

## O. Bone and Joints

### Diagnostic Scignificance of Computer Scintigrams for Bone Diseases

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**Purpose:** It is the purpose of this study to try image processing of bone scintigrams using clinical data system on-line and to utilize them clinical diagnosis.

**Method:** The state of RI accumulation at the affected site and normal site immediately after i.v. injection was recorded with data store playback accessory using Pho/Gamma scinticamera. After 3 hours, miniscan and life size scan of the affected were carried out with whole body scanner, model scc-750w. Concerning these data, various programs for image processing and for image display were investigated using SCINTIPAC-200 through image interface on-line.

**Result:** (1) By using local program for processing a histogram, it is possible to analyze numerically the change of RI accumulation with time at the affected site and normal site and to assess condition of diseases.

(2) As image display programs effective to the diagnosis of the bone diseases the followings were investigated: MAP display, isocount line display, profile display, etc. It is considered that they are all of useful help to find out smaller lisions of bone diseases and to measure RI distribution quantitatively and contribute to the improvement of the accuracy of diagnosis.

### Experiences of Bone Scanning with Tc-99m-diphosphonate

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About 55 various bone disease caces, we took bone scanning with Tc-99m-diphosphonate.

And we compared their results with 58 cases with Tc-99m-pyrophosphate. Giving 10 mCi of Tc-99m-diphosphonate intravenously in adult cases we observed the state of accumulation in bone. After 3 hours we took 1/5 minisize scintigram of whole body and life size scintigram of bone lesion by S.C.C. 750W whole body scanner.

Results were as follows;

1. In the early period (about 5 minutes to 10 minutes after), the accumulation to the normal part reached plateau but that of the affected part was apt to increase.
2. After one hour, the activity of RI in the blood decreased less than 10%.
3. To get the good picture that has little

background, it is good method that begins the scanning after intravenous injection, more 2 hours after. In spite of this method, we got the high background scintigram in 12% cases.

4. We could not take notice of the particularity of the image every diseases.
5. Although we took scintigrams after urination, the observation of pelvic bone needs notice because the high accumulation to kidney and urinary bladder.
6. We could not notice of the evident relative merits of Tc-99m-diphosphonate between Tc-99m-pyrophosphate.
7. Remarkd above, there are some problem but this is superior radioactive preparation.

### **Scintigraphical Studies of the Bone Using <sup>99m</sup>Tc-Pyrophosphate and di-Phosphonate**

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67 cases in our hospital, having the possibility of the primary or metastatic bone tumors, were performed the whole body mini-scan after intravenous injection using 10mCi of <sup>99m</sup>Tc-pyrophosphate or di-phosphonate. Also, scintigraphic differentiation between scinti scan-photos. and camera images were compared. The both radiopharmaceuticals were obtained from Dainabot RI Lab. Ltd..

In 67 cases, the positive finding cases on the roentgenogram and scintigram were almost similar ratio as approximately 25%. However, we were convinced that in the cases of multiple accumulation of radiopharmaceuticals, the possibilities of the metastatic bone tumors, were approximately 8 times by the method of

scanner images than that of the roentgenograms. And the scintiscann and camera images of the bone metastatic tumors were appeared relatively earlier than the observation of that of the roentgenograms.

And further examinations, adding to the clinical observation, were done as follows. About 50% of the both radiopharmaceuticals were cleared from the blood within 30-60 minutes and also urinary excretion was proved to be about 50% within 2-3 hours in our experiments.

In some cases, the scinticamera images were clearly revealed the metastatic tumors with ribs than that of scintiscan. We were considered that the figures of scinticamera image were