Research article

Osteoporosis in rheumatic diseases

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Abstract

Background: Inflammatory joint disease such as rheumatoid arthritis, as well as other rheumatic conditions, such as Systemic Lupus Erythematosus (SLE) and ankylosing spondylitis comprise a heterogeneous group of joint disorders that are all associated with extra-articular manifestations, including bone loss and fractures.

Objectives: Evaluation of osteoporosis burden on patients with rheumatic diseases by determining the frequency of osteoporosis among those patients and to study the risk factors of osteoporosis in patients with rheumatic diseases.

Methods: The inclusion criteria for the study were all patients who were diagnosed to have rheumatic diseases that attended to Rheumatology Clinic of Tripoli Medical center, Tripoli, Libya, for follow up in the period from May 2013 to December 2013. Dual Energy X-ray Absorptiometry (DEXA) scan for the lumber spine and the hips was done for all patients. Demographic details such as age, sex and menopausal status were recorded. Clinical characteristics such as drugs used for every patient, steroid maintenance dose and duration of taking steroid were noted. Other clinical data as history of previous fractures and family history of osteoporosis were also determined.

Results: The study included 100 patients who had rheumatic diseases and followed in rheumatology out patients' clinic. Osteoporosis was detected in 37/100 (37%) of patients. Osteopenia occurred in 51/100 (51%) of patients. Normal DEXA scan presented in 12/100 (12%) of the patients. Thirty seven patients who had osteoporosis, 5/37 (13.5%) were male and 32/37 (86.4%) were female. Thirty two female patients, 4/32 (12.5%) were in premenopausal age and 28/32 (87.5%) were in postmenopausal age. Most patients who had osteoporosis, 32/37 (86%) were taking steroid in form of prednisolone tablets. Previous fractures occurred in 4/37 (10.8%) of osteoporotic patients. Family history of osteoporosis was found in 4/37 (10.8%).

Conclusion: Presence of osteoporosis in 37% and osteopenia in 51% of our patients indicate a large burden of osteoporosis on patients with rheumatic diseases. Multiple risk factors of osteoporosis present in our patients, family history of osteoporosis in the first degree relatives in 10.8%, previous history of factures in 10.8% and long term use of corticosteroid treatment in 86%.

Keywords: Osteoporosis, Rheumatic diseases

Introduction

Inflammatory joint disease such as rheumatoid arthritis, as well as other rheumatic conditions, such as Systemic Lupus Erythematosus (SLE) and ankylosing spondylitis comprise a heterogeneous group of joint disorders that are all associated with extra-articular manifestations, including bone loss and fractures[1].

The concept of osteoimmunology is based on growing insight into the links between the immune system and the bone[1]. The pathogenesis of osteoporosis in rheumatic diseases is multifactorial[1].

Several cross-sectional studies reported that disability and reduced motility that are due to functional impairment are among the most important detrimental effect of uncontrolled disease activity on bone density. In this perspective, the suppression of inflammation probably remains the main concern when considering the treatment options[2].

A better appreciation of the impact of osteoporosis in rheumatic disease by rheumatologists represent a clinical challenge, however, a greater understanding of this frequent complication will improve the quality of health care and the lives of patients who have rheumatic diseases.

Materials and Methods

The inclusion criteria for the study were all patients who were diagnosed to have rheumatic diseases that attended to Rheumatology Clinic of Tripoli Medical Center, Tripoli, Libya, for follow up in the

period from May 2013 to December 2013 and consented to participate in the study. The study was done after receiving consent from Tripoli Medical Center ethical and research committee.

Dual Energy X-ray Absorptiometry (DEXA) scan for the lumber spine and the hips was done for all patients. Osteopenia, defined as a T-score in the lumber spine and /or hips between -1 and -2.5. Osteoporosis was defined as a T-score less than -2.5. Demographic details such as age, sex and menopausal status were recorded. Clinical characteristics such as drugs used for every patient, steroid maintenance dose and duration of taking steroids were noted. Other clinical data such as history of previous fractures and family history of osteoporosis were also determined.

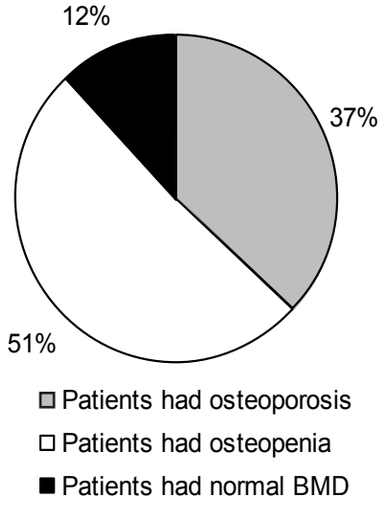
Data analysis: Data was analyzed using SPSS computer soft ware package. Continuous variables were categorized in ranges and summarized into mean, median and standard deviations.

Objectives: Evaluation of osteoporosis burden on patients with rheumatic diseases by determining the frequency of osteoporosis among those patients and to study the risk factors of osteoporosis in patients with rheumatic diseases.

Results

The study included 100 patients who had rheumatic diseases and followed in rheumatology out patients' clinic. Osteoporosis detected in 37/100 (37%) of patients. Their mean age was 54.97 ± SD 11.75) years and the median was 55 years (range 36 - 76 years). Osteopenia occurred in 51/100 (51%) of patients. Normal DEXA scan was presented in 12/100 (12%) of patients (Figure 1).

