Diagnostic agreement of combined radiogrammetric analysis with texture analysis in the evaluation of bone density: A comparison with dual energy X-ray absorptiometry

Trivitayaratana W., Trivitayaratana P.

Dept. of Radiological Technology, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Abstract

To assess the reliability and validity of combined radiogrammetric analysis with texture analysis (digital X-ray radiogrammetry: DXR) of metacarpals and distal forearm when compared to dual energy X-ray absorptiometry (DXA) of the distal radius. DXA readings from the supradistal and distal 1/10 of radius were compared with DXR obtained on the same day with a sample of 274 women and 87 men (average age 31.33 years, range 20-65 years). The results showed that both sites of forearm DXA scores were significantly correlated with DXR scores (r = 0.5211 and 0.6090, respectively). DXA scores were used as the standard, defining moderate fracture risk by a standardized t score <-2 and marked risk by t <-3. Following the current WHO definition of osteoporosis, t <-2.5 was also applied. Using cutting points of t <-2, <-2.5 and <-3 for DXA and t <-2 for DXR values, the sensitivity to osteopenia was 38.98 per cent, 40.63 per cent and 55.56 per cent respectively, with specificity of 94.36 per cent for all cutting points of DXA. At these cutting points, the corresponding false positive was 5.64 per cent and false negatives were 61.02 per cent, 59.37 per cent and 44.44 per cent, respectively. It indicated that DXR measurement had low sensitivity but was appropriate with high specificity for discrimination of forearm osteoporosis.

Keywords: Bone Density; Radiogrammetry

Journal of the Medical Association of Thailand. 2001; 84(Suppl. 2) : S599-S604