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Biochemical markers of bone turnover and calcium dietary intake evaluation in HIV-infected patients

G Camanni*[1], G Toraldo[2], D Rosignoli[1], R Pippi[2], E Schiaroli[1], G Angeletti[2], F Baldelli[1] and D Francisci[1]

Address: [1]Clinica di Malattie Infettive, Perugia, Italy and [2]Medicina Interna Scienze Endocrine e Metaboliche, Perugia, Italy
* Corresponding author

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Purpose of the study

A high prevalence of bone demineralization has been reported in HIV-infected patients, but its aetiology and mechanism are still unknown. Prevalence estimates vary widely and may be influenced by antiretroviral therapy, lipodystrophy, severity of HIV disease, and overlapping bone loss risk factors. We sought to assess bone metabolism and calcium intake in HIV-infected patients, naïve or treated with HAART.

Methods

From February 1, 2008, 100 consecutive outpatients attending the Department of Infectious Disease, Perugia Hospital, were included in this study. Every patient was screened for serum level of 25 (OH) vitamin D, parathyroid hormone (PTH), bone-specific alkaline phosphatase (BALP), serum crosslaps, calcium and phosphate. A questionnaire on consumption of calcium-containing foods was administered. Data on race, age, BMI, duration of infection and HAART, smoking, alcohol, viral load and CD4+ cells count were collected from our medical records.

Summary of results

Out of 100 patients studied (including 83 Caucasians and 13 Africans) 70 were men; mean age was 45 years (range 27–69); mean BMI was 23.9 (range 15.6–30.9); 54 were active smokers and six had an alcohol intake >30 g/day; 82 patients had been treated with HAART for at least 6 months. Mean CD4 cell count was 603 cells/mcl (range 4–1630) and HIV viremia was undetectable in 59 patients. Lipodystrophy and HBV or HCV co-infection were present in 21 and 27, respectively. Vitamin D deficiency (25(OH) vitamin D level <20 ng/ml) was present in 84 and secondary hyperparathyroidism in 26 patients. Serum crosslaps and BALP results were elevated in 71 and 34, respectively. Serum calcium level was in the normal range while phosphate level results were low in 20 patients. Assessment of calcium consumption showed that 65 patients did not meet calcium recommendations for age, with an average calcium intake deficit of 340 mg/day (range 10–804).

Conclusion

This study shows that the majority of our patients have a deficit of calcium intake associated with low level of vitamin D, elevation of PTH and increase in markers of bone turnover (serum crosslaps and BALP). Because hypovitaminosis D was present in almost all the patients (naïve or treated), we believe that levels of vitamin D should be assessed and routinely corrected in all HIV patients, not only for the well-known action of this hormone on bone metabolism and bone fractures, but also because of its immunomodulatory properties and effects on adipocyte differentiation.