# I. Liver

## Use of Computer in Scintigraphic Interpretation of Liver Disease

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Five hundred liver scintigrams were taken in our department and 150 cases of these were varified by autopsy, surgical operation, needle biopsy and laparoscopy.

For data processing, (1) standard value was determined by the controlled cases and (2) probability of abnormal scintigraphic finding were evaluted by satistical method on 150 proved cases. Among the informations of liver scintigram, area, left lobe/right lobe ratio, patchy pattern and mottled appearance of the scintigraphic findings, degree of splenic visualization, bone marrow visualization and K ($^{198}$Au-colloid disappearance rate constant in blood) were chosen for this study. In addition to these scintigraphic informations, data from liver function tests (serum protein, A/G ratio, icterus index, ZTT, TTT, CCLF, SGOT, SGPT, alkaline phosphatase, total cholesterol etc.) and palpability of liver were compared.

The digital computer processing by likehood method was designed for differential diagnosis of liver disease. Computer diagnosis nosis by likehood method was tried as follows. After the probability and standard value of information in each disease were memorized in digital computer, data of each case were typed in computer. When the computation was finished, the likehood of each disease wa styped out. The answer of the most likehood was chosen as a probable diagnosis.

Correct answer was obtained in 95% in the cases of normal, 50% in hepatitis, 71% in cirrhosis, 65% in hepatom, 78% in metastatic malignant tumor, 80% in extra-hepatic obstructive jaundice.

The authors believe that the likehood by computer technic will able to suggest an accuracy of diagnosis.

## Liver Scintigraphy Using $^{99m}$Tc-Sulfur Colloid

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$^{99m}$Tc-$0_4$ was eluted by saline from Ultratechnecow. $^{99m}$Tc-sulfur colloid was prepared in sterilized condition and injected intravenously in 194 cases, including 18 primary liver cancer, 67 metastatic liver cancer, 18 liver cirrhosis, 33 suspected liver cirrhosis, 16 hapatitis, 2 liver abscess, 4 obstructive jaundice, one of each liver cyst, reticulosis, chronic leukemia, reticulosarcoma and hemoangiosarcoma of the spleen and 31 nomal cases. The scintiphotos were taken by Nuclear Chicago's scinticamera, PHO/GAMMA III, in

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the projections of posterio-anterior, right anterior oblique in patient's supine, both lateral and anterio-posterior in prone josition. In most of cases given 3 to 5 milli-curie of $^{99m}$Tc-sulfur colloid, the scintiphotos could be taken within 30 second. In less than 3 milli-curie, the time for scintiphotography was 30–180 sec. Even more than 5 milli-curie of $^{99m}$Tc-sulfur collid, it takes about 10 sec. Therefore, 3–5 milli-curie was considered sufficient for the breath-holding liver scintiphotography. Compared with radio-gold liver scintiphotography, the contour and size of liver was more sharp and close to the real size in the breath-holding liver scintiphotography using $^{99m}$Tc-sulfur colloid, because of the limited movement of liver during to take multi-derectional scintiphotography and that gives even better information for the diagnosis of liver disease.

## Clinical Studies on Kinetics of $^{59}$Fe-Chondroitin Sulfate Iron in Chronic Liver Diseases

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It has been reported that in chronic liver diseases the clearance of colloid-iron are strikingly delayed and its corporation into the reticulo-endothelial system in liver are remarkably disturbed.

After $^{59}$Fe-Chondroitin Sulfate Iron ($^{59}$Fe-CS5 8–10 $\mu$Ci/10 mg (Fe)) were intravenously administered in five patients of chronic hepatitis, five of liver cirrhosis and normal subjects, plasma $^{59}$Fe-SSI disappearance (PCID) t½, % of red cell utilization (%RCU) and the body surface counting for two weeks were observed.

Results:

1) PCID t½ was 6.00 ± 0.54 min. in normal, 12.15 ± 0.57 min. in chronic hepatitis and and 11.00 ± 1.19 min. in liver cirrhosis respectively.

2) Values of %RCU revealed respectively 79.90 ± 12.30% in normal, 63.95 ± 12.19% in chronic hepatitis and 71.27 ± 9.42% in liver cirrhosis.

3) Pattern of the body surface counting showed that the uptake of $^{59}$Fe in liver was lower in chronic liver diseases than in normal, it in liver cirrhosis showed further low level than in curonic hepatitis. Increased radioactivity in spleen was accompanying with the progress of the fibrosis in liver and while the radioactivity in liver decreased, it in spleen gradually inclined to higher level. The uptake in bone-marrow was the highest level in liver cirrhosis and its peak appeared at the earlier stage than in normal.

Conclusions:

From above mentioned results, while characteristic features were presented in the kinetics of $^{59}$Fe-CSI in chronic liver diseases, these in liver cirrhosis were remarkably differentiated from in chronic hepatitis.

It has been speculated that their changes depend on the abnormalities in RES in liver diseases, moreover are modified by the variation of ferrokinetics, erythropoiesis and erythrokinetics in them.

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