

much better than that of scintiscan, due to the differences of the operating time in both methods. From these result, the best appearance time was at 3-4 hours after intravenous injection of both radiopharmaceuticals. And it was less images of the liver, spleen, and others. Comparatively, the use of the both radiopharmaceuticals in the diagnosis of the

primary or metastatic bone tumors were very valuable. Furthermore, we were considered that these examinations were very safety, inexpensively and perfectly visualized the abnormal finding. Adding, the radiation dosages to the practitioners and patients were much lower than that of the roentgenographical procedures.

Diagnosis of Carcinoma of the Prostate with Bone Metastasis: 5 Hours Urinary Excretion Test of ^{99m}Tc-Labeled Pyrophosphate

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Bony metastasis of thirty six cases with prostate cancer, being proved histologically, was studied by both bone scanning and radiography. In addition, thirteen cases was determined urinary excretion rate for five hours after ^{99m}Tc-labeled pyrophosphate injection.

The bone scanning was performed three hours after injection of 10 mCi of ^{99m}Tc-labeled pyrophosphate using minified whole body scanner (Shimadzu) and life size rectilinear scanner (Graphic-Abbott) in the interesting regions.

Age of the patients studied was ranged from 57 years old to 84, with a mean age of 72.6 years old.

Cases examined were classified into five groups according to the spreades of metastases; stage 0 stands for no metastasis proved, stage I for metastases to the pelvis and/or lumbar spine, stage II for thoracic spine and/or thor-

acic cage other than stage I, stage III for cranial region or lower extremities besides stage II, and stage IV means metastases to the bones throughout the body.

Calculation of urinary excretion rate was made as follows:

$$\begin{aligned} &\text{urinary excretion ratio (\%, 5hrs)} \\ &= \frac{\text{urine count}}{\text{standard count}} \\ &\quad \times \frac{\text{mCi of standard}}{\text{mCi of administration dose}} \times 100 \end{aligned}$$

Normal range of urinary excretion rate was indicated $49.9 \pm 3.5\%$ /5hrs for adult (mean age of 35 years old) and $29.9 \pm 1.9\%$ /5hrs for the aged (mean age of 68.5 years old).

Stagings both by bone scan and by radiography were found to be equal in twelve-three cases (63.9%). Only one case with normal bone scan showed abnormal radiography which is most probably benign osteosclerosis.

The rest of twelve cases (33.3%) was diagnosed far better by ^{99m}Tc -labeled pyrophosphate scan than by radiography.

In seventeen cases (47.2%), the sites of abnormal accumulation of radioactivity were observed in the same regions of bones on radiography plus the other sites where no abnormal shadow was found in X-ray study.

Urinary excretion rate of ^{99m}Tc -labeled pyrophosphate was classified according to the staging of the bone scan.

In four cases with generally disseminated metastases (stage 4), urinary excretion rates were indicated lower values, 7.9, 3.8, 1.4,

0.7% respectively.

In those patients, no visualization of kidney with ^{99m}Tc -labeled pyrophosphate was found.

In summary, bone scanning of ^{99m}Tc -labeled pyrophosphate is more superior for the detection of metastasis to X-ray bone survey.

This suggests bone scan is suitable for early detection as well as screening of bone metastasis of prostatic cancer.

Five hour urinary excretion test of ^{99m}Tc -pyrophosphate was found to be of value to differentiate cases with multiple disseminated metastasis from cases with limited metastasis.

Bone Scintiscan with Tc-99m Pyrophosphate —Availability of RI Data Processing System—

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This report deals with the availability of RI data processing system (JAC-120m), in order to determine that slight difference of RI activity has pathological significant in various bone diseases.

The materials studied in this report consist of the cases with metastatic bone lesion, fractures of the facial bones and with joint diseases. In operation of RI data processing system, the following factors were combined, namely addition, subtraction, multiplication, division, logarithm, square, cut off, smoothing, rotation and region of interest (ROI), and various conditions were studied. In observation of the processed data, the following displays were

used, namely profile, oblique, contour map, typeout map and routine.

Valuable procedures comparing with scintiphotos were processing constant subtraction, smoothing and ROI. In comparison of ROI pointed at symmetrical region in bilateral maxillar bones, there noted 2 to 16 per cent of difference in normally whereas 40 to 700 per cent of difference in ROI of pathological lesion was observed. In comparison of ROI pointed at vertebral bodies without metastasis, there noted only 2 to 10 per cent of difference whereas at those with metastasis 40 to 36 per cent of difference was observed.