Clinical Experiences of Bone Scanning with ^{99m}Tc-Diphosphonate

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Whole body bone scintigrams were taken on 204 patients with ^{99m}Tc-polyphosphate (35 cases), ^{99m}Tc-pyrophosphate (54 cases), ^{99m}Tc-pyrophosphate by electrolysis method (28 cases), and ^{99m}Tc-diphosphonate (87 cases), and the scintigram qualities were compared with each other on the basis of general appearance and liver image which should not be visualized with well prepared agent. The qualit was divided into three grades, such as "good", "acceptable", and "not good". Polyphosphate group was judged as "good" in 87.5% whereas pyrophosphate in 79.6%, pyrophosphate of electrolysis method in 75.0% and diphosphonate in 85.1%. The ratio of "not good" was 11.4% with polyphosphate, 5.6% with pyrophosphate, 0.0% with pyrophosphate of electrolysis method, and 1.1% with diphosphonate. Strong accumulation in the liver was seen in 11.4% with polyphosphate, 3.7% with pyrophsphate, and 0.0% with both pyrophsphate of electrolysis method and diphosphonate. Therefore, it can be said that the accumulation in the liver interferes with general image quality in a great deal. Although the ratio of good image quality was the best with polyphosphate, we found that diphosphonate provides us more constantly good images than others do.

As well mentioned by others already, there are confusing accumulations in some areas in the body, such as asymmetrical accumulation in joints, spotty accumulation in sternum, and sometimes marked accumulation in the area of thyroidal and cricoid cartilages. In this respect, interrelation between the age and the grade of accumulation in the area of thyroidal and cricoid cartilates was checked. From this study, it was found that the incidence of accumulation in this area and its grade become higher as the age goes up in general. Therefore, ossification of the cartilage will be the cause of such accumulation to some extent.

Bone Scanning with ^{99m}Tc-Pyrophosphate

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The purpose of this study is to evaluate the usefulness of ^{99m}Tc-pyrophosphate as a bone tumor scanning agent. Bone scannings have been carried out in ninety-eight regions in seventy-one patients, including six cases of primary bone tumor, fifty-two cases of malignant diseases in various organs.

Five to seven millicuries of ^{99m}Tc-pyropho-

sphate was intravenously administered, and two to five hours, scannings were wade with conventional rectilinear scanner and gamma camera.

Positive scans were obtained in 100% of patients with primary bone tumors, in 59% of regions in bone scannings of malignant diseases in variousorgans. In fourteen regions with metastatic tumors of bones were detected prior to observable changes in X-ray films.

In conclusion ^{99m}Tc-pyrophosphate provides us with a high quality, rapid method of evaluating bone disease and it was proved to be useful bone scanning agent for primary or metastatic tumors.

Observations on the Course of Treatment of Primary Malignant Bone Tumors by Bone Scanning

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Concerning the effect of radiation therapy in the management of primary malignant bone tumors, it is no unanimity of opinion as yet. In recent years, however, ^{60}Co-γ rays and high pressure X-rays have been applied increasingly and survical effect due to the treatment has been observed in some kinds of tumor. We conducted bone scanning at various times prior to and after treatment and investigated its advisability for the observation on the progress under treatment and the assessment of conditions of diseases. Histological features of primary lesions were also examined before and after radiation.

Forty-two patients with primary malignant tumors receiving rediation therapy in our clinic were studied; 25 cases in osteosarcoma, 7 cases in Ewing's tumor, 2 cases in reticulosarcoma, 5 cases in fibrosarcoma, and 3 cases in chodrosarcoma. The patients were given 200—500 rads of ^{60}Co-X rays or linac once daily. The total dose is ranged from 22,000 rads to 2,400 rads in an average of 9,870 rads. Scan was carried out before radiation, at the end of radiation and every six months after radiation. ^{87m}Sr was used as nuclide, and scan was carried out an hour after i.v. injection of 2 mCi. Recently, scan has been carried out three hours after i.v. injection of 10 mCi. of ^{99m}Tc-pyrophosphate.

Result: Scintigrams prior to and during radiation therapy revealed high concentration of RI at the site of the lesions, but after treatment, it showed decrease with the lapse of time. Bone scanning as well as roentgenografic examination was very effective for the observation of progress under radiation therapy and the assessment of conditions of diseases. Histological examination made three months after radiation revealed appreciable degneration of tumor cells in the patient who had received a total of 11,000 rads. In another patient who had received a total of 18,600 rads fibrosis was seen cleary, and it appeared that activity of tumor tissue was disturbed to a considerable extent.