

## Study on the Liver Scanning with $^{113m}\text{In}(\text{OH})_3$ Colloid

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As regards the scanning with  $^{113m}\text{In}$ , Stern and his coworker reported on lung scanning in 1966. They also reported on the cardiac pool and brain scanning in 1967. Hishida reported on scanning of the liver, brain, bone marrow and other organs.

We studied on liver scanning and fundamental experiments using  $^{113m}\text{In}$ -colloid from July in 1970 to August in 1971. The results are summarized as follows:—

1) The radioactive equilibrium of generator reaches in approximately 6 hours after the milking, and so, milking two times a day is possible.

2) The time necessary for the preparation of the  $^{113m}\text{In}$  scan agents has been much reduced with the recent development of labeled compounds which simplified the kit of scanning agents in each organ.

3) The  $^{113m}\text{Tin}$  contamination in the  $^{113m}\text{In}$  solution was about 0.003%. This is 1/500 of

tolerance limit.

4) The liver radiation dose is about 0.8 rads with the intravenous injection of 2 mCi of  $^{113m}\text{In}$ -colloid. This is about 1/15 of the dose of irradiated as compared with 300  $\mu\text{Ci}$  of  $^{198}\text{Au}$ -colloid.

5) In the liver scanning with  $^{113m}\text{In}$ -colloid, a shadow of the spleen is often recognized. We noticed the spleen shadow in some normal cases. And so, the appearance of the spleen does not always mean the existence of disturbance in the portal system as it does in liver scanning with  $^{198}\text{Au}$ -colloid.

6) Considering the diagnostic significance of the liver scanning with  $^{113m}\text{In}$ -colloid, it is not different from that with  $^{198}\text{Au}$ -colloid, and we believe that the former provides sufficient informations for clinical diagnosis.

In addition to the foregoing points,  $^{113m}\text{In}$  is a nuclide useful for various purposes, and so, its utilization should be further spread in future.

## Clinical Evaluation of Right Lateral Liver Scanning

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An analysis of 1,000 liver scans in the right lateral projection performed by our diagnostic isotope laboratory between May 1970 and June 1971, was presented.

A scan in the frontal and lateral projections was obtained in all cases. The patient was placed in the supine position for the frontal and the right lateral liver scanning in all cases.

The radiopharmaceutical used in all cases was colloidal  $^{198}\text{Au}$  in a dose of 100  $\mu\text{Ci}$ . A rectilinear scanner with a  $5 \times 3$  in. NaI crystal and a 91 hole, 10 cm focusing lead collimator was used.

The results obtained are summarized below.

1) The shape of the normal right lateral liver scan was almost round. It was important that a wedge shaped hollow was noticed on 75 percentage (46 cases) in normal 61 cases at the lower and anterior side of the right lateral scintigrams.

2) In 129 cases of the scintigram pattern in the anterior projection presenting hypertrophy of the left lobe, a hollow above described was disappeared on 72 percentage.

3) The right lateral scan was helpful in making clear geometrically the fact that the scintigram pattern presenting atrophy of the

right lobe and hypertrophy of the left lobe was characteristic of liver cirrhosis.

4) In an undetermined large number of cases, the lateral scan was useful in confirming, refuting or localizing pathology when a

scan in the anterior projection was equivocal.

The lateral scan also was helpful in delineating pathology within liver, such as tumors, and behind the liver, such as renal, lymph node lesions.

## New Indicators for Reading Liver Scintiphotos

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As liver Scintiphotos are influenced by the change of shape and form of liver characterized by disease and other bodily conditions, it is necessary to distinguish the former from the latter changes for the diagnosis of liver disease. Radio-gold ( $200 \mu\text{Ci}$ ) was administered to 89 cases including 33 of acute hepatitis, 30 of chronic hepatitis, 17 of liver cirrhosis and 9 control cases. The life size Scintiphotos were taken by Toshiba GAMMA CAMERA in the direction of postero-anterior, right-lateral and antero-posterior in patients supine. On well gradationed right-lateral film the oblique line directed from upper-posterior to lower anterior is often appeared, and this is assumed to be a liver base line involving hepatic

portae. The angle which this line forms to antero-posterior axis of body is named liver hanging angle  $\theta$ , and the lowest point of the right lobe of liver is named M point. In control cases  $\theta$  is about  $25^\circ$ , in acute hepatitis about  $35^\circ$ , and liver cirrhosis about  $15^\circ$ , in chronic hepatitis indefinite, and in thin person except cirrhosis  $\theta$  is generally larger. M point is shifted to posterior in atrophic liver cirrhosis and in thin person. These indicators,  $\theta$  and M point are useful in diagnosing disease, because they can quantitatively indicate the characteristic shape and form of liver and the changes of that in the course of liver disease.

## Scanning Studies with $^{67}\text{Ga}$ -Citrate on Patients of Liver Tumor

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We studied liver scanning with  $^{67}\text{Ga}$ -citrate on 32 patients who showed cold area on the liver scintigram with  $^{198}\text{Au}$ -colloid.

Two micro curie of Ga-citrate was injected intravenously and scans were made 24 to 72 hours following injection.

Now we reported 3 cases who showed hot area on liver scintigram and were made post-mortem examination.

Case 1 52 year old male.

He died from hypoglycemia and anemia. Scans of Ga-citrate revealed hot area on the liver. He was diagnosed as cancer of the stomach with liver metastasis by postmortem examination.

Case 2. 48 year old male

Clinical fininding presented cirrhosis of the liver. Scans of  $^{67}\text{Ga}$ -citrate showed  $8 \times 6 \text{ cm}$