Figure 1: Distribution of the results of DEXA scan in 100 rheumatic diseased patients



Thirty seven patients who had osteoporosis, 5/37 (13.5%) were male (all were smokers and not alcoholics) and 32/37 (86.4%) were female (all were neither smokers nor alcoholics). Thirty two female patients, 4/32 (12.5%) were in premenopausal age and 28/32 (87.5%) were in postmenopausal age (Table 1).

Table 1: Demographic characteristics of 37 osteoporotic patients

Age (years)	
Mean (SD)	54.97 (± SD 11.75)
Median (Range)	55 (36 - 76)
Sex (No.,%)	
Female	32 (86.4%)
Male	5 (13.5%)
Menopause status (No.,%)	
Premenopause	4 (12.5%)
postmenopause	28 (87.5%)

In 37 osteoporotic patients, 9/37 (24%) had systemic lupus erythematosus (mean age was 42 years, 72% were female and 29% were male), 24/37 (64%) had rheumatoid arthritis (mean age was 59 years, 96% were female and 4% were male) and 2/37 (5%) had Behcet's disease (mean age was 50 years and 100% were male). Other diseases were systemic sclerosis, polymyositis, primary Sjogren's syndrome, overlap syndrome, gouty arthritis and psoriatic arthritis, osteoporosis occurred in 1/37 (2.7%) in each disease.

Drug history of those patients was as follows: prednisolone was taken by 81% of patients, 59% of patients were taking methotrexate, 19% were taking hydroxychloroquine, 13.5% were on leflunomide, 5% were on salazopyrine, 2.7% were on azathioprine and 2.7% were on cyclophosphamide. Regarding anti-osteoporotic therapy, 46% were on bisphosphonates and 2.7% were on denosumab. Forty six percent of patients were taking vitamin D and 43% were taking calcium tablets. All 37 osteoporotic patients had Bone Mineral Density (BMD) ≤ 2.5 in the lumber spine and 7/37 (19%) had BMD of ≤ 2.5 in both the lumber spine and the hips. Previous fractures occurred in 4/37 (10.8%) of osteoporotic patients, 2 patients had radius fracture and 2 patients had leg fracture. Family history of osteoporosis was found in 4/37 (10.8%).

Discussion

In our study, half of our patients with rheumatic disease had osteopenia, more than one third had osteoporosis and only 12% had normal bone densitometry, this reflects the great burden of osteoporosis on our patients. In a subgroup analysis of patients with rheumatoid arthritis, bone loss in both the spine and the hips was much larger in those patients with high C-Reactive Protein (CRP) levels (>20mg/dl) (eg, in the spine,-2.1% vs 0.2% respectively). The same was found in the lumber spine for patients with low functional capacity (Health Assessment Questionnaire [HAQ] score >1) compared with patients with a better HAQ score <1) (-1.9% vs -0.2%, respectively).

Unmodifiable risk factors for osteoporosis include a personal history of a fracture after the age of 40 years, first degree relative with a history of facture, white or Asian race, weight less than 127 pound, height more than 5 feet and 7 inches and advanced age. Modifiable risk

factors included inadequate intake of dietary calcium and vitamin D, low testosterone levels in men, pre-menopausal estrogen deficiency, cigarette smoking, excess alcohol intake, impaired vision, neurologic disorders, lack of sunlight and physical inactivity.

Secondary causes of osteoporosis include gonadal deficiencies, medical conditions altering bone turn over (rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis) and medications interfering with bone metabolism (corticosteroids, methotrexate, cyclophosphamide)[4]. In our osteoporotic patients, 10.8% had previous history of factures, 10.8% had history of osteoporosis in their first degree relatives and 86% were on corticosteroid treatment.

General lifestyle measures are important for all patients with rheumatic diseases: an adequate calcium intake, prevention of falls, adequate vitamin D levels and prevention of immobilization, if possible. Special attention must be paid to sufficient serum 25(OH)D levels in SLE patients because of photosensitivity. In addition, the prescription of adequate immunosuppressive medication to reduce inflammation-induced bone loss is important, which has been documented in RA. Unfortunately, intervention studies demonstrating the effectiveness of one of the available anti-osteoporotic drugs (eg. bisphosphonates) for fracture reduction in patients with RA, SLE, or AS have not been performed yet[5].

Bisphosphonates are recommended for the prevention and treatment of osteoporosis in corticosteroid treated patients. Another point is the use of bisphosphonates during long-term use of corticosteroids. Although bisphosphonates are effective in the initial phase of treatment, their use in long-term can be criticized[6]. Fundamental studies have elucidated that the upregulated RANKL, with subsequent activated osteoclastogenesis, is an important determinant of bone loss in RA. Denosumab, a monoclonal antibody against RANKL, is an attractive new therapeutic agent for osteoporotic patients with RA. Not only has an increase in BMD of the spine and the hips been demonstrated in RA patients, but also a strong reduction in joint erosions[1]. Clinical studies have demonstrated that adequate immunosuppressive therapy (eg. According to the treat to target principle) prevent both local and generalized bone loss.

Conclusion

(i) Presence of osteoporosis in 37% and osteopenia in 51% of our patients indicate a large burden of osteoporosis on patients with rheumatic diseases.
(ii) Multiple risk factors of osteoporosis present in our patients, family history of osteoporosis in the first degree relatives in 10.8%, previous history of factures in 10.8% and long term use of corticosteroid treatment in 86%.
(iii) Control of disease activity and use of preventive measures of osteoporosis are important factors to decrease osteoporosis risk in rheumatic patients.

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