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EVOLUTION OF BONE MINERAL DENSITY AFTER RENAL TRANSPLANTATION USING QUANTITATIVE CT SCAN

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Patients of chronic kidney disease show decreased bone mineral density (BMD), which may persist after successful renal transplantation. We used quantitative CT (QCT), which is superior to DEXA scan in detecting early changes from trabecular bone, to assess BMD in ESRD patients and its evolution after transplantation.

A total of 56 ESRD patients (47 males) who underwent live related renal transplantation at our institute were enrolled in this prospective observational study. BMD was assessed at the lumbar spine using single energy QCT (GE light speed) < 1 month before, and 3 and 6 months after transplantation. All patients received calcineurin-based immunosuppression.

The BMD, T score and Z score before transplantation were 172 ± 53 mg/cc, 0.07 ± 1.8 and 0.26 ± 1.7 respectively. Mean PTH before transplantation was 265.41 ± 257.71 pg/ml (range: 9 to 1350 pg/ml). Seven patients (12.5%) had PTH < 50 pg/ml, whereas 16 (28.6%) had PTH > 300 pg/ml. Pre-transplant BMD did not correlate with dialysis duration or PTH. Fifteen (37.5%) patients continued to have elevated PTH 6 months after transplantation. BMD declined by 11.8% at 3 and 16% at 6 months ($p < 0.0001$) after transplantation. BMD loss was greater in those with post-transplant hyperparathyroidism. Cumulative cyclosporine or tacrolimus doses did not correlate with bone loss but cumulative prednisolone dose had a marginal correlation ($p = 0.06$). The BMD loss was similar in those with or without acute rejection episodes.

QCT is a sensitive tool for measuring BMD in trabecular bone. Lumbar BMD declines after renal transplantation and this bone loss is evident as early as 3 months after transplantation. Persistent hyperparathyroidism and prednisolone therapy are associated with this pronounced bone loss.