Computed X-ray densitometry measurement of mBMD & MCI in normal Thai and osteoporotic patients

Trivitayaratana W.a, Trivitayaratana P.a, Suphaya-Achin K.a, Bunyaratavej N. b, Kotivongsa K. a, Chongcharoenkamol T. a

a Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand
b Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand

Abstract

To establish the reference values of age-related change of metacarpal bone mineral density (mBMD) and metacarpal index (MCI) in screening for osteoporosis, both postero-anterior (PA) hands and lateral thoraco-lumbar radiography were done on 1,182 normal volunteers aged 17-83. From PA hands radiographs, mBMD and MCI were measured by computed X-ray densitometry (CXD) (Bonalyzer, Teijin Ltd., Tokyo). Exclusion of the surgical menopause condition and the causes of affected bone loss, the results show that mean mBMD and MCI in various age groups were significantly different (p-value < 0.005 for both) in females. Both values increased gradually from age under 20 and peaked in the 30-39 years age group, then decreased gradually until age 50 and decreased markedly after age 50. The yearly rate of bone loss from the peak density detected by mBMD and MCI was 1.3 per cent and 1.6 per cent between aged 50-59, 1.6 per cent and 2.7 per cent in subjects aged 60-69, 1.3 per cent and 3.2 per cent in those aged 70-79. However, mBMD and MCI in males did not show a downward trend with age. It indicated that a screening program for early prevention of osteoporosis may be necessary only in females before, during and after menopause. Because 92.3 per cent of 39 osteoporotic subjects had abnormal CXD measurements lower than -2 standard deviations (SD) limit of mean mBMD in young healthy women (aged 20-40 years), this value appeared to constitute a satisfactory definition of "high risk of developing osteoporosis". The incidence rate of high risk of developing osteoporosis was 3.03 per cent in a normal young population, while the risk rate occurred 4.76, 13.14, 34.28, 47.30 and 47.00 per cent in subjects aged 40-49, 50-59, 60-69, 70-79 and >80, respectively. Results confirmed the necessity of early prevention of osteoporosis in postmenopausal women. These measurements may be appropriate for mass screening to separate patients who have a greater risk for development of osteoporosis from those at lesser risk.

Keywords: Age; Bone Density

Journal of the Medical Association of Thailand. 2000; 83(1) : 47-56