Depression and Osteoporosis

The relationship between osteoporosis and indices of psychopathology and well-being were studied in 102 Portuguese white women. Depressive symptoms were assessed by the Beck Depression Inventory, psychopathology by the Hopkins Symptom CheckList-90 Revised (SCL-90-R), quality of life by the Psychological General Well-Being Index and other data from a questionnaire comprising social, demographic, clinical, and behavioral characteristics. The prevalence of osteoporosis was 47.1%. Women with osteoporosis vs. women without had significantly higher scores on the BDI (16 vs. 13, p=.045) and lower scores for hostility (0.8 vs. 1.2, p=.012) and phobic anxiety (1.1 vs. 1.5, p=.041) on subscales of the SCL-90-R. No differences were found for mean general well-being scores (62 vs. 64, NS).

Comment: This study showed that women with osteoporosis have a significantly higher prevalence of depression independent of other factors strongly associated with osteoporosis such as age and BMI. Depression and osteoporosis were significantly related.

Depression, Osteoporosis and the HPA Axis

The hypothalamic-pituitary-adrenocortical axis is a very complicated control system mediating stress reactions in which glucocorticoids suppress autonomic, endocrine, immunological and psychological responses to stressful stimuli. There are marked clinical, physiological and biochemical connections between osteoporosis and major depressive disorder. Both are associated with a hyperactive HPA axis and LC/NE (locus ceruleus/norepinephrine) system, and hence with increased corticotropin releasing hormone, cortisol, and catecholamine secretion. There are numerous states or diseases associated with osteoporosis in which hypercortisolism is common. Recent studies have shown that earlier history of major depression was associated with marked osteoporosis. Major depressive disorder patients are well known to exhibit hypercortisolism and resistance to dexamethasone suppression. In 31 patients with major depression under long-term antidepressant treatment and who had no evidence of osteoporosis at baseline (19 men, 12 women, age 29–41), development of osteoporosis was significantly greater compared to 17 healthy male volunteers (ages 34–45) (2p=0.01). There was also a high inverse correlation of bone mineral density with baseline serum cortisol (24-hour free cortisol, and 8 a.m. and 5 p.m. levels) and resistance to dexamethasone suppression.


Comment: The biochemical interrelationships associated with stress grow “curiouser and curiouser.” One certainty seems to be that stress effects are ubiquitously distributed in all biochemical organ systems with little favoritism and few known exceptions. It behooves practitioners to be consistently aware of the myriad effects which may lie within or outside of the patient’s consciousness. Healthy, highly effective and eminently learnable responses to stress are available in a wide variety of venues. Unfortunately, academic institutions of higher learning seem to be among the last to get on board. My own extensive experience in learning a sound stress management approach was developed entirely outside of an academic degree-granting institution. Resistance is probably more due to intellectual inertia than anything else, but is an unfortunate outcome of academia’s extensive research limited to a very narrow database.

Depression, Osteoporosis and Inflammatory Dysfunction

Depression is a major health problem with 13–20% of the population having depressive symptoms at any given time and ≤5% experiencing major depression. Related pathological processes include ischemia, neoplasia, necrosis, apoptosis, infection, and inflammation. The latter is the most compatible with the waxing and waning course of depression, and could explain the biology of its fluctuating course with severe episodes that can be followed by partial or complete remission. Recent evidence suggests that major depression is associated with dysfunction of inflammatory mediators. Major depression commonly co-occurs with coronary artery disease and decreased bone mineral density and increases mortality in CAD. Brain cytokines, principally interleukin-1β and IL-1 receptor antagonist, may play roles in major depression and also be involved in the pathophysiology and somatic consequences of depression and effects of antidepressant treatment. Related interventions could reduce the morbidity and mortality risks for both osteoporosis and behavioral symptoms in patients with major depression. The integration and differential regulation of peripheral and central cytokine compartments is a key element for the optimal functioning of the immune and nervous systems.
