QUANTITATIVE ESTIMATION OF LIVER AND SPLEEN UPTAKE USING EMISSION COMPUTED TOMOGRAPHY. T. Hirano, H. Nada, T. Itoh, T. Nakagawa, M. Taguchi, T. Kitano, M. Kakegawa and S. Matsui. Mie University School of Medicine, Tsu, Toshiba, Nasu.

Quantitative estimation of liver and spleen uptake was made in various hepatobiliary diseases using emission computed tomography with Jupiter (GE Co.) equipped with an opposed-gantry camera.

Ten min. after administration of 3mCi of Tc-99m-phytate, image data were collected 3 min. by continuous rotation mode. Following reconstruction, attenuation correction was made by Chang's method. Uptake images were constructed by displaying in color the quotient of the counts for each of the elements divided by the dose. Total liver or spleen uptake was calculated by the sum of the regional uptake over the organs.

In 6 adult normals, total liver uptake was 74.3±6.4% (mean±S.D) and spleen-liver ratio (S/L ratio) was 6.9±1.7. Total uptake of liver and S/L ratio in liver cirrhosis was 33.5±7.5% and 29.8±23.5, providing useful information on liver function. In various diseases, uptake of blood flow and spleen uptake correlated well with liver blood flow (r=0.694) and lipid emulsion test T1/2 (r=0.767), while the correlation between total liver uptake and ICG Rmax was poor.

Although a regional mean liver uptake was correlated well with total liver uptake (r=0.903), slight discrepancy was found in some cases who had decreased liver volume with normal mean uptake.

ANALYSIS OF HEPATIC FLOW CURVE BY Tc-99m-Sn COLLOID. H. Ohnishi, C. Sugituma, N. Ishidion, Y. Inoue, T. Fukagawa, M. Matsuo, I. Narabayashi, S. Nishiya, S. Kihura. Kobe University School of Medicine, Kobe.

In the liver scintigraphy by Tc-99m-Sn colloid, using the rapid intravenous injection of colloid, we estimate the hepatic and splenic flow curves, by which the differential diagnosis of the several liver diseases is performed. There are 75 cases consist of hepatitis 15, liver cirrhosis 10, hepatoma 11, metastatic liver tumor 8 and normal 31 cases as control. Following as Harper's method, we determined arteralization index (AI). By the same way, the splenic index (SI) is determined from the ratio between the slope of arterial phase in splenic flow curve and that of arterial phase in liver. AIs and SIs are 0.65±0.19 and 0.31±0.18 in normal, 1.024±0.42 and 0.34±0.23 in hepatitis, 2.65±2.01 and 0.82±0.29 in liver cirrhosis, 1.90±0.73 and 0.51±0.19 in hepatoma, 0.92±0.11 and 0.30±0.15 in metastatic liver tumor, respectively. AIs and SIs in liver cirrhosis and hepatoma are significantly higher (P<0.05) to that of normal cases. In other liver diseases AI and SI are insignificant to that of normal. In routine treatment of liver scintigraphy, by adding the above mentioned method, the increased information of circulation dynamics in liver seems to be useful for diagnosis of the liver diseases.


A new technique for quantitative assessment of the portal venous ratio to the total hepatic flow was established. Its clinical value was discussed in 11 normal subjects and 3 patients with diffuse hepatic diseases.

Radio nuclide angiography was performed to generate 1st pass time-activity curves for the left ventricle [H(t)], right hepatic lobe [L(t)], right lung [L(t)], spleen [S(t)] and kidney [R(t)], following rapid intravenous bolus injection of 3 mCi of Tc-99m Sn colloid. Data acquisition by computer (DECK: PDP 11/34A) was started simultaneously with injection and 100 one-second images were obtained.

For analysis, two time points were determined: (a) ta, when Tc-99m was maximal in abdominal organs (the renal peak); and (b) tp, when Tc-99m was at the 1st portal venous phase (second peak of the left ventricle). Analysis was based on the height of the ends of two phases of the hepatic curve. The portal venous ratio (Op) = [L(tp)/-L(ta)] x 100/L(tp) (%). The mean Op for the normal subjects (n=11) was 73.3±5.4%; for the diffuse hepatic disease group (n=24) was 60.6±9.9% (P<0.001); for the liver cirrhosis group (n=10) was 30.1±16.2% (P<0.001).