A NEW METHOD TO ESTIMATE THE GENERAL OSTEOPOROTIC FRACTURE RISK FROM AN ULTRASOUND SPINAL SCAN

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OBJECTIVE: To evaluate the performance of a new ultrasound (US)-based method for the prediction of generic osteoporotic fractures.

MATERIAL AND METHODS: 58 female patients [50-70 years; BMI (body mass index) $\leq$ 30 kg/m^2] were enrolled, 28 with a recent non-vertebral fragility fracture and 30 controls without fracture history. All the patients underwent two examinations: a conventional spinal DXA (Hologic Discovery) and an abdominal US scan of lumbar vertebrae. US data were analyzed by an innovative algorithm that processed both echographic images and "raw" radiofrequency signals providing as final output a new parameter named Fragility Score (F.S.), whose value is proportional to the skeletal fragility and, consequently, to the fracture risk. Fracture discrimination power of F.S. was compared with DXA-measured BMD by calculating areas under the receiver operating curve (AUC) and using unpaired two-sided Student *t*-test.

RESULTS: Both F.S. and BMD discriminated significantly between fractured and non-fractured women: F.S. values found in the fractured patients (56.8 ± 15.2) were significantly higher than the corresponding values found in the control group (46.6 ± 9.3, $p<0.01$) and BMD values of the fractured group (0.846 ± 0.143 g/cm^2) were significantly lower than the corresponding values found in non-fractured women (0.971 ± 0.139 g/cm^2, $p<0.01$). The comparison between the AUC values indicated that BMD (AUC=0.73) performed only slightly better than F.S. (AUC=0.71).

CONCLUSIONS: The proposed US approach showed a good performance in the discrimination between fractured and non-fractured patients and, therefore, has the potential to become an innovative tool for the estimation of osteoporotic fracture risk through early identification of frail patients.

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