the margin of the liver can be delineated automatically in each liver scintigram and 22 parameters can be extracted automatically by computer itself. Using those 22 parameters, differential diagnosis was performed using BMD (Biomedical Computer Program). When all cases are used as the training group, over all accuracy rate of the computer diagnosis is 96%. When about 2/3 cases are used as the training group, residual 1/3 cases are used as the testing group, accuracy rate of testing group is 85%.

This study proved that completely automatic computer differential diagnosis with good results is possible.

Combined Liver-Kidney Scintigraphy in Evaluation for An Inferoposterior Defect on ^{99m}Tc-Colloid Liver Scan

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Combined liver-kidney scintigraphy was performed to evaluate an inferoposterior defect on ^{99m}Tc-colloid liver scan. Liver-kidney image was obtained about one hour after intravenous infection of 2 mCi of ^{99m}Tc-Sn-Colloid and 4 mCi of ^{99m}Tc-DMSA.

In normal case, no separations were found between liver-spleen and kidneys, and therefore such findings were considered to be abnormal.

In present study, twenty-nine cases showed a clear-cut defect at inferoposterior portion on ^{99m}Tc-colloid liver scan. In seventeen cases, that defect was found to be a normal right renal indentation by a combined scintigram finding. However, in remained twelve cases, combined scintigraphy revealed the pathological lesion. Three out of 12 cases were extrarenal lesions, and another nine lesions were renal lesions.

From the present study, the clinical significance of combined liver-kidney scintigraphy was considered to visualize the diret relationship between liver-spleen and kidney, and it could be especially applied to decide the defect at inferoposterior portion whether it was a normal renal indentation or a pathological finding. Moreover whether renal lesions or extrarenal lesions could be decided from the contour of right kidney.

Investigations on Left Lobe Abnormalities of Colloid Liver Scan

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In the interpretation of liver images, knowledge of the anatomy and physiology of the liver and its surrounding structures may often permit definitive diagnosis of abnormality seen. There are some reports about false positive liver image of the right lobe by surroundings, but there are few about the abnormality of the left lobe images. The thin and flexible left lobe is easily compressed and deformed by surroundings.

Retrospective discussion was made on 7 cases in which colloid liver scan showed focal defect in the left lobe. Causes of these defects were proved by other radionuclidic examination, contrast angiography, operation or autopsy.

Case 1: Spleen-scan revealed a large splenic cyst corresponding to the focal defect of the left lobe.

Case II: Accumulation of ^{67}Ga-citrate to the area of focal defect, high level α-Fetoprotein and contrast angiography proved hepatoma.

Case III: Operation proved aplasia of the left lobe, which was difficult to diagnose even by

contrast angiography.

Case IV: Dilated stomach due to pyloric stenosis compressed the outer half of the left lobe. Liver scan in sitting position was useful to differentiate it from the tumor.

Case V: Focal defect in the lower portion of the left lobe. In this area, ^{75}Se-methionine scan showed slight but definite accumulation. α-Fetoprotein was negative. Contrast angiography showed hepatoma and an extremely dilatated tortuous gastric coronary vein, both contributing to the dimished radioactivity on scintigram.

Case VI: The vertical defect in the middle portion of the left lobe. The RI angiography (dynamic and static) revealed tortuous abdominal aorta corresponding to the defect.

Case VII: Round small defect caused by a coin on the skin (artifact).

Calibration of the Respective Clearance Rates of the Liver and the Spleen by Simultaneous Administration of ^{99m}Tc-Sn and ^{198}Au Colloids

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Increase in the splenic uptake of radiocolloid sometimes masks reduction in the hepatic one behind the compensated blood disappearance rate and visualized splenic uptake does not necessarily reflect the splenic function. Difference was observed between ^{99m}Tc-Sn and ^{198}Au colloids in their distribution among the liver, spleen and the bone marrow on simultaneous administration. This difference is attributable to non-proportional efficiency in their extraction among these organs. Applying this difference, we attempted to calibrate the respective clearance rates of radiocolloid which were attributable to each organs.

Following intravenous administration of a mixture of ^{99m}Tc-Sn, 1.5 mCi, and ^{198}Au, 150 μCi, radiograms of the liver, or spleen, and of the precordium were recorded for the respective radionuclides in order to calculate the total blood clearance rate. The linear scanning along the body axis differentiated the liver-spleen uptake from the extra-liver-spleen one Relative radioactivity of the selected liver 'ROI' and the selected spleen 'ROI' was measured with a scinticamera equipped with clinical data processing system. Setting a model of simultaneous equotions and their solution yielded the distribution ratios of these radiocolloids between the liver and the spleen. With the total clearance rate and distribution ratio among these organs, the clearance rate attributable to each organ was calibrated.

The liver clearance rate thus calculated was more useful than the rate as a whole in detecting the cirrhotic change in this organ and the reduction in the hepatic flow following the splenectomy or the portal-systemic shunting. The liver clearance rate of both ^{99m}Tc-Sn and ^{198}Au was correlated well with ICG clearance rate but some dissociation was observed, which was assumed to be related to the extra-hepatic shunting rate of splenic flow.

The spleen clearance rate was significantly correlated with its size and change, usually reduction, in the latter was almost proportional to that in the former.

Thus the calibration of the respective liver and spleen clearance rate was useful in diagnosing the hepatosplenomegalic patients as well as in evaluating the therapeutic effects in cases with portal hypertension.