

Aging and Bone Loss in Native American Women

Perry HM 3rd, Bernard M, Horowitz M, Miller DK, Fleming S, Baker MZ, et al. The effect of aging on bone mineral metabolism and bone mass in Native American women. *J Am Geriatr Soc* 1998;46:1418-22.

Study Overview

Objective. To assess the impact of age on mineral metabolism and bone mineral density (BMD) of the hip and spine in Native American women.

Design. Prospective, cross-sectional study.

Setting and participants. 77 Native American women between 19 and 85 years of age from the Sac and Fox Nation in rural Oklahoma.

Main outcome measures. Serum levels of 25-hydroxyvitamin D (25-OHD), osteocalcin, and immunoreactive parathyroid hormone were measured. Hip and spine BMD were assessed by dual energy x-ray absorptiometry.

Main results. The use of *t* scores indicated that femoral bone density was higher ($P < 0.05$) premenopausally but lower ($P < 0.05$) postmenopausally in Native American women compared with white women. Serum 25-OHD was related inversely to age ($r = -0.32$; $P < 0.05$), and 7% of the subjects had 25-OHD levels below 15 ng/mL. Serum osteocalcin was higher ($P < 0.001$) and BMD was lower ($P < 0.001$) in postmenopausal women than in premenopausal women. In postmenopausal women, serum osteocalcin was related to age ($r = 0.59$; $P < 0.001$). There was no evidence of bone loss before age 50 in either the femur or the spine. Age ($r > -0.48$, $P < 0.001$) and body mass index ($r > 0.41$; $P < 0.005$) were independent determinants of both femoral and lumbar BMD. Age, body mass index, and serum 25-OHD together accounted for 70% of the variance in BMD.

Conclusion

In Native American women, there is a reduction in bone density and a sustained increase in bone turnover postmenopausally. Body mass index and serum 25-OHD level are significant determinants of BMD. Peak BMD may be higher and the postmenopausal rate of bone loss greater in Native American women than in white women.

Commentary

Numerous studies have documented that aging, especially

among women, is associated with bone loss and a resultant increase in the risk of fracture [1,2]. Most of the information regarding factors that predict bone loss and the physical health problems that result from bone loss has been obtained in studies of white women, and some equivocal results have been compiled for women of other ethnic groups [3]. However, the authors of this study have recently reported bone loss findings in African-American as well as white women [4], and this study expands such findings to a third ethnic group.

Applications for Clinical Practice

Perry and colleagues have demonstrated that there seems to be ongoing postmenopausal reduction in lumbar and femoral bone density in Native American women, a finding consistent with previous observations in white and African-American women. Providers of care for Native American women should be attentive to concerns in this area. And although studies of bone loss in women typically have reported on rather small cohorts and on a cross-sectional basis, the National Osteoporosis Risk Assessment (NORA) program is now tracking a large nationwide cohort of women longitudinally and will significantly expand on what is known regarding the relevant risk factors and resultant patient experience over time. The findings from NORA should further help to guide physician practice.

References

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3. McHugh D, Baumgartner RN, Stauber PM, Wayne S, Hicks VL, Heyward VH. Bone mineral in southwest Native American women. *Basic Life Sci* 1993;60:87-8.
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