

patients who had been in state of paralyses for more than one year, more ^{99m}Tc -albumin was accumulated in the affected side than unaffected

side of bones. Conclusively distinct correlation between the accumulation of phosphates and blood supply was not obtained.

Bone Scintigraphy of New Bone Formation at the Donar Site Following Excision of Fibula

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Where much of bone transplant is needed, especially when the situation requires a bone transplant which is long enough or can provide an adequate support, the fibula is chosen to serve for such a therapeutic purpose not infrequently. In the present study we made an observation of donar sites of fibulas for the time course of new bone formation following bone excision in an attempt to investigate the regenerating ability of the bone as related to age at operation by bone scintigraphy and roentgenography.

Thirty-six cases were involved in this study. The age at operation in this series ranged from 1 year and 9 months to 63 years and the duration of postoperative follow-ups averaged 3.5 years. Bone scintigraphy and roentgenography were done 1, 2 and 3 months postoperatively and at 6-month intervals thereafter.

Results:

In order to study the relationship between the age at operation and the regenerating capacity of bone, the subject patients were divided into 2 groups depending upon whether the operation was performed before or after closure of the linea

epiphysialis.

Seventeen cases underwent operation before closure of the linea epiphysialis at an average age of 8.5 years. In all of these cases bone scintigrams demonstrated marked radioisotope concentration over the entire area of bone defect one month postoperatively before corresponding changes were visualized by roentgenograms. New bone formation was satisfactory in all instances.

Another 19 cases received operation after closure of the linea epiphysialis at an average age of 29.8 years. Bone scintigrams demonstrated a slight degree of radioisotope concentration at both proximal and distal ends of one defect but failed to reveal any discernible radioisotope concentration in the diaphysis at any postoperative stages. Moreover, there was evidence of poor bone formation occurring in the defective area. These findings suggest that regeneration of the fibula might be unexpected following surgical excision of the bone done later than closure of the linea epiphysialis, even if the periosteum is adequately preserved.

Clinical Study of Renal Osteodystrophy in Patients Treated with Chronic Hemodialysis Part 1. Calcium-Regulating-hormones

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Calcium (Ca), phosphorus (P), and alkaline phosphatase (Al-P) in serum, and ionized cal-

cium (Ca^{++}), parathroid hormone (PTH), calcitonin (CT), and 25-hydroxycholecalciferol

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

Ca showed low mean value of 8.1 ± 0.5 mg/dl and Ca⁺⁺ was found in the level of 4.13 ± 0.41 mg/dl, and so Ca⁺⁺/Ca showed a high level. P revealed high mean value of 6.48 ± 2.06 mg/dl. Al-P was in level of 8.9 ± 3.5 KAU. The value of PTH was more than 7.8 ng/ml (normal 0.5 ng/ml) and 2.45 ± 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-D₃ was very low (14.9 ± 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 ± 0.77 ng/ml to 0.82 ± 0.50 ng/ml after one-month of the administration of 1 α -hydroxycholecalciferol (1 α -O-D₃), but Ca showed no significant change. Another month of the administration later, the level of Ca increased significantly from 8.2 ± 0.5 mg/dl to 9.3 ± 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 α -OH-D₃ treatment.

As Ca was increased after decrease of PTH, 1 α -OH-D₃ may suppress the secretion of PTH directly. More 1 α -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 1 α -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 α -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 ^{99m}Tc-methylene diphosphonate (^{99m}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 α -OH-D₃ for 1–3.5 months and its efficacy was judged by skeletal scintiphotography. Patients received 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 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.