Osteoporosis in Psoriasis and Psoriatic Arthritis Patients

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Abstract

Background: There is evidence of occurrence of osteoporosis in patients with psoriasis and psoriatic arthritis. This study aimed to assess the occurrence of osteoporosis in patients with psoriasis and psoriatic arthritis.

Patients and methods: A cross-sectional study involved 154 (88 males and 66 females) patients with psoriasis; of them 42 (23males and 19 females) fulfilled the classification criteria of psoriatic arthritis, from Oct. 2018 –Jan.2020. Extensive data collection involving full investigations, disease activity, PASI and DAS28 were measured for both psoriasis group and psoriatic arthritis group, respectively. Dual energy X ray absorptiometry (DXA) was performed for both groups.

Results: From the total sample of 154 patients, 112 patients with psoriasis 65 (58.9%) were males and 47 (41.1%) were females, 42 patients with psoriatic arthritis 23 (54.7%) were males and 19 (45.3%) were females. Whereas 33 patients of the psoriasis group have osteoporosis in a percentage of 29.5%, that is associated with high psoriasis area and severity index (PASI), in particular in males; there were only two patients who have osteoporosis in the psoriatic arthritis group in a percentage of 4.7%, which also was associated with high disease activity. Patients with psoriatic arthritis have less frequency than those patients with Psoriasis of developing osteoporosis particularly those on biologic treatment.

Conclusion: Osteoporosis frequently occurs in patients with psoriasis than Psoriatic arthritis patient, in particular male patients. It is less frequently occurring in patients with psoriatic arthritis, in particular those on anti TNF treatment.

Key words: psoriasis, psoriatic arthritis, osteoporosis.

Introduction

Psoriasis is defined as an inflammatory skin disorder which presents with an erythematous scaly rash on the extensor surfaces and trunk. It also affects the scalp, palms, and soles and may affect the nails resulting in either pits or onycholysis. Inflammatory arthritis may develop in 30% of patients with psoriasis and present with pain and stiffness in the affected joints (1). Psoriatic arthritis (PsA) is an inflammatory arthritis that is usually preceded by psoriasis. Psoriasis and PsA affect women and men in a ratio of 1:1(2). PsA has heterogeneous presentations and may involve both the axial skeleton (spondylitis and/or sacroiliitis) and the peripheral joints. It also affects skin, nails and entheses.

In contrast to rheumatoid arthritis, PsA is associated with the activation of osteoclasts as well as osteoblasts, and as a consequence, there are features of both bone destruction and new bone formation(3). Whereas rheumatoid arthritis is a disease of osteoclast activation, resulting in increased risk of generalized bone loss and the development of osteoporosis (4–7). Studies reported an association between psoriasis and PsA and the appearance of osteoporosis (8,9). Whereas others found no difference in bone mineral density (BMD) between patients with PsA and the background population (10–14). With the introduction of the new biological therapies in the treatment of psoriasis and psoriatic arthritis there was an obvious improvement in controlling the inflammatory process hence disease activity [15]. Therefore, there is a need for updating the information regarding osteoporosis in PsA.

Osteoporosis is defined as the generalised reduction in bone mass that results in disruption of the microarchitecture of bone, and decreased bone strength leading to an increased risk of bone fractures. The World Health Organization defines osteoporosis as a bone mineral density (BMD) below 2.5 standard deviations of the mean for young healthy adults of the same sex, whereas T scores between -2.5 and -1 standard deviations are defined as osteopenia (16).

Patients and methods

A cross-sectional study was carried out at the Dermatology Outpatient Unit, Department of Rheumatology and Rheumatology Outpatient Unit in Basra Teaching Hospital from Oct. 2018 – Jan.2020. A sample of 154 (88 males and 66 females) patients with psoriasis, was randomly selected. The diagnosis of psoriasis was confirmed by dermatologist. Out of the total psoriatic patients 42 patient (23 male and 19 female), had Psoriatic arthritis and fulfilled the classification criteria of psoriatic arthritis (17). Data collection was done through interview with the patients using a special questionnaire developed by the researchers. The questionnaire included information regarding: age, sex, disease duration and drug history. All patients were examined and investigated for complete blood cell count, erythrocyte sedimentation rate (ESR), dual-energy X-ray absorptiometry (DXA) was done and BMD was measured for all patients. Psoriasis area and severity index (PASI) was calculated by the dermatologist for all patients with psoriasis and disease activity score using 28 joints (DAS28) and ESR was measured for all patients with psoriatic arthritis by a rheumatologist. Elderly patients, postmenopausal women, patients with endocrine, metabolic, renal, and malabsorption diseases, and patients using systemic steroids were excluded from the study. Informed consent was taken from all participants.

