

## O. Bone and Joints

### Preclinical and Clinical Studies with $^{99m}\text{Tc}$ Methylene Diphosphonate

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Methylene diphosphonate (MDP) labeled with  $^{99m}\text{Tc}$  was investigated by animal experiments and clinical studies.  $^{99m}\text{Tc}$ -MDP was compared with  $^{99m}\text{Tc}$  diphosphonate and  $^{99m}\text{Tc}$  pyrophosphate in tissue radioassay 1 hr after injection to the rats.

Skeletal concentration, skeletal/blood and skeletal/muscle of  $^{99m}\text{Tc}$  MDP were greater than those of  $^{99m}\text{Tc}$  diphosphonate and  $^{99m}\text{Tc}$  pyrophosphate. Urinary excretion of  $^{99m}\text{Tc}$  MDP for 1 hr was similar to that of  $^{99m}\text{Tc}$  diphosphonate but faster

than that of  $^{99m}\text{Tc}$  pyrophosphate. In human volunteers the blood clearance of  $^{99m}\text{Tc}$  MDP was faster than that of  $^{99m}\text{Tc}$  diphosphonate.

Although satisfactory bone scintigrams were obtained 3 hr. after injection, bone images 2 hr after injection were good enough to be diagnosed.  $^{99m}\text{Tc}$  MDP proved satisfactory and safe for clinical bone imaging studies and better than  $^{99m}\text{Tc}$  diphosphonate and  $^{99m}\text{Tc}$  pyrophosphate.

### Clinical Evaluation of Bone Seeker Agent Using $^{99m}\text{Tc}$ -MDP (Methylene Diphosphonate)

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The various bone diseases were performed the radioisotopic evaluation using  $^{99m}\text{Tc}$ -MDP (methylene diphosphonate).

The images was obtained remarkable results within 2 hours after the injection for clinical interpretation setting whole body scanner and  $\gamma$ -camera.

The  $T_{1/2}$  from blood and urine were about 30 and 150 minutes after the injection, respectively. The quality were noted 75% with the excellent and

efficient images in 42 cases. But one case with iliac metastasis from thyroidal cancer, adenocarcinoma in pathologically, was notified as false negative result. In addition according to be worse the kidney function, the image was often noted as high back ground activity.

However, its images had very advantageous result for clinical evaluation in various bone diseases. We can suggest that  $^{99m}\text{Tc}$ -MDP is much better available radioisotopic agent.

### Clinical Investigation of Bone Scintigraphy with $^{99m}\text{Tc}$ M.C.P.

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Two hundred and four patients were investigated by whole body scintigraphy with  $^{99m}\text{Tc}$ -MDP, developed by Sabramanian, for the detection of malignant bone tumors. In twelve of 14 patients

with primary malignant bone tumor, scintigrams showed abnormalities, however, 18 out of 21 benign bone tumors showed abnormalities also. This results indicates that bone tumors are con-