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Osteoporosis in patients of psoriatic arthritis: A cross-sectional study

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Abstract
Aim: The purpose of this investigation was to examine bone mineral density (BMD) in patients with PsA as measured by dualenergy X-ray absorptiometry at the hip and lumbar spine.
Methods: 20 patients with PsA were recruited in succession and evaluated for osteoporosis. A comprehensive data collection effort was undertaken, encompassing demographic information as well as indicators of disease activity and health status.
Results: The range of PsA patients was 18 to 70 years, with a mean age of 53.4 ± 9.3 years. Among them, 61 (50.8%) were females and 59 (49.1%) were males. The mean height was 168.0 cm and the mean weight was 81.9 kg. The average duration of the disease was 6.8 years. Mean CRP levels were 2.2, and ESR was 15. Corticosteroids applied topically were utilized by 43% of patients with PsA. Current NSAID use was reported by 34 patients, synthetic DMARD use was reported by 76 patients, and calcium and vitamin D supplement use was reported by 16 patients. Comparable to the expected value of 16%, the proportion of patients with insufficient BMD was ascertained using the normal distribution of the Z score within the population. An incidence of osteoporosis was a mere 6.4% among the patients. There were no statistically significant correlations observed between BMD and disease activity measures.
Conclusion: PsA patients exhibited a low prevalence of osteoporosis or poor BMD, which was comparable to the range observed in the reference population. This suggests that, relative to the general population, patients with PsA do not have an elevated risk of developing osteoporosis. As a result, clinicians may apply the same osteoporosis monitoring guidelines for patients with PsA as they would for the general population.

Keywords: Osteoporosis, psoriatic arthritis, bone mineral density

Introduction
Psoriatic arthritis (PsA) is a form of inflammatory arthritis in which psoriasis is the underlying cause. In addition to epidermis, nails and entheses, the clinical manifestation of PsA is diverse, encompassing the axial skeleton, peripheral joints and axial skeleton (sacroiliitis or spondylitis) [1]. It is a multisystem disorder distinguished by inflammatory musculoskeletal manifestations and psoriasis. Peripheral arthritis, dactylitis, enthesitis, axial disease, psoriasis, nail lesions, and the absence of rheumatoid factors are examples of cardinal signs and symptoms [2, 3]. PsA is distinguished by concurrent radiographic bone resorption and new bone formation, which is marked by periostitis, ankylosis, and enthesophytes.
Psoriasis (PsO) is estimated to affect between 1% and 3% of the global population [5, 6]. Moreover, psoriatic arthritis (PsA), which is the most common comorbidity of psoriasis, manifests in 14% of Asian patients with psoriasis and 19.7% of the global population [7].
PsA can involve the activation of both osteoclasts and osteoblasts; consequently, patients may exhibit both bone destruction and new bone formation [8]. Diverse skeletal manifestations of PsA can be observed, including destructive characteristics of the peripheral joints approximating those of rheumatoid arthritis and spinal manifestations resembling ankylosing spondylitis. As a result of advancements in molecular biology and immunopathology, clinical research has shifted its attention towards aberrant bone remodelling identified in experimental settings [9].
Osteoporosis is a systemic skeletal disorder distinguished by microarchitectural injury and bone loss.

Frediani *et al*. [10] initially postulated a potential association between PsA and osteoporosis in a cross-sectional study. However, subsequent research has reported similar levels of bone mineral density (BMD) in patients with PsA as in the general population. Osteoclast activation predominates in rheumatoid arthritis (RA), and there is substantial evidence linking RA to an increased risk of overall bone atrophy and the onset of osteoporosis. Contradictory data exist regarding systemic bone loss in patients with PsA; these findings are likely to be extremely dependent on patient selection [11]. Despite the omission of bone health from the guidelines regarding psoriatic comorbidities, recent research has indicated that individuals diagnosed with psoriatic arthritis are more susceptible to developing osteoporosis.

Systemic bone loss in patients with PsA may be influenced by the significant developments in pharmacological treatment for the disease, most notably the introduction of biologic therapies, which have improved the ability to control disease activity and inflammation. Therefore, in consideration of these advancements, current information regarding the risk of osteoporosis in PsA is required.

In order to determine the relationship between patients with PsA and bone mineral density (BMD) at the hip and lumbar spine as determined by dual energy X-ray absorptiometry, we conducted an investigation.

Methods

Study population

At routine visits, 120 patients were recruited in succession for further examination; 120 patients, 120 of whom were male and female, underwent DXA scanning of the lumbar spine and hip. Patients' informed assent was obtained.

