

# Does major depressive disorder cause osteoporosis in a young man?

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*KEY WORDS:* major depression, osteoporosis, men, stress.

## Background

We recently reviewed the literature about major depressive disorder (MDD) as an additional risk factor for osteoporosis (1, 2). Most of the studies examining the association between depression and osteoporosis have been conducted in women whereas the few existing studies on depression and osteoporosis conducted in men have been limited to the elderly (3, 4). An association between depression and lower BMD has been reported in elderly Asian men (4), however, the same association was not observed in community-dwelling, elderly Caucasian men (3). Very little is known about osteoporosis in young men (5, 6). Results from the Third National Health and Nutrition Examination Survey (NHANES III) show that major depressive episode (MDE) is associated with 2% lower BMD at the total proximal femoral level in multivariate models in young men but not in women (5). The existence of a relationship between depression and osteoporosis in young men remains controversial.

## Case history

A 37-year-old man from Bolivia was referred to our clinic at the NIH CC for evaluation of idiopathic osteoporosis.

*Current medical history:* The patient reported that in November 2001 he had spine surgery for a herniated disk. At that time, a bone mineral density scan was performed and he was diagnosed with osteoporosis. The patient also reported a loss of 4 cm in height (from 175 to 171 cm), which was most likely due to an asymptomatic vertebral fracture.

*Past medical history* included chronic symptoms of depression for which he had been prescribed fluoxetine that he never took,

and frequent headaches. The patient reported a finger fracture at age 18.

*Social and physiological history:* the patient was married, and he had two children who appeared to be in good health. His dietary calcium intake, as determined by a dietician was adequate, approximately 1.000 mg/day. Of note, he habitually used to drink up to four liters of carbonated soft drink (CSD) every day. He smoked approximately four cigarettes a day since age 22. The patient denied any period of prolonged immobilization or glucocorticoid therapy. Exercise history was non-contributory.

*Family history* was negative for osteoporosis. His mother was 62 years old and there was no history of any non-traumatic fractures or loss of height. None of his relatives had suffered from osteoporosis.

*Main findings:* the patient was taking no medications at time of assessment. Physical examination was unremarkable; weight 67.7 kg, height 171 cm (BMI 23.2), blood pressure 100/59, pulse rate 71. Psychiatric evaluation included the Structured Clinical Interview for DSM IV (SCID), which was conducted by a psychiatrist (P.E.M.) in Spanish, the native tongue of the patient. The patient met diagnostic criteria for major depressive disorder, single episode, and melancholic type. This diagnosis was based on the following symptoms: depressed mood, anhedonia, weight loss, hypersomnia, psychomotor retardation, fatigue, feeling worse in the morning, lack of reactivity to pleasurable activities, feelings of worthlessness, diminished ability to think, inappropriate guilt without any suicidal ideas or plans. The patient reported having these chronic depressive symptoms for at least ten years. No other Axis I disorder was found based on the SCID. DEXA measurements confirmed that the patient had osteoporosis at the level of the spine and osteopenia at the level of the hip (T-scores: PA lumbar spine -3.00, femoral neck -1.00, trochanteric -1.70, total hip -1.40; Z-scores: PA lumbar spine -3.00, total hip -1.10). Both the NTX peptide (a marker of bone resorption) and bone specific alkaline phosphatase (a marker of bone formation), were within the normal range. Levels of 25-OH-Vitamin D and total calcium were also normal. The intact parathyroid hormone result was slightly elevated (54.3 pg/ml; normal values 6 to 40). Other laboratory tests were within normal limits, with the following tested: hemochrome, glycaemia, creatinine, plasma electrolytes, urinalysis, urinary free cortisol, urinary catecholamines, IGF I (119 ng/ml, with normal value 114 to 492 ng/ml), and thyroid function. Lipid panel results were also normal (total cholesterol 164 mg/dl, HDL cholesterol 110 mg/dl, LDL cholesterol 110 mg/dl, triglycerides 68 mg/dl). Total testosterone and the percent of free testosterone were both within normal limits. The patient was sexually active, although he complained of a decrease in libido, which seemed related to his depression.

## Discussion

This case study examines a young man with osteoporosis and major depressive disorder. It is likely that the osteoporosis might be caused by the depressive disorder. A contributory cause could have been the high CSD consumption (7-9),

although no association between these two conditions has been observed (10). Major depression and osteoporosis are both less likely to be diagnosed in men than in women, especially at a younger age. However, the awareness for both conditions in men is increasing. Within the limitations that are inherent to a case-report, these findings make the interesting and novel point of a potential association between major depression and osteoporosis in men. Prospective studies to address the presence of this association in young men and establish whether a causal link between these two conditions are needed.

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