

used diagnostic procedures, such as x-ray, clinical and laboratory examinations; and (3) that the procedure may be used effectively in cases of bone

fracture for appraising post-treatment course and healing status (e.g. delayed union), for diagnosing pseudarthrosis as well as for evaluating prognosis.

An Evaluation of the ^{99m}Tc -Sn-polyphosphate or ^{99m}Tc -Sn-pyrophosphate scan for the Detection of Bone Metastases from Prostatic Carcinoma

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Cancer of the prostate is the most common neoplasm metastatic to bone. Early detection of skeletal involvement is important in ascribing prognosis and selection of therapy.

The purpose of this study is to assess the usefulness of bone scans utilizing ^{99m}Tc -Sn-polyphosphate (Tc-Po) or ^{99m}Tc -Sn-pyrophosphate (Tc-Py) for the detection of metastases from carcinoma of the prostate.

Materials and Methods: Selected for study were 32 patients with various clinical stages of prostatic carcinoma. Histologic proof of their disease was obtained prior to scans.

Tc-Po or Tc-Py was prepared in the usual manner. Each patient was given 5 to 10mCi of it intravenously.

Scans were performed from 2 to 5 hours after injection with scintillation camera (Nuclear Chicago, PHO/Gamma HP) or scintillation scanner (Aloka, JSS-104 and Shimazu, SCC-130W).

Roentgenograms of the whole body were obtained and serum acid phosphatase and serum alkaline phosphatase were determined. All of the scans and radiographs were reviewed by the author. They were judged to be abnormal (positive) or normal (negative) for evidence of increased uptake of isotopes or bone metastases respectively.

Results: Eighteen patients (56%) had radiographic evidence of bone metastases with all of the lesions being osteoplastic in type. In each case the radioisotope scans showed increased concentration of Tc-Po or Tc-Py in the corresponding areas. The extent of tumor involvement as delineated on the scan was generally the same as or greater than that shown on the radiograph. Seventeen patients (53%) had an abnormally elevated serum acid phosphatase and fifteen patients (47%) had an abnormally elevated alkaline phosphatase.

Twenty patients had an abnormal scan. Of these patients with an abnormal scan, eighteen (90%) had radiographic evidence of bone metastases. Thirteen patients (65%) had an unusually high serum alkaline phosphatase and it was more than patients who had an unusually high serum acid phosphatase (12 patients, 60%).

Twelve patients had a normal Tc-Po or Tc-Py scan. Of these, none had radiographic evidence of bone metastases and abnormally elevated serum alkaline phosphatase. Four patients (33%) in this group had an elevated serum acid phosphatase.

Bone biopsies of the abnormal areas noted on scans were obtained in seven cases, and four metastatic adenocarcinomas were proved.

Regions with abnormal scan and with normal

X-rays were ribs (7 cases), sterns (5 cases), skulls (3 cases) and others.

Conclusion: In this study, I have investigated the use of Tc-Po or Tc-Py bone scanning in an attempt to find a more accurate method for the early detection of osseous metastases from prostatic carcinoma.

The results of my study suggest that the Tc-Po or Tc-Py bone scan is more sensitive than the

skeletal radiograph in the detection of metastases from carcinoma of the prostate. I feel that Tc-Po or Tc-Py bone scan is a more valuable diagnostic parameter than roentgenograph, serum acid phosphatase and serum alkaline phosphatase in managing patients with prostatic carcinoma. However, there remains the problem that Tc-Po or Tc-Py bone scan is not specific to bone metastases from prostatic carcinoma.

Indication and Availability of Bone Scintiscan on Diseases of the Pelvis

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In pelvis variety of bone disorders is encountered, and as diagnostic measurement besides roentgenogram, bone scintiscan has been utilized in many occasions.

This paper deals with review on the extent of indication and availability in the bone scanning.

In our clinic, the bone scintiscan has performed in total of 925 cases with 1104 times since 1968 to 1973. Based on our experience from these scanning, some characteristic features on several diseases of the pelvis including hip joint were analysed.

In this series as bone seekers, ^{85}Sr (20 to 100 microcurie) was used in earlier period, and in later period $^{87\text{m}}\text{Sr}$ (0.3 to 3 millicurie) has been used since 1969. Recently $^{99\text{m}}\text{Tc}$ pyrophosphate (2 to 12 millicurie) has been also used.

The scintigrams were obtained through conventional scanner equipped with 3 inch diameter crystal and scinticamera. The scintigraphic data were superimposed roentgenogram obtained by 2

meter focus distance and localization of radioisotope uptake was studied.

The information obtained from scintiscan on skeletal metastasis of malignant tumor, has several advantages as previous reports already pointed out. Of these, the availability for confirmation of roentgenographic finding is most valuable which is recognized again recently. For example, when bone metastasis is suspected by roentgenogram with positive scanning then diagnosis is reliable, and with negative scintiscan result is false. The rate of detection for bone metastasis by scintiscan is indeed quite high.

In primary malignant bone tumor, scintigram has significant value for diagnosis on extent of its bony infiltration rather than its type and quality.

In benign bone tumor, except for some cases, there note no characteristic findings on scintigram.

In degenerative coxarthrosis, scintigram has different and specific findings according to each