Inclusion criteria

- 18 years of age
- Fulfilled the Classification Criteria for Psoriatic Arthritis (CASPAR)
- With dual-energy X-ray absorptiometry (DXA) data at the first visit to our clinic

Exclusion criteria

- Axial joint involvement
- Known prevalent metabolic bone diseases such as hyperthyroidism, hyperparathyroidism, or hypogonadism
- Other rheumatic diseases
- Malignancy
- Liver or renal disease (Serum alkaline phosphatase, gammaglutamic trans-peptidase, alanine or aspartate aminotransferase, urea, creatinine, and lactate dehydrogenase twice the upper limit of normal)
- History of fragility fracture prior to PsA diagnosis

Collection and measurement of data

In gathering the data, demographic information, clinical and laboratory measurements, treatments, and fracture histories were gathered. The following data were recorded: age, sex, postmenopausal status, weight, height, body mass index (BMI), duration of PsA, smoking status (current or previous), alcohol consumption (more than three units pr day), ESR (Westergren's method), C-reactive protein (CRP, lowest detectable value 1 mg/dL), level of physical activity (>1 time pr. week or <1 time pr. week), DAS 28, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Maastricht Ankylosing Spondylitis Enthesitis Score (MASES), cutaneous involvement (Psoriasis Area Severity Index (PASI)), patient's global assessment (PGA), investigator's global assessment (IGA), tender joint count 68, swollen joint count 66, Modified Health Assessment Questionnaire (MHAQ), non-steroidal anti-inflammatory drug (NSAID) use, disease modifying antirheumatic drug (DMARD) use, tumour necrosis factor (TNF) inhibitors, glucocorticoid treatment (Current use or ever use of ≥5 mg>3 months), vitamin D and calcium supplements and anti-osteoporotic treatment.

Bone density measurements

Using DXA (Lunar Prodigy, GE Healthcare), BMD (as g/cm2) was determined at the lumbar spine (L1–L4) and hip (femoral neck and total hip). Preferably, measurements were taken from the left buttock. Lumbar spine measurements were taken from each participant. Throughout the duration of the investigation, the DXA machine maintained its stability, and all DXA measurements were conducted by seasoned technicians. The *in vitro* long-term coefficient of variance (CV) for the spine phantom was 0.62%, which served as an indicator of BMD variability. The L1–L4 measurements had an *in vivo* CV of 0.91%, the left femoral neck 1.56%, and the left total hip 0.88%. The T score (comparison with youthful, normal subjects of the same sex) and Z score (comparison with normal controls matched in age, sex, and weight) were calculated using the manufacturer-supplied reference values in the DXA machine.

Statistical Analyses

Every statistical analysis was conducted utilising SPSS for Mac V.21. The level of statistical significance was established as $p<0.05$. When continuous data are normally distributed, they are presented as mean with standard deviation (SD), whereas when they are not normally distributed, they are presented as median with interquartile range (IQR). The difference between the mean Z score at each anatomical site and the reference population data provided by the DXA machine provider was evaluated using CIs.

Results

Total 120 patients were recruited for the study. 61 were females and 59 were males.

Table 1: Demographic and clinical variables of the 120 patients with psoriatic arthritis included

Parameters	PsA patients (n = 120)
Age	53.4±9.3
Male	59(49.1%)
Females	61(50.8%)
Postmenopausal females	24(39.3%)
Weight	81.9
Height	168.0
BMI	29.1
Disease duration,	6.8
Smoking	36(30%)
Alcohol consumption	3(2.5%)
CRP, mg/L	2.2
ESR, mm/hour	15
Physical activity≥1 time per week	59
HLA B 27	31
DAS 28,	3.36
BASDAI	3.15
MASES	1.97
PASI	2.78
Patient global assessment,	33.52
Investigator global assessment	13.42
TJC 68	4(3.3%)
SJC 66	0
MHAQ	0
Current use of NSAIDs	34(28.3%)
Current use of synthetic DMARDs	76(63.3%)
Current use of glucocorticoids	18(15%)
Ever use of glucocorticoids ≥5 mg ≥3 mg	34(28.3%)
Use of calcium or vitamin D supplements	16(13.3%)
Osteoporosis medication,	2(1.6%)
Previous low energy fracture	10(8.3%)

The mean age of PsA patients was 53.4±9.3 years, ranged from 18 to 70. 59 (49.1%) of them were male and 61 (50.8%) were females. Mean weight was 81.9kg and mean height was 168.0 cm. The mean disease duration was 6.8 years. Mean levels of CRP was 2.2, ESR 15. Topical corticosteroids were used in 43% of PsA patients. Current use of NSAIDS was in 34 patients, synthetic DMARDs 76 patients, use of calcium and vitamin D supplements was in 16 patients.

