Correlation between QUS of phalanx and DXA in assessment of bone structure in patients under hemodialysis

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Abstract

Introduction: Many patients under hemodialysis, have osteopenia or even osteoporosis by the definition of the World Health Organization based on bone mineral density (BMD). Dual-energy X-ray absorptiometry (DXA), the standard method to assess BMD, is not always available. Quantitative ultrasound (QUS) of phalanx is an inexpensive, mobile, and radiation-free diagnostic alternative. There is few data about correlation of this method with DXA in patients undergoing hemodialysis. The present study assessed the value of QUS in detecting changes in bone structure in patients under hemodialysis compared with DXA.

Materials and Methods: The patients had End Stage Renal Disease (ESRD) who was referred for Bone densitometry in BMD ward of EMRC. BMD of the hip (neck and total) and spine was measured using a GE-Lunar DXA device (DPX-MD). QUS of phalanx was done in all of them using a DBM-Sonic 1200 device. This device measures amplitude dependent speed of sound (Ad-SOS). SPSS (10) was used for statistical analysis. ROC curve was drawn to measure the sensitivity and specificity of QUS of phalanx. P- Value less than 0.05 were considered as significant.

Results: In a cross-sectional analysis, 64 patients (37 men) with a mean age of 51.33+-15.20 years and mean dialysis time of 49.45+-45.62 months (2-180), were studied. DXA measurements established the diagnoses of osteoporosis in 31.3% in any of the total of femur or neck of femur or L2-L4 regions (25% in Neck , 18.8% in Total , 7.9% in L2-L4 regions).Using QUS of phalanx, osteoporosis diagnosed in 28.1% of patients . Using ROC curve, sensitivities of T-score ≤-2.5 of phalanx for diagnosing of osteoporosis in neck and total of hip and L2-L4 regions were respectively 37.5% and 50% and 80% and specificities were respectively 75% and 77% and 76%. Area under curve for neck, total and spine regions were 0.692 (P-value=0.022), 0.701 (P-value=0.031), 0.809 (P-value=0.023), respectively.

Conclusions: QUS of phalanx can be recommended for screening osteoporosis among hemodialysed patients. Those suspected of osteoporosis, should be examined by additional DXA measurement for establishment of diagnosis.

Key Words: Osteoporosis, BMD, DXA, QUS, and Hemodialysis.

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