The Comparative Studies of Splenic Scanning with ^{51}Cr and ^{203}Hg-Labeled MHP

I. TATSUNO

The Department of Radiology, National Kanazawa Hospital, Kanazawa

We have carried out the comparative studies of splenic scanning with ^{51}Cr and ^{203}Hg labeled MHP.

As to the procedure moderately damaging erythrocytes, while the ^{51}Cr method needs more precise caution and takes more time, the MHP method can be performed more easily and instantly.

With the ^{51}Cr method the high level of radioactivity in the spleen is maintained usually 30 minutes to 10 hours after I.V. injection and more easily scanned, but with the MHP method the peak level of activity occurs 1 to 2 hours after I.V. injection and the suitable time for scanning is so short that spleen is apt to be superimposed with left kidney after missing the optimal period.

On the other hand, the merit of MHP scan is that the differential diagnosis of the left upper quadrant abdominal mass can be possible when spleen and kidney are shown separated on one scintigram.

The upper pole of the right kidney is not so clearly delinated with ^{203}Hg-MHP compared with ^{203}Hg-Neohydrin because the former deposits much more in the liver than the latter.

The linear scan and RI clearance are greatly helpful to decide the time suitable for splenic scanning with ^{203}Hg-MHP. Routine whole body linear scan is performed at the 1 hour interval for the first 6 hours after I.V. injection. The time of starting renal scan with ^{203}Hg-MHP is more easily selected than with ^{203}Hg-Neohydrin because in the case of ^{203}Hg-MHP 6 hours after I.V. injection enough radio-activity for scanning remains for 10 days.

It is to be noted that the patterns of linear scanning for deciding he optimal time for splenic area scanning are greatly deviated from the normal one in the cases of various splenic anomalies.

RI clearance and RI distribution in the spleen, the liver and the kidney depend on the MHP concentration in the mixture of MHP and blood which influences the grade of damaging of erythrocytes.

The radioactive mercury of MHP in the kidney and liver is excreted in the urine and the stool. The 5 studies indicate that 3 to 9 per cent of injected dose is found in the urine for first 24 hours, 0.5 to 1.5 per cent daily after 2 days and only 10 to 14 per cent for 1 week. The 2 studies reveal 17 and 23 per cent in the stool for 1 week. Most of radiomercury remains in the kidney with a effective half life of 18 to 49 days. Average Teff excluding the cases of nonfunctional spleen and Banti's syndrome would be 30 to 35 days.

To promote the excretion of radiomercury in the kidney and the liver, we have tried to use some antidotes, chelating agents and blocking agent. BAL, D-Penicillamin, Ca-EDTA and nonradioactive Neohydrin are used for 9 cases, but no significant effect with these drugs can be detected as to the excretion per cent of radiomercury. Excretion per cent seems to depend rather on individuals and the kind of diseases.

Splenic radiation is not significant since radiomercury remains in the spleen for only a few hours. Viewing from the standpoint of radiation, the critical organ is the kidney. The radiation dose after the time of maximum retention of radiomercury which is usually observed 2 to 4 days after the injection can be determined by the Quimby formula. The radiation to a 120 g of kidney (which is average weight of each kidney of Japanese people) from a dose of 100 microcuries (75 per cent in kidneys) of injected ^{203}Hg-MHP will be approximately 90 rads. The does will be reduced to at least one-tenth by the use of ^{197}Hg, but ^{197}Hg-MHP is highly expensive now. Higher sensitive scanner will be able to reduce the I.V. dose of ^{203}Hg-MHP.