Table 2: Bone mineral density for PsA patients

Items	PsA patients (n = 120)	P value
Femoral neck	0.680±0.136	0.007
Total hip	0.746±0.383	0.004
Lumbar spine	0.867±0.341	0.032

BMD values in femoral neck was 0.680±0.136, total hip 0.746 ± 0.383 and in lumber spine was 0.867±0.341.

Discussion

We found a low prevalence of osteoporosis and low BMD among PsA outpatients in this cross-sectional study. Thus, generalized bone loss does not appear to be a significant comorbidity among patients with PsA in the era of biological treatment, according to our data. Patients with PsA had comparable gender-adjusted BMD (Z score), age, and weight, according to our data, in comparison to the normative reference population. Our results corroborate those of Busquets *et al.* [12], Nolla *et al.* [13], and Riesco *et al.* [14], which reported similar bone mineral density (BMD) in patients with PsA and the general populace.

The proportion of osteoporosis reported in PsA varies considerably, with estimates ranging from 1.4% to 68.8% according to Frediani B *et al.* [10], Busquets N *et al.* [12], Grazio S *et al.* [15] and Attia EA *et al.* [16]. The study's results, amounting to 6.4%, are situated towards the lower end of the range that was reported. It is challenging to compare results across studies due to variations in patient selections, outcomes, and control groups [11]. Prior to the era of biological therapy, a 2001 study by Frediani B *et al.* [10] reported a 30% prevalence of osteoporosis among Italian patients with PsA. PsA patients likely experience less disease activity now than they did seventeen years ago, due to improved early detection and more efficacious treatment alternatives. A study conducted by Busquets *et al.* [12] documented an osteoporosis prevalence of 16% among male and female patients with PsA who were classified as premenopausal and postmenopausal and attended an outpatient clinic. A similar incidence of osteoporosis was documented by Grazio *et al.* [15], who also observed a negative correlation between osteoporosis and MHAQ. We found no association between BMD and disease activity, disease duration, or outcome measures in the present study, with the exception of subgroup analyses involving males, which revealed a correlation between BMD and ESR. The patients in the present study, on the other hand, exhibited a low disease activity, as evidenced by a median of 66 distended joints (With a count of 0), low CRP, and ESR. This outcome is consistent with the modern clinic population, as physicians strive to reduce disease activity to the greatest extent feasible.

According to the available data, the risk of osteoporosis appears to be lower in PsA than in RA. Following osteoclast-mediated bone resorption, osteoblasts replenish

the reabsorbed bone in healthy bone. Spondyloarthropathies, including PsA, are characterised by a dysregulation of the "coupling" between bone formation and resorption. This results in localised bone loss at the enthesal insertion sites and excessive bone formation in the periosteal regions adjacent to the sites of bone erosion. These distinctive skeletal alterations are the consequence of endochondral ossification, which involves the replacement of cartilaginous matrix with new bone [17]. In comparison to rheumatoid arthritis, this enhanced bone formation at sites of inflammation is a characteristic of PsA and the other spondyloarthropaties. This pathophysiological mechanism distinction between rheumatoid arthritis and spondyloarthritis may account for the variation in bone density documented in the medical literature. In addition, clinical distinctions such as age at onset, the possibility of more intermittent inflammation and reduced glucocorticoid use in PsA relative to RA may impact the variation in the risk of systemic bone loss. Prior to this, 13.7% of all patients with PsA were reported to be currently taking prednisolone in our outpatient clinic, compared to 54.3% of all patients with RA [18]. 15% of the participants in the current investigation were glucocorticoid users.

Recently, there has been an expansion in the definition of bone strength to encompass bone quality, which comprises microarchitecture, collagen quality and the rate of bone turnover, among other factors [19]. Despite a normal BMD, patients with PsA have been reported to have higher cortical porosity and reduced cortical bone density of the distal radius on high resolution CT [20]. This may compromise the integrity of the cortical bone and increase its susceptibility to fractures. Patients diagnosed with psA and psoriasis had a marginal yet statistically significant increased risk of all fractures, according to a recent population-based study [21]. 8.3% was not a significantly high prevalence of self-reported fragility fractures, according to our research.

This study's primary strength is its application of objective criteria for PsA. Moreover, comprehensive clinical data pertaining to the study cohort is incorporated. Our lack of a control group recruited from the baseline population is the primary limitation.

