Charactertics of Bone Scintigram in Various Diseases of Aged People

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Bone scannings were performed by ^{99m}Tc-labeled polyphosphate, pyrophosphate or diphosphonate in 120 adults including 48 male cases and 54 female cases (61 Y.O.–94 Y.O.) and 3 children. 1) The comparison of three phosphates labels in bone scanning was made. There were no significant differences between these three compounds. Pyrophosphate, however, had the best stability, reproducibility in imaging and high labeling yield among these compounds. 2) The age difference of RI distribution was compared. Children accumulated labels predominantly to the lower extremities but young adults (19 Y.O.–27 Y.O.) indicated the relative decrease in distribution of RI in the lower extremities. Then aged older people stared to show the increased accumulation of labels in the lower extremities probably due to negative balance of bone metabolism. 3) Femoral neck fracture is frequently found in aged people. In these cases density of the fractured side increased compared with the intact side extending not only in the affected bone but further down to the end of the lower extremities. This phenomenon was found in 52% of the preoperative cases and in 65% of the postoperative cases. 4) 8 cases of osteoporosis had high density in the parts of fracture. One of hyperparathyroidism, which had no bony change in the radiography, also did not show the abnormal accumulation of labels in bone scanning. The other case of hyperparathyroidism, which was found to have adenoma by operation, to indicate otitis fibrosa cystica (generalisata) by bone biopsy and to have osteomalacia by radiography and autoradiography, had increased accumulation of the label in the pelvis, both knee joints and other skeletons. 5) Multiple bony metastases from prostate cancer were shown in the various skeletons of 25 cases. Bone- survey by radiography, however, frequently missed these metastatic lesions. 6) 6 cases of gonitis deformans, 5 cases of coxitis deformans and 2 cases of aseptic necrosis of femoral head had also high densities in the diseased parts. 7) 4 cases of rheumatoid arthritis showed multiple increased densities in the many affected joints.

Bone scanning by ^{99m}Tc-labeled condensed phosphates seemed to be superior to the other bone seekers such as ^{85}Sr and ^{87m}Sr. Extremely improved sensitivity of the bone imaging by this new labelenabled us to make more improved

diagnosis of the bone lesions, if not definitive, which are not disclosed by the routine radiography bone survey. Then bone scanning must be performed at first in the aged patients complaining of gonalgia or coxalgia because positive findings appear in the bone scanning of these patients before positive findings appear in the radiography. ^{99m}Tc-labeled pyrophosphate accumulates not only to the osteoplastic lesions such as metastases to bone from prostate but to the osteolytic lesions such as osteoporosis and hyperparathyroidism where negative bony metabolic balance exists.

Since geriatric patient has frequent incidence of bone diseases such as osteoporosis, fracture, gonitis, coxitis and bony metastases due to various malignancies, introduction of reliable bone scanning method provided us not only diagnostic accuracy but also the new means to study the mechanism of agings of bone. Reading of the bone scanning in aged people should be based on the different criteria from younger adult since the difference of bone image was so significant when compared with other organ imagings.

The Diagnosis and Observations on the Course of Treatment in Bone Diseases

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Numerous reports have already been made on the usefulness of scanning in the diagnosis of bone diseases. We, in our department, have thus far performed bone scanning in 735 cases of diseases of or trauma to bone in an attempt to study its diagnostic value in various pathologic conditions of bone. This series comprised 363 cases of periosteomyelitis, 148 cases of bone tumor, 132 cases of fracture and 93 others. The purpose of this communication is to outline our data concerning the usefulness of bone scanning in the diagnosis and in the evaluation of response to therapy of bone tumor, periosteomyelitis and fracture among orthopaedic conditions studies. As radionuclide we used ^{85}Sr initially and then ^{87m}Sr from February, 1969 on and have used ^{99m}Tc polyphosphate compound since autumn of the last year. We make it a rule to perform profilescanning first and then photoscanning. From profilescintigrams the left-to-right ratio of hot area is obtained, which, after subjected to classification, serves as a means of evaluating disease activity. Photoscintigrams, which permit to estimate the extension of lesion, are subject to computer analysis after rescanning; the information recorded on a tape, when analyzed by a medical analyser, scintipac-200, permits to make a study of iso-counting rate curve, iso-counting rate distribution diagram, 3-dimensional presentation and RI deposition on a given section of bone.

The results obtained in this series warranted us to conclude: (1) that in bone tumors scintiscanning of bone not only provides an effective means of early diagnosis and of making diagnosis as to the location and extension of lesion but also permits to evaluate response to therapy, radiotherapy for example; (2) that in periosteomyelitis it enables us to make observations for therapeutic response, to evaluate therapeutic effectiveness and to make a decision on therapeutic policy and hence provides a procedure of great diagnostic aid to be used in conjunction with the conventionally