Bone density measurements:
BMD (as g/cm2) was measured at the lumbar spine (L1–L4), and hip (femoral neck and total hip) by DXA machine in the Rheumatology unit in Basra Teaching Hospital. The T score (comparison with normal, young subjects of same sex) and Z score (comparison with age, sex and weight matched normal controls) were based on the reference values in the DXA machine provided by the manufacturer. We also calculated the percentage of patients with T score ≤−2.5 SDs and Z score ≤−1.0 SD. The definition of osteoporosis according to WHO guidelines was (T score ≤−2.5 SD) and (T score ≥ −1.0 SD) defined as normal BMD) (18).

Statistical analyses:
Statistical analysis was performed with Chi squared and Mann-Whitney tests to explore the significance of any differences or associations between the relevant variables. To conclude significance, a p-value less than 0.05, was considered significant.

Results

The demographic distributions of patients are shown in Table 1. From the total sample of 154 patients, 112 patients with psoriasis 65 (58.9%) of whom were males and 47 (41.1%) were females with median age and disease duration of 52 and 12 years respectively. Out of the forty two patients with psoriatic arthritis, 23 (54.7%) were males and 19 (45.3%) were females with median age and disease duration of 51.5 and 11 years respectively. Whereas, 33 patients of the psoriasis group have osteoporosis in a percentage of 29.5%, which is associated with high PASI, in particular in males with p-value of 0.0001, which is statistically highly significant as shown in Table 2 and Figure 1. There were only two patients with osteoporosis in the psoriatic arthritis group in a percentage of 4.7% also associated with high disease activity as shown in Table 3 and Figure 1. Osteoporosis less frequently complicates psoriatic arthritis especially those patients treated with biologic treatment compared to those on other treatments with statistically significant difference of p-value of 0.002 as shown in Table 4.

Table 1: The demographic distribution of patient groups

Characteristic	Psoriasis	Psoriatic arthritis	P-value
Total No. (154)	112	42	
Men (88)	65 (58.9%)	23 (54.7%)	0.715
Women (66)	47 (41.1%)	19 (45.3%)	
Age (Median)/ Years	52	51.5	0.367
Disease duration (Median)/ Years	12	11	0.476

Table 2: PASI in psoriasis patients with osteoporosis compared with psoriasis patients without osteoporosis

	Psoriasis group	With osteoporosis	Without osteoporosis	P-value
Men	65(58%)	29(25.9%)	36(32.1%)	0.0001
Women	47(42%)	4(3.6%)	43(38.4%)	
Total	112(100%)	33(29.5%)	79(70.5%)	
PASI (Median)	15	61.5	13	0.0001

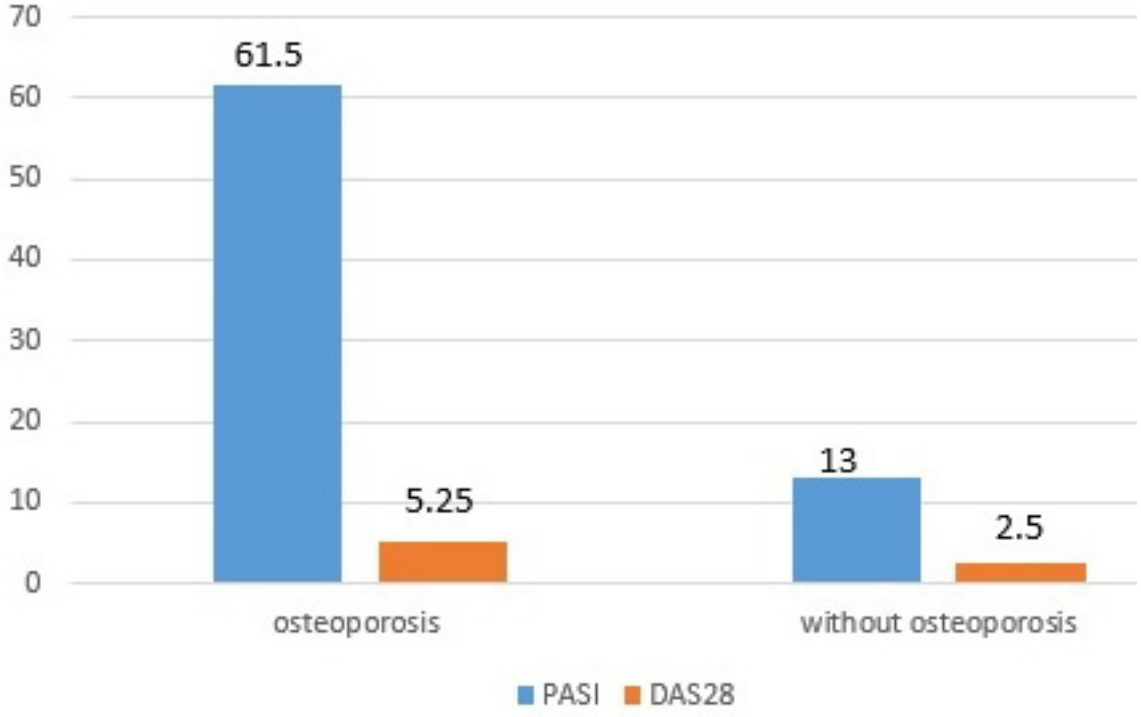
Table 3: DAS28 in psoriatic arthritis patient with osteoporosis compared with psoriatic arthritis patients without osteoporosis