Conclusion

According to the findings of this study, in the era of biological treatment, insufficient BMD does not appear to be a significant clinical issue for patients with PsA. Therefore, the results support the recommendation that patients with PsA adhere to osteoporosis assessment guidelines that were devised for the general population.

References

1. Gulati AM, Michelsen B, Diamantopoulos a *et al*. Osteoporosis in psoriatic arthritis: A cross-sectional study of an outpatient clinic population. RMD Open. 2018;4:e000631.
2. Kwok TS, Sutton M, Ye JY, Pereira D, Chandran V, Gladman DD. Prevalence and factors associated with osteoporosis and bone mineral density testing in psoriatic arthritis. Arthritis Care & Research. 2019;74(6):1006-12.
3. Ritchlin CT, Colbert RA, Gladman DD. Psoriatic arthritis. N Engl J Med. 2017;376:957-70.
4. Anandarajah A. Imaging in psoriatic arthritis. Clinic Rev Allerg Immunol. 2013;44:157-65.
5. Wang Y, Song ZB, Deng XR, Zhang XH, Zhang ZL. Risk factors associated with osteoporosis and fracture in psoriatic arthritis. Chin Med J 2019;134:2564–72.
6. Myers WA, Gottlieb AB, Mease P. Psoriasis and psoriatic arthritis: clinical features and disease mechanisms. Clin Dermatol. 2006;24:438–47.
7. Alinaghi F, Calov M, Kristensen LE, Gladman DD, Coates LC, Jullien D, *et al*. Prevalence of psoriatic arthritis in patients with psoriasis: A systematic review and meta-analysis of observational and clinical studies. J Am Acad Dermatol. 2019;80. 251-65.
8. Kruithof E, Baeten D, De Rycke L, *et al*. Synovial histopathology of psoriatic arthritis, both oligo- and polyarticular, resembles spondyloarthropathy more than it does rheumatoid arthritis. Arthritis Res Ther. 2005;7:569–80.
9. Ritchlin CT, Colbert RA, Gladman DD. Psoriatic Arthritis. N Engl J Med. 2017;376:957-70.
10. Frediani B, Allegri A, Falsetti P, Storri L, Bisogno S, Baldi F, *et al*. Bone mineral density in patients with psoriatic arthritis. J Rheumatol. 2001;28:138-43.
11. Chandran S, Aldei A, Johnson SR, *et al*. Prevalence and risk factors of low bone mineral density in psoriatic arthritis: A systematic review. Semin Arthritis Rheum. 2016;46:174-82.
12. Busquets N, Vaquero CG, Moreno JR, *et al*. Bone mineral density status and frequency of osteoporosis and clinical fractures in 155 patients with psoriatic arthritis followed in a university hospital. Reumatol Clin. 2014;10:89–93.
13. Nolla JM, Fiter J, Rozadilla A, *et al*. Bone mineral density in patients with peripheral psoriatic arthritis. Rev Rhum Engl Ed. 1999;66:457–61.
14. Riesco M, Manzano F, Font P, *et al*. Osteoporosis in psoriatic arthritis: An assessment of densitometry and fragility fractures. Clin Rheumatol. 2013;32:1799–804.
15. Grazio S, Cvijetić S, Vlak T, *et al*. Osteoporosis in psoriatic arthritis: Is there any? Wien Klin Wochenschr. 2011;123(23-24):743–50.
16. Attia EA, Khafagy A, Abdel-Raheem S, *et al*. Assessment of osteoporosis in psoriasis with and without arthritis: Correlation with disease severity. Int J Dermatol. 2011;50:30-5.
17. Goldring SR. Osteoimmunology and bone homeostasis: Relevance to spondyloarthritis. Curr Rheumatol Rep. 2013;15:342.
18. Michelsen B, Fiane R, Diamantopoulos AP, *et al*. A comparison of disease burden in rheumatoid arthritis, psoriatic arthritis and axial spondyloarthritis. PLoS One. 2015;10:e0123582.
19. Licata A. Bone density vs bone quality: what's a clinician to do? Cleve Clin J Med. 2009;76:331-6.
20. Zhu TY, Griffith JF, Qin L, *et al*. Density, structure, and strength of the distal radius in patients with psoriatic arthritis: the role of inflammation and cardiovascular risk factors. Osteoporos Int. 2015;26:261–72.
21. Ogdie A, Harter L, Shin D, *et al*. The risk of fracture among patients with psoriatic arthritis and psoriasis: A population-based study. Ann Rheum Dis. 2017;76:882-5.