

In  $^{131}\text{I}$ -R.B. test, normal value were showed in GPT and Al-phos. of serum, for the cases that counted over 7.1%/min. in Ku and over 0.41%/min. in Ke.

The pathologic findings of gall bladder wall was less in the cases that showed positive cholecystogram under 15 min of  $^{131}\text{I}$ -RB test.

### Radioisotope Combined Diagnosis of Obstructive Jaundice

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Attempts were made to raise the diagnostic rate of obstructive jaundice by a combination of a dynamic study of the liver and bile duct using  $^{131}\text{I}$  BSP and a static study of the liver by  $^{99\text{m}}\text{Tc}$ -Blended Scientiphography. Four patterns in the liver scintigram, from Type I-Type IV were set forth to indicate the degree of dilatation of the intrahepatic bile duct. In addition to the above, with regard to the reading of liver and bile duct scintigrams, diffuse expansion type, congegrated type around the hepatic hilus were considered to determine whether the diagnosis would be 1) incomplete extrahepatic obstruction 2) complete

extrahepatic obstruction 3) or where the site of obstruction is. As a result compared against the positive diagnostic rate of 41.2% by dynamic study alone, a diagnostic rate of 64.7% was obtained. However, it was found that the diagnosis as to whether the diseased state is malignant or benign was difficult everwhen the duration of the jaundice and liver function were considered together. We are of the opinion that the direction of diagnosis of bile duct diseases by RI should be to clarify partial liver function by determining the bile duct dynamic curve using a computer.

### The Effect of Spironolactone Pretreatment on the Biliary Excretion of $\text{Cd}^{++}$ , $\text{Ce}^{+++}$ , and $\text{Zn}^{++}$ in the Rat

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Spironolactone (Sp) pretreatment was reported to protect rats against lethal dose of inorganic mercury intoxication (Selye, Science, 169: 775, 1970). In addition, the biliary excretion of inorganic mercury was reported to be enhanced more than 10 times. (Haddow et al., Gastroenterology, 63: 1053, 1972, Ishimura & Kitani, Jap. J. Nucl. Med. 11: 34, 1974).

In this study, the effect of SP pretreatment on the biliary excretion of i.v. injected heavy metals other than mercury (cadmium, zinc and cerium) was investigated in rats, using  $^{115\text{m}}\text{Cd}$ ,  $^{65}\text{Zn}$ , and  $^{141}\text{Ce}$  as tracers.

Under nembutal anesthesia, each metal (in chloride form, 0.5 mg/rat) was injected i.v. and

the biliary recovery of injected metal was measured for 4 hrs.

Sp was given orally as a water suspension of powdered Aldactone A tablet (5 mg/100 g B.W. as Sp weight) 1-3 hrs prior to the metal study. The radioactivity of  $^{115}\text{Cd}$  was measured by gas flow counter.

The 4 hr recoveries of injected metal expressed as a percent of the injected dose were Cd: control (n=6)  $15.7 \pm 1.5$ , Sp treated (n=5)  $14.9 \pm 2.0$ ,  $p > 0.05$ ; Zn: control (3)  $2.0 \pm 0.6$ , Sp (3)  $2.1 \pm 0.7$ ,  $p > 0.05$ ; Ce: control (3)  $0.13 \pm 0.03$ , Sp (3)  $0.12 \pm 0.01$ ,  $p > 0.05$ . Thus, the pretreatment of Sp was ineffective in enhancing the biliary excretion of these metals. Multiple treatment of

Sp (2 doses/day, for 3 days) even reduce the biliary excretion of cadmium ( $11.8 \pm 0.6$ ,  $n=4$   $p < 0.05$ ).

It was concluded that the effect of Sp on the biliary excretion of mercury is a specific effect on mercury only.

### Diagnosis of Focal Lesions on Liver Scintigraphy

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From March in 1971 to October in 1976, 920 patients were studied with liver scintigraphy using  $^{198}\text{Au}$  or  $^{99\text{m}}\text{Tc}$  colloid. On 568 cases of these final diagnoses were confirmed by operation biopsy or necropsy.

Space occupying lesion (SOL) was found in 158 cases of 568—41 with primary hepatoma, 100 with secondary liver cancer and 17 with other miscellaneous conditions. 82.9% of cases with primary hepatoma had solitary or bilateral SOL and 60.6% showed moderately or strongly increased shadow of spleen. On the other hand, 63% of cases with secondary liver cancer had multiple SOL and 91.5% showed slight or negative splenic shadow.

$^{67}\text{Ga}$  citrate scan and  $\alpha$ -fetoprotein (AFP) from December in 1975 to October in 1976, were

studied on 38 patients with hepatic cancer—7 with hepatocellular carcinoma, 3 with cholangioma, and 28 with metastatic carcinoma. Definite accumulation of the radionuclide was noted in the lesions of 15 out of 38 total cases.—All of 7 with hepatocellular carcinoma, 8 of 28 with metastatic carcinoma which histology was identified as the undifferentiated or poorly differentiated type.

AFP was elevated in 5 out of 7 cases with hepatocellular carