Spinal Bone Measurement in Renal Osteodystrophy

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Dear Sir, References

Trabecular bone of the axial skeleton is the more sensitive to metabolic changes [1, 2]. On the other hand, there is a poor prediction of spinal density based on radius density, both in osteoporosis and renal disease [3, 4]. Thus, direct spinal measurements are needed for monitoring this sensitive site. In this commitment computerized tomography (CT) [5, 7] and dual photon absorp-tiometry (DPA) [8, 9] have been widely investigated in recent years. DPA measures an integral of compact and trabecular bone, and the well documented increase in the calcium content of the aorta in uremic patients [10, 11] may be a major drawback of this method. CT has the advantage of allowing the spatial separation of trabecular bone of the spine. Mazess[3] contends that single-energy X-ray CT is subjected to very large accuracy errors (20–30%) in measuring trabecular bone of the spine, due to variability of marrow composition or osteoid proliferation. In renal osteodystrophy this error may be magnified by the presence of hyperostoidosis and marrow fibrosis. Mazess[3] believes that the previously reported changes of trabecular bone mass (TBM) of the spine by CT in renal osteodystrophy [12] are outside of the realm of those seen in bone biopsy. In 16 patients (13 with chronic renal failure and 3 successfully transplanted) we have compared TBM assessed by CT with histomorphometry of the undecalci-fied iliac crest bone biopsy [13]. A highly significant correlation was found between TBM assessed by CT and trabecular bone volume (mineralized + osteoid) ($r = 0.84$; $p < 0.001$). A good correlation was also found with mineralized bone volume, but at a lower level of significance ($r = 0.74$; $p = 0.001$), suggesting that final CT value is an integral of mineralized bone and osteoid with a higher influence of mineralized bone. These findings indicate that a much lower accuracy error than that reported by Mazess[3,4] is subjected to single-energy X-ray CT. We believe that an accuracy of 5–8% as has been found by Genant et al. [5] is more appropriate. In the future, changes of TBM assessed by CT in chronic renal failure patients during chronic hemodialysis, after vitamin D therapy or successful transplantation, must be established and compared with histomorphometry of repeated bone biopsies.

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T. Torres

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Torres

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