H. Digestive Tracts (Liver and Biliary Tract)

Hepatic Accumulation of ^{99m}Tc-labeled-phytate in Liver Diseases

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The hepatic accumulation of ^{99m}Tc-labeled-phytate was measured on more than 200 cases with a variety of liver diseases by using an external detector directed to the right lobe of liver. The half-time of accumulation (T-1/2) was estimated by using count-rate curves plotted. Increases of T-1/2, over 4 min, were encountered in many cases with liver cirrhosis. In other liver diseases, T-1/2 was almost less than 3 min. and the overlaps of T-1/2 were seen among them. The correlation among T-1/2 and regular liver functional tests, SGOT, SGPT, LDH, ZTT and γ-GTP, was studied, and, no correlation was indicated among them. But, TTT alone showed the possibility of correlation with T-1/2. The regional T-1/2 was measured on liver areas by using a scintillation camera coupled with a computer. Some variations of the regional T-1/2 were seen among the regions in the liver.

The blood disappearance half-time of ^{99m}Tc-labeled phytate was measured by an external counting on the forehead of the patients simultaneously with the hepatic accumulation study. Many cases showed individually some discrepancies between the half-time of blood disappearence and that of hepatic accumulation, however, as a whole both hald-times showed a good corretation.

Scintigram of Heterotopic Ossification

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In the patient whose extremities are deprived of motility from head or spinal cord injury or from hemiplegia following apoplexia, heterotopic ossification often develops near the joint.

These ossifications on X-ray film were compared with scintigram by ^{99m}Tc-phosphate.

In some cases, ossification was parallel to accumulation of ^{99m}Tc-phosphate; in the other

cases, ossification on X-ray was not recognized on scntigram; in the remainder, remarkable accumalation of radioisotope was demonstrated though faint image on X-ray film.

Scintigraphic image didn't run parallel in the course of the disease.

In general, the accumulation of ^{99m}Tc-phosphate increases prior to the appearance of ossification on X-ray film. High accumulation on scintigram is recognized in active stage of ossification, while accumulation is lower when the ossification is completed and opacity on-X-ray film become stable.

Study of Portal Circulation with Per-Rectal Portal Scintigraphy

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Method

10 mCi of ^{99m}Tc O_4^- in a 3 ml solution is instilled through a polyethylene tubing into the rectum.

Scintigrams are taken sequentially at 15 second-interval by time-lapse camera and the radioactivities are recorded through VTR for ten minutes.

Results

Experimental per-rectal portal scintigraphy was done on the normal monkey. Scintigrams by time-lapse camera visualize the portal system, liver and heart successively.

Over the liver, counts of radioactivity per 4 seconds, when sequentially followed, start to increase at 19 seconds after rectal instillation and go up rapidly, while over the heart they start to increase at 30 seconds and go up slowly.

In three patients without hepatic or cardiac diseases, scintigrams visualize the portal system, liver and heart successively.

Counts per 8 seconds showed sequential change almost similar to that in the monkey, although appearance time at the heart was 16 seconds later than that at the liver.

In three cases with chronic active hepatitis, the appearance-time at the heart was earlier and only 11 seconds (mean) later than that at the liver.

The speed of count-increase at the heart was almost same as that at the liver. In ten cases with cirrhosis of the liver, the scintigrams not visualize the liver but clearly visualize the heart.

In the nine of ten cases, at the heart, the count-increase was speedy from the start.

20 to 40 seconds later than it, the liver starts to show a clearly visible count-increase, which however goes up slowly than normal.

The spleen showed a count-increase at the same time as the liver.

Presumably, the above-noted count-increase over the liver results from the radioisotope reaching by way of the hepatic artery.

In conclusion, the non-invasive per-rectal portal scintigraphy enables clinicians to analyse hemodynamics of the portal system in various liver diseases.