, vertebrae) without trauma and /or signs of osteoporosis BMD, is not limited only to healing, but to better specify whether we are facing a state of primitive and / or secondary osteoporosis and consequently for an adequate treatment. Even patients, unrelated to osteoporosis, who are seen occasionally with a request for orthopedic specialist advice (prescription for an adjuvant, example: the brace) deserve to be better studied.

Patients and methods:

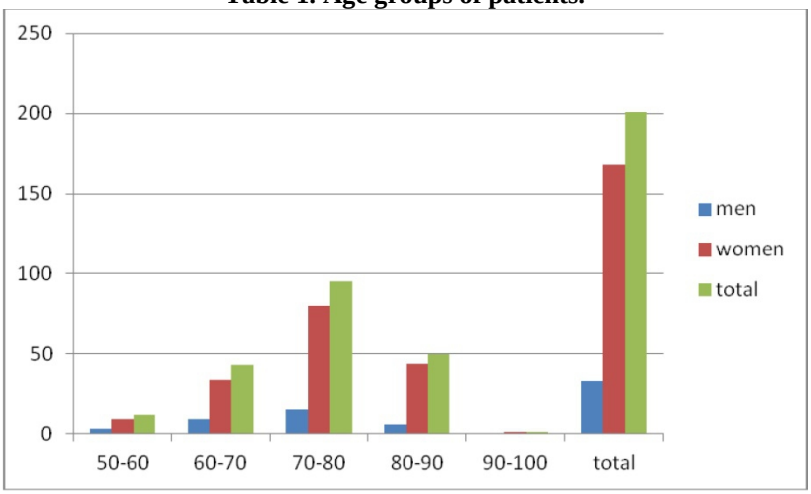
201 patients were selected from a total of 4872 within five years (from December 2002 to February 2008) in the clinic of Orthopedic Surgery in Borgo San Lorenzo at the Center of Polyvalent Social Health, Florence, Italy. These 4872 patients referred to our Center are aged between 3 and 95 years. Among them only 201 patients aged between 50 and 95 years (168 women, 33 men) had evidence of osteoporosis: BMD_DXA with reduction of bone mineral density, with T-score: greater than -2.5 SD or X-ray signs of non traumatic fractures.

These patients underwent biochemical and instrumental investigations for an assessment of bone metabolism. On their first visit, age,

gender, and medical history were determined for each patient. Moreover, laboratory tests of rheumatic metabolism and calcium-phosphorus (complete blood count, ESR, CRP, uric acid, creatinine, blood urea nitrogen, serum calcium, phosphorus, magnesium, serum protein electrophoresis, serum electrolytes) and some indices of bone turnover (total alkaline phosphatase and bone, urinary calcium (24hr), phosphaturia, 25- (OH) - and 1,25- (OH) 2-vit.D3, parathyroid hormone) were done.

Patients were divided in five groups according to the age: 50 to 60 years, 60 to 70, 70 to 80, 80 to 90 and 90 to 100. From 50 to 60 years we had 12 patients: 9 women and 3 men, from 60 to 70 years 43 patients: 34 women and 9 men, from 70 to 80 years 95 patients: 80 women and 15 men, from 80 to 90 years 50 patients: 44 women and 6 men and from 90 to 100 one woman only between. The report showed that the group with higher incidence is represented by 95 patients aged between 70 and 80 years, followed by the group aged between 80 and 90 years, adding up to a total of 50 patients. The last age group includes patients aged between 60 and 70 years for a total of 43 patients.

Table 1. Age groups of patients.

