

(25-OH-D<sub>3</sub>) in plasma were determined in 18 patients undergoing hemodialysis.

Ca showed low mean value of  $8.1 \pm 0.5$  mg/dl and Ca<sup>++</sup> was found in the level of  $4.13 \pm 0.41$  mg/dl, and so Ca<sup>++</sup>/Ca showed a high level. P revealed high mean value of  $6.48 \pm 2.06$  mg/dl. Al-P was in level of  $8.9 \pm 3.5$  KAU. The value of PTH was more than 7.8 ng/ml (normal 0.5 ng/ml) and  $2.45 \pm 3.24$  ng/ml in mean value. Therefore, every patient was diagnosed as secondary hyperparathyroidism. The level of CT was high in 15 cases, and normal in 3 cases. The mean value of 25-OH-D<sub>3</sub> was very low ( $14.9 \pm 12.9$  mg/dl). The remarkable correlation between PTH and Ca ( $r = -0.3477$ ) and the one between PTH and Al-P ( $r = 0.6084$ ) were observed. However, no relation between PTH and Ca or between PTH and Al-P was observed in all the patients except one with high PTH level of 15 ng/ml and vascular calcification.

Among 11 cases except one described above,

the mean value of PTH reduced significantly from  $1.46 \pm 0.77$  ng/ml to  $0.82 \pm 0.50$  ng/ml after one-month of the administration of 1 $\alpha$ -hydroxycholecalciferol (1 $\alpha$ -O-D<sub>3</sub>), but Ca showed no significant change. Another month of the administration later, the level of Ca increased significantly from  $8.2 \pm 0.5$  mg/dl to  $9.3 \pm 1.4$  mg/dl. The value of Ca elevated more markedly in cases with low PTH level than in those with high PTH level after 1 $\alpha$ -OH-D<sub>3</sub> treatment.

As Ca was increased after decrease of PTH, 1 $\alpha$ -OH-D<sub>3</sub> may suppress the secretion of PTH directly. More 1 $\alpha$ -OH-D<sub>3</sub> was needed to elevate Ca in cases with high PTH level than in those with low PTH level. This fact is suspected that plasma 1 $\alpha$ -25-dihydroxycholecalciferol is of low value in the former than in the latter. It is supposed that renal osteodystrophy is pathogenetically caused by secondary hyperparathyroidism which resulted from decrease in plasma 1 $\alpha$ -25-dihydroxycholecalciferol.

## Clinical Study of Renal Osteodystrophy in Patients Treated With Chronic Hemodialysis Part II. Whole body Skeletal Scintiphotography

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Morphological evaluation of renal osteodystrophy has mostly been performed using bone X-ray examination. As bone scintiphotography is a highly sensitive indicator of focal and generalized skeletal disorders and reflects the osseous metabolic turnover, we have studied <sup>99m</sup>Tc-methylene diphosphonate (<sup>99m</sup>Tc-MDP) skeletal scintiphotographic findings in 15 patients on chronic dialysis, with clinical and laboratory evidence of secondary hyperparathyroidism and renal osteodystrophy. 8 patients of them were treated with 1 $\alpha$ -OH-D<sub>3</sub> for 1–3.5 months and its efficacy was judged by skeletal scintiphotography. Patients received a dose of 5–10 mCi <sup>99m</sup>Tc-MDP intravenously, and anterior and posterior whole body scans were obtained with 5:1 minification about 3 hours later.

The results are as follows:

- 1) all 15 patients (100%) had abnormal accumulation on the scintiphotograms, while roentgenographic abnormalities were present in only 6 patients (40%), indicating that scintiphotography is superior to X-ray in the early detection of skeletal changes.
- 2) the most frequently involved regions found by scintiphotography were the large joints, sternum, ribs, spines and pelvis.
- 3) the whole body skeletal scintiphotography is very useful as a supplementary diagnostic method of renal osteodystrophy.
- 4) it is possible to judge therapeutic efficacy by means of whole body skeletal scintiphotography, too.