partly due to the decrease in metabolic clearance rate of rT_3. In in vitro experiments to observe production of T_3 from T_4, production of T_3 was increased in hyperthyroid rats and decreased in starved rats indicating that changes in production rate was another important factor to regulate serum concentrations. From these results, it is suggested that metabolism of T_4 changes greatly in many diseases due to changes in metabolic clearance rate of each metabolite and to changes in metabolic pathways. Changes in T_4-metabolism may be related to the essential pathophysiology in each disease and could be employed for diagnosis.

Bone Scintigraphy in Patients with Chronic Renal Failure on Dialysis

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Early detection of alteration in mineral contents of the skeletal system has always been a difficult problem.

Here is reported the comparative study of bone scan and CT scan in the patients with chronic renal failure on maintenance dialysis. Bone scan with ^{99m}Tc-phosphate compounds was performed in 9 male and 7 female patients. The age ranged from 19 to 50 years and the duration of dialysis was 1 to 55 months. Scan was performed 3 hours after IV injection of 15mCi ^{99m}Tc-EHDP or MDP. Anterior and posterior whole body images were obtained by Toshiba 5-inch dual scanner. Then, spot scintigraphic images of anterior and lateral calvarium, and of hands were also obtained by Pho/Gamma HP camera. The bone image was classified into positive and negative scan (Positive scan: symmetrically high activity in the calvaruim, mandible, sternum, vertebrae and ribs. Negatice scan: being equal to normal uptake or decreased bone uptake but high background.) Bone scans in 6 of 16 patients were found to be positive.

Within one to 2 weeks after bone scan the calvarium of the patients was scanned with EMI CT 1000 (matrix 160×160) using 13 mm slice thickness. The plane of the scan slices was oriented 15 to 20 degrees toward feet in relation to the orbitomeatal line. The scanner was operated with 120kV, 33mA. A slice, usually 7 cm above the orbitomeatal line, was studied as a polaroid picture (window level 400, window width 100) and as a numerical print-out (160×160). The numerical print-out was analyzed in the area of the frontal bone approximately 1.5 cm from the midline, EMI number 300 being chosen as a cut-off for differentiating bone from soft tissue. Average EMI number was calculated from the numerical print-out in the study group and in the control group. EMI number of the study group was significantly low compared to that of the control group.

Subperiosteal bone resorption of the phalanges on radiogram was found in 3 of the 6 positive bone scan cases. The degree of bone scan and CT scan abnormalities correlated well with the duration of the dialysis, level of the serum alkaline phosphatase, and the PTH.

One patient was treated with α-D_3 for 3 months. Follow-up study of this patient showed no significant change in serum chemistry, bone scintigram and CT scan, compared to that of the initial study.

The usefulness of radionuclide bone scan for investigating the skeletal effects of hyperparathyroidism was first reported by Sy et al, and bone scan can detect changes of bone, particularly of the calvarium, earlier than radiography. However, it is difficult to evaluate the effect of the medical treatment on the bone disease only by bone scan, because this is not a real quantitative study. It is possible to measure bone mineral content of the calvarium quantitatively by means of CT scan. So, combination of the bone scan and CT scan is the most useful method to detect early change of the bone mineral content.