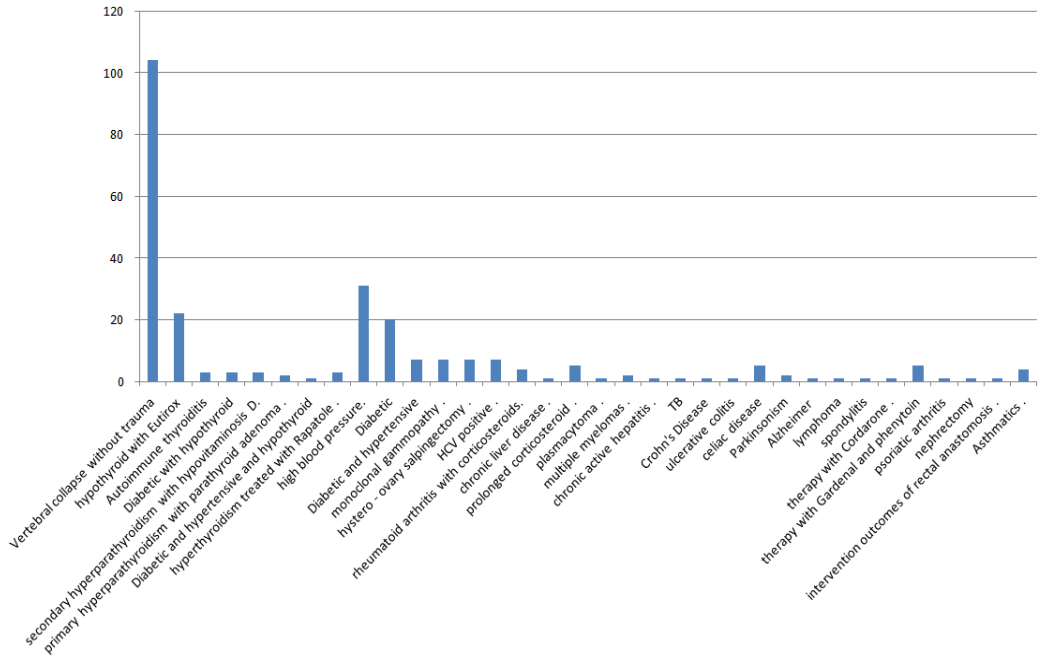


Statistical analysis:

201 patients aged between 50 and 95 years, including 168 women and 33 men, had BMD / DXA with reduction in bone mineral density, with T-score greater than -2.5 or osteoporosis with signs of fractures without previous trauma on X RAY. Data from this study shows: 104 patients having vertebral collapse without a trauma, 22 hypothyroid patients on Eutirox, 3 suffering from autoimmune based thyroiditis, 3 diabetics with hypothyroidism, 3 suffering from hyperparathyroidism secondary to Vitamin D deficiency, 2 having primary hyperparathyroidism with parathyroid adenoma, 1 diabetic having hypertension and hypothyroidism, 3 cases of

hyperthyroidism treated with methimazole. 31 patients suffering from arterial hypertension, 20 diabetics, 7 diabetic and hypertensive patients and 7 cases of monoclonal gammopathy, 7 women who have had hystero ovario salpyngectomy, 7-HCV positive, 4 rheumatoid arthritis therapy with corticosteroids, 1 suffering from chronic liver disease, 5 patients continuously receiving glucocortisteroids, 1 patient suffering from plasmacytoma, 2 multiple Myeloma patients, 1 Suffering from active chronic hepatitis, 1 patient having TB, 1 patient suffering from Crohn's Disease, 1 case of ulcerative colitis, 5 cases of celiac disease, 2 suffering from Parkinson disease, 1 suffering from Alzheimer Disease, 1 lymphoma, 1 ankylosing spondylitis, 1 on amiodarone therapy, 5 on Phenobarbital and phenytoin therapy, 1 case of psoriatic arthritis, 1 who had nephrectomy, 1 suffering from intervention outcomes of recto-sigmoid anastomosis and 4 asthmatics.

Table 2.Diseases and conditions associated with secondary osteoporosis.



Special cases:

In our study series, patients without instrumental BMD evidence of osteoporosis or non traumatic fractures visible on X Ray have been excluded. From the 4872 patients seen in our orthopedic Center, 201 patients had fractures of the femur, post-traumatic vertebral collapse or signs of osteoporosis with BMD DXA T score: greater than -2.5. For correct diagnosis of osteoporosis, accurate documentation of history and physical examination should be done to evaluate the risk factors and exclude secondary forms of the disease. A proper metabolic evaluation should be

performed to exclude other skeletal metabolic diseases and secondary forms of the disease that occur with the reduction of bone mineral densitometry. In addition to the instrumental evaluation and radiography to reveal any asymptomatic vertebral fractures.

Conclusion:

The approach to osteoporotic patients should be accurate and multidisciplinary. Many patients studied in our research had vertebral fractures, parathyroid and thyroid disease, but had not been considered as cases of osteoporosis. It is so important to perform laboratory tests for correct diagnosis and adequate treatment. Given the frequency with which this complication occurs in the cases mentioned above, it is essential to establish a "surveillance" follow up from the outset designed to detect signs of osteoporosis as early as possible so it is important for patients at risk to carry out blood tests and Radiographs at regular intervals in order to closely monitor on one hand the bone metabolism, and on the other its conformation. Again, it is therefore essential for the doctor to be aware of the possibility of the onset of secondary osteoporosis in certain circumstances, and immediately put in place a suitable monitoring protocol. It is very important to have a correct diagnosis and a proper multidisciplinary approach for a patient with radiographic signs of vertebral collapse and / or fragility fractures. The clinical relevance of secondary osteoporosis can be understood both as an event in the course of a disease already manifested or an epiphenomenon clinical initiation of systemic diseases for which osteoporosis may be a key for initial diagnosis.

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