DXA ERROR INFLUENCE ON THE ASSESSMENT OF A NOVEL ECHOGRAPHIC APPROACH TO OSTEOPOROSIS DIAGNOSIS ON THE SPINE

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Objective: To assess the clinical effectiveness of an advanced quantitative echographic method for osteoporosis diagnosis on femoral neck.
Materials and Methods: 273 female patients (55 –80 years) underwent both a femoral DXA and an echographic scan of the proximal femur. Data analysis algorithm was based on the closely integrated processing of B-mode images and corresponding "raw" unfiltered signals, performing a series of combined spectral and statistical elaborations ("echosound approach" [1]). A novel dedicated signal compensation tool was also employed, to better take into account the physiological differences related to the variable distance between the femoral neck interface and the probe, and the subsequent frequency-dependent attenuation due to the soft tissues. The diagnostic agreement between DXA, assumed as the gold standard reference, and the proposed echographic method was assessed by accuracy calculation, Cohen's k, Pearson correlation coefficient (r), root mean square error (RMSE), and Bland-Altman analysis.
Results: The overall agreement with DXA patient classification was88.3%(k=0.794,p<0.0001).A further confirmation of the good diagnostic performance was also provided by the significant correlation found between the echographically estimated values of BMD and the corresponding DXA-measured ones (r=0.81, p<0.001),and by the low residual error (RMSE=0.053g/cm2). The average difference between paired BMD measurements was −0.002±0.105 g/cm2 (bias ±2 SD).
Conclusions: The adopted signal compensation method resulted in an unprecedented diagnostic agreement between DXA and echographic osteoporosis diagnoses on the femoral neck, supporting the clinical translation of the employed echosound approach.

References:

1. Casciaro et al., Clin Cases Min Bone Metab 2015;12:142.

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