(25-OH-D₃) in plasma were determined in 18 patients undergoing hemodialysis.

Ca showed low mean value of $8.1 \pm 0.5 \text{ mg/dl}$ and Ca⁺⁺ was found in the level of $4.13 \pm 0.41 \text{ mg/dl}$, and so Ca⁺⁺/Ca showed a high level. P revealed high mean value of $6.48 \pm 2.06 \text{ mg/dl}$. Al-P was in level of $8.9 \pm 3.5 \text{ KAU}$. The value of PTH was more than $7.8 \text{ ng/ml}$ (normal $0.5 \text{ ng/ml}$) and $2.45 \pm 3.24 \text{ ng/ml}$ 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-D₃ was very low ($14.9 \pm 12.9 \text{ mg/dl}$). 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 $15 \text{ ng/ml}$ and vascular calcification.

Among 11 cases except one described above, the mean value of PTH reduced significantly from $1.46 \pm 0.77 \text{ ng/ml}$ to $0.82 \pm 0.50 \text{ ng/ml}$ after one-month of the administration of 1α-hydroxycholecalciferol (1α-O-D₃), but Ca showed no significant change. Another month of the administration later, the level of Ca increased significantly from $8.2 \pm 0.5 \text{ mg/dl}$ to $9.3 \pm 1.4 \text{ mg/dl}$. The value of Ca elevated more markedly in cases with low PTH level than in those with high PTH level after 1α-OH-D₃ treatment.

As Ca was increased after decrease of PTH, 1α-OH-D₃ may suppress the secretion of PTH directly. More 1α-OH-D₃ was needed to elevate Ca in cases with high PTH level than in those with low PTH level. This fact is suspected that plasma 1α-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 1α-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 scintigraphy is a highly sensitive indicator of focal and generalized skeletal disorders and reflects the osseous metabolic turnover, we have studied $^{99m}$Tc-methylene diphosphonate ($^{99m}$Tc-MDP) skeletal scintigraphic 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 1α-OH-D₃ for 1–3.5 months and its efficacy was judged by skeletal scintigraphy. Patients recieved a dose of 5–10 mCi $^{99m}$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 patinet (100%) had abnormal accumulation on the scintigraphograms, while roentgenographic abnormalities were present in only 6 patients (40%), indicating that scintigraphy is superior to X-ray in the early detection of skeletal changes.
2) the most frequently involved regions found by scintigraphy were the large joints, sternum, ribs, spines and pelvis.
3) the whole body skeletal scintigraphy 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 scintigraphy, too.