Liver Scintigraphy with $^{99m}$Tc-stannous Hydroxide

I. YAMAMOTO, T. SAKAMOTO, T. ODORI and K. TORIZUKA

Department of Radiology

K. HAMAMOTO, T. MORI, T. MUKAI, T. KOUSAKA and T. FUJITA

The Central Clinical Radioisotope Division, Kyoto University, School of Medicine, Kyoto

The liver scintigraphy with $^{99m}$Tc-stannous hydroxide was performed in patients with various liver diseases and compared with the results with $^{198}$Au-colloid. Usefulness of $^{99m}$Tc-stannous hydroxide scintigraphy was discussed.

$^{99m}$Tc-stannous hydroxide was prepared by the electrolysis method with Pt-Sn electrodes which was developed by Dainabott Radioisotope Laboratories. Average particle size was 0.42 $\mu$ in electron microscopic measurement and when it was injected into patients, 80 to 90% of this compound was taken up by liver.

Scintigraphy was undertaken by using scintillation camera 10 to 15 minutes after intravenous administration of 2 mCi of $^{99m}$Tc-stannous hydroxide. Scintigrams were taken in normal breathing and holding breath under expiration and inspiration. It took 10 seconds to accumulate 50,000 counts. The distribution of radioisotope in the liver was fed into magnetic tape through 1600 channel analyzer connected with scintillation camera. Computer scintigram was made by smoothing and iterative approximations with computer. All patients were performed $^{198}$Au-colloid scintigraphy one week later and compared with that of $^{99m}$Tc-stannous hydroxide.

In the present study the scintiphotograms and computer scintigrams with $^{99m}$Tc-stannous hydroxide with the without breathing and with $^{198}$Au-colloid were compared.

Both in diffuse liver diseases and in liver tumors, scintigram with $^{99m}$Tc-stannous hydroxide without breathing demonstrated definitely the changes in distribution of radioisotope in the liver. Computer scintigram revealed a slight unevenness of distribution of $^{99m}$Tc-stannous hydroxide in the metastatic focus (3 x 3 cm) where any abnormal distribution of radioisotope was not detected on the scintiphotograms.

Absorbed dose estimated by MIRD’s method when 2 mCi of $^{99m}$Tc-stannous hydroxide is injected, is as follows:

Total body: 0.019 rad. Gonad: 0.037 rad (male), 0.063 rad (female). Liver: 0.916 rad. These values were lower than those of $^{131}$I-MiAA or $^{198}$Au-colloid. It is concluded that $^{99m}$Tc-stannous hydroxide is one of the best radiopharmaceuticals for liver imaging, because of its easy labeling, possibility of taking scintiphotogram without breathing and decreasing the absorbed dose to the patients.