	Psoriatic arthritis group	With osteoporosis	Without osteoporosis	P-value
Men	23(54.8%)	1 (2.4%)	22 (52.4%)	1.000
Women	19(45.2%)	1 (2.4%)	18 (42.8%)	
Total	42(100%)	2 (4.8%)	40 (95.2%)	
DAS28(Median)	2.55	5.25	2.5	0.018

Table 4: Percentage of osteoporosis in patients treated with anti TNF and patients without anti TNF

Patient characteristics	No. (%)	Anti TNF user	Anti TNF non- user	P-value
Total	154 (100%)	33 (100%)	121(100%)	
Patients with osteoporosis	35 (22.7%)	1 (3%)	34(28.1%)	0.002
Patients without osteoporosis	119 (77.3%)	32 (97%)	87(71.9%)	

Figure 1: Relationship between PASI and DAS28 in psoriasis and psoriatic arthritis patient with osteoporosis compared with those in patients without osteoporosis



Discussion

In this cross-sectional study, we found osteoporosis more prevalent among patients with psoriasis but it was less prevalent among those with PsA in a percentage of 29.5% and 4.6% respectively. The results indicate that generalized bone loss is an important comorbidity in patients complaining of psoriasis, which is comparable to a study conducted by Frediani B.et al (8), and was also shown by Martinez-Lopez Antonio et al that psoriatic patients has less BMD (19).

This may be explained by the previous global studies that related Psoriasis with low Vit D levels (20,21) and lower levels of its metabolizing enzymes, CYP27A1 and CYP27B1, within psoriatic lesions (22,23).

On the other hand, vitamin-D supplementation and treatment with oral calcitriol have been associated with clinical improvement in psoriasis lesions (24).

Several mechanisms may be implicated in the association between psoriasis and osteoporosis, such as the elevated systemic levels of inflammatory cytokines (interferon [IFN]-c, interleukin [IL]-6, tumor necrosis factor [TNF]-a), the use of antipsoriatic drugs (corticosteroids, methotrexate, cyclosporin), and prolonged immobilization due to joint dysfunction and severe pain for patients suffering from PsA.(25,26). The results, reflected by the high PASI in psoriasis patients with osteoporosis which is related to poor disease control, may correlate to the shortage of biologic treatment for dermatologic disease in our locality. We found male patients are obviously more affected by osteoporosis than female patients; a result consistent with Jacob Dreiher et al finding who conclude, an association between psoriasis and osteoporosis was observed among males, but not among females. (16). Further studies are needed to confirm our observation. The low percentage of osteoporosis in patients with psoriatic arthritis in this study is consistent with the findings of another study done by Reddy SM. et al (9) who reported a modest association between PsA and osteoporosis. Further, we found that osteoporosis less frequently occurs in patients with psoriatic arthritis; a result that is comparable to other studies (9,12-14,27,28). These results, in part, may be related to the disease nature; the activation of both osteoclasts and osteoblasts, and as a consequence, patients may show signs of both bone destruction and new bone formation (3), or it may be related to the use of TNF inhibitors in this group of patients (drugs authorized only for rheumatologic disorders in our locality). TNF inhibitors have been shown to increase BMD in lumbar spine and hip in spondyloarthropathies (29–31). In this study there is an inverse relationship between the PASI and BMD in psoriasis patients with osteoporosis, this was in contradiction with Sara D'Epiro et al 2014 who found no association between bone resorption and severity of skin involvement (PASI score) (32).

Patients with high PASI that reflects poor disease control is associated with low bone mineral density, and again an inverse relationship between DAS28 and BMD in psoriatic arthritis patients with osteoporosis; patients with high disease activity that is associated with poor disease control and low bone mineral density.

Conclusion

Osteoporosis frequently occurs in patients with psoriasis, in particular male patients. It is less frequently found in patients with psoriatic arthritis, in particular those on anti TNF treatment.

Recommendations:
We recommend the introduction of biological therapies for dermatological disorders in our locality, and further studies are needed to confirm our observation about involvement of mainly males with psoriasis in osteoporosis.

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