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ABOUT THE CLINICAL SIGNIFICANCE OF DEXA (Dual Energy X-Ray Absorptiometry) IN RENAL OSTEODYSTROPHY (ROD)

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We recently examined the argument of the clinical value of bone densitometry in renal failure. We know that in subjects without renal failure, who have a normally calcified bone, there is a good relationship between bone volume and bone mineral density (BMD). Accordingly, osteoporosis and increased fracture rate are diagnosed in the presence of low BMD values. At variance, patients with renal failure, have a variably impaired calcification, and bone formation can be increased enough to result in woven bone. Therefore the amount of calcium contained in a volume of uremic bone may be lower than normal, and bone mineral density may change independently of bone volume. Accordingly, the reference ranges for BMD values (mostly obtained with DEXA and derived from populations with normal renal function) must be used carefully in renal patients. Because bone histology is the gold standard for renal osteodystrophy, we verified the correspondence between DEXA and bone biopsy in 25 stage 5 CRF pts (51±11 y.o.; 11M/14F; HD since 102±66 months). In all we obtained biochemistries (Ca, P, AP, PTH, BGP), Lumbar (L) and Femoral (N) DEXA, and transiliac bone biopsy (bone histology and, in 17/25, static histomorphometry). Mean values (±SD) were: PTH: 604±491 pg/ml; AP: 204±151 mU/ml; BGP: 426±723 ng/ml; Ca: 9,8±1.3 mg/dl; P: 5.7±1.7 mg/dl; BMD-L 0.93±0.24 g/cm²; BMD-N 0.70±0.16 g/cm². ROD diagnoses were: 13 prevailing hyperparathyroidism; 7 Mild; 3 Mixed; 1 Osteomalacia and 1 ABD. T-Scores (L and N) were used to obtain 3 groups of pts: OP (>-2.5DS), Osteopenia (<-2.5>-1DS), or Normal BMD. For both sites (L and N) we did not observe the prevailing of any histologic diagnosis in any group. Patients with DEXA-OP had higher PTH, bone resorption and endosteal fibrosis as compared to DEXA-Normals (ANOVA p<0.03) but not different Bone Volume, Osteoid Volume and Calcified Volume. Negative correlations were found between PTH and L (r=-0.49, p<.05) and N (r=-0.7, p<.01) T-Scores and between these BMD parameters and semiquantitative evaluation of resorption (p<.05) and fibrosis (p<.05). PTH and AP correlated positively with resorption and fibrosis (p<.01). DEXA-L and N were also negatively correlated with Osteoid Surface (p<.05), Osteoclastic Surface (p<.01) and Osteoclasts Number (p<.01), but not with Bone Volume, Osteoid Volume and Calcified Volume. Our results suggest that DEXA-L or F: 1. Do not allow to distinguish between types of ROD; 2. Are not strictly correlated with bone volumes (calcified or not); 3. Are related to the severity of bone lesion, independently of its type. We conclude that in ROD the lower is the DEXA-BMD, the greater is the severity of the underlying bone lesion, independently of its type.