DXA ERROR REDUCTION THROUGH QUALITY CONTROL AND IMPACT ON ECHOSOUND FEMORAL NECK DENSITOMETRY

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Objective: To assess the influence of dual x-ray absorptiometry (DXA) report inaccuracies on the performance of the Osteoporosis Score (OS), a recently introduced ultrasound (US) parameter for osteoporosis diagnosis on the femoral neck.

Materials and Methods: 191 patients aged in 50-75 years were enrolled in this study. They underwent a conventional femoral DXA and an echographic scan of the same anatomical site by the new EchoSound technology [1]. At first, all the DXA reports of the enrolled patients were considered as the reference to evaluate the performance of the OS parameter, calculating the diagnostic accuracy in patient classification (osteoporotic, osteopenic, or healthy) and the correlation coefficient between DXA-measured bone mineral density (BMD) and corresponding OS-derived BMD values. At a later stage, all those cases presenting a typical DXA error as identified by recent literature (e.g., incorrect patient positioning, presence of artifacts, improper image segmentation, etc.) [2] were excluded from the analysis and the actual diagnostic accuracyofthe EchoSound approachwasre-assessed byconsidering only those patients having a reliable DXA report.

Results: ConsideringalltheDXAreports,anoverallaccuracy of 80.6% in patient classification was obtained, and a good correlation betweenDXA-measuredBMDand corresponding OS-derived BMD values was measured (r=0.75, p<0.001). After the detailed examination of DXA reports, 63 patients (33%) were excluded from the analysis for the presence of various errors. An actual diagnostic accuracy of 92.2% (r=0.87, p<0.001) was obtained by considering only the remaining 128 patients having a reliable DXA report. Furthermore, the intra- and inter- operator repeatability of OS-derived BMD measurements were evaluated through the root mean square coefficient of variation (RMS-CV) which resulted to be respectively 0.28% and 0.35%. Conclusion: The common inaccuracies of the routine DXA reports lead toan underestimation of OSaccuracyin osteoporosis diagnosis. The actual performance of different ultrasonic methods that assumed routine DXA reports as the gold standard reference could be re-assessed employing the same approach.

References:

[1] Conversano et al, UMB 2015;41:281.
[2] Messina et al, Eur Radiol 2015;25:1504.

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