

Bone mineral density of patients with chronic plaque psoriasis

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Summary

Reduced bone mineral density (BMD), the major risk factor for osteoporotic fracture, has been linked to palmoplantar pustular psoriasis, but no significant studies have examined BMD in chronic plaque psoriasis (CPP). In this study, in-patients with severe CPP had their BMD measured at the nondominant hip and lumbar spine using dual energy X-ray absorptiometry. Ten male and 10 female Caucasian patients were recruited, with a mean age of 47 years (range 20–71 years). There were no significant differences in BMD between patients and controls. However, patients with psoriatic arthropathy in addition to CPP had a significantly lower mean lumbar spine Z-score (-1.16) than those without arthropathy ($+1.38$, $P = 0.015$). Neither previous nor current treatment with systemic steroids, retinoids or methotrexate significantly affected BMD. We found no evidence that patients with CPP, despite risk factors, have a significantly low BMD, although the subgroup with joint involvement appear to be at significantly higher risk of osteoporosis and may therefore require preventative treatment.

Report

Osteoporosis is defined by the World Health Organization as a bone mineral density (BMD) that is 2.5 SD or more below the mean peak value in young adults (T score),¹ leading to significant morbidity through the increased risk of fractures. In the UK, the cost of osteoporosis to the National Health Service is currently estimated to be £940 million per annum.²

Psoriasis is a common inflammatory skin disease with an estimated prevalence of 1.5% in the community.³ Reduced BMD has been linked to palmoplantar pustular psoriasis⁴ but has not been examined in chronic plaque psoriasis (CPP). Increased alcohol consumption, cigarette smoking and long-term therapy with systemic corticosteroids amongst patients with CPP have the potential to adversely affect BMD.^{5–7} Conflicting evidence exists for psoriatic arthropathy, methotrexate and

retinoid therapy being associated with osteoporosis.^{8–13} Our aim was therefore to examine the BMD in CPP in a case–control study, taking into account differences in established osteoporosis risk factors.

Twenty Caucasian patients, 10 males and 10 females were recruited sequentially to the study from the dermatology ward, to which they had been admitted for in-patient treatment of severe CPP (in-patients were chosen for this study because of their extensive skin psoriasis). The mean age was 47 years, range 20–71 years. Ten female controls comprised members of the St Thomas' UK Adult Twin Registry, a volunteer-based group of female adult twins recruited from the healthy UK population by successive media campaigns. Ten male controls comprised healthy members of hospital staff. Each participant was graded for age, height, weight, menstrual history, daily exercise, cigarette smoking and consumption of alcohol, using questions previously validated by the Twin Research Unit. Participants were also classified according to a history of previous treatment with systemic steroids or retinoids and the presence or absence of psoriatic arthropathy diagnosed clinically and radiologically by a rheumatologist. For each female patient, an individual control was

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chosen, to match the patient for age and body mass index (BMI; kg/m²). For male patients there were insufficient controls for individual age matching so the mean age of the groups were matched instead. The patient and control mean BMI were 26.6 kg/m² (SD, 5.30 kg/m²) and 24.7 kg/m² (SD, 3.30 kg/m²), respectively. For both male and female patients, no significant differences from the controls were detected for age or BMI. However, 17 out of 20 patients were current smokers vs. zero controls, although six controls were ex-smokers. Six out of 20 patients were graded as heavy alcohol consumers (> 20 units per week), compared with zero controls; patients took less daily exercise than controls ($P = 0.065$).

BMD was measured at the nondominant hip (femoral neck and total hip) and lumbar spine (L1–L4) in the anterior to posterior projection using a dual energy X-ray absorptiometry (Hologic QDR-2000 DXA scanner). BMD results were recorded as the Z-score (difference in SD from the mean of a healthy, age- and sex-matched sample) for each patient. Reproducibility was assessed by performing duplicate scans of 40 normal volunteers and was between 0.6% and 1.6%, depending on the site scanned. Patients' BMD results were compared to those of controls by means of the paired and unpaired *t*-test where appropriate.

The respective mean spinal Z-scores for patients and controls were 0.36 (SD, 2.38) and -0.06 (SD, 1.57). Similarly, the respective mean femoral neck Z-scores for patients and controls were 0.02 (SD, 1.40) and -0.03 (SD, 1.10). There were no significant differences in mean spinal and femoral neck Z-scores between patients and controls ($P = 0.36$ and 0.78 , respectively). The eight patients with psoriatic arthropathy in addition to CPP had a mean lumbar spinal Z-score of -1.16 [95% confidence interval (CI), -2.45 to -0.13] compared with the 12 psoriasis patients without arthropathy whose mean score was 1.38 (95% CI, -0.11 to 2.86); the difference is significant ($P = 0.015$). In the arthritic group, a widespread psoriatic polyarthropathy was present in all patients with low Z-scores. Neither previous nor current treatment with systemic steroids, methotrexate or retinoids significantly affected BMD, when examined using the same technique.

In this preliminary study we have found a significantly lower BMD in patients with CPP with arthropathy, compared to those without arthropathy. No significant differences in BMD were detected between the psoriasis patients as a whole and healthy controls.

Our patient sample represents a group with unusually severe CPP, most of whom were tertiary referrals from other hospitals; the extent of their psoriasis therefore

makes them a unique sample, with significantly worse disease than is usually seen in the general dermatology clinic or in general practice. All patients had used long-term topical steroids to a greater or lesser extent; it is therefore reassuring that their BMD was not significantly affected. With regard to the validity of the control group, the mean Z scores of the female twin controls have recently been compared to those of singleton females from the Chingford Study¹⁴ and were found not to differ.

BMD is an important marker of fracture risk. Each SD decrease in femoral neck BMD increases the age-adjusted risk of hip fracture by a factor of 2.6 (range, 1.9–3.6).¹⁵ It is therefore reasonable to assume that our patients with psoriatic arthropathy (who have a low BMD) are at increased risk of fracture; however, in the present study we did not examine fracture rates as this requires a larger, long-term prospective investigation. Other determinants of fracture risk include abnormal bone architecture and high bone turnover which leads to a greater number of bone-remodelling sites that can buckle.⁶

Although small, our sample could detect differences of 0.146 g/cm² and 0.112 g/cm² in femoral neck BMD with a power of 80% and 60%, respectively, at the 5% level. The significantly lower BMD in the group with psoriatic arthropathy may possibly be explained by functional impairment; interestingly, patients with rheumatoid arthritis not taking steroids also have a lower BMD and higher fracture rates than controls, possibly for the same reason.^{16,17} However, the high level of cigarette smoking and alcohol consumption in our psoriasis patients compared with controls suggests that these factors should also be considered as potentially responsible for the low BMD in the arthritic group, although this was not specifically tested.

In conclusion, we found no evidence that patients with CPP, despite risk factors, have a significantly low BMD, although the subgroup with joint involvement appears to be at significantly higher risk of osteoporosis and may therefore require preventative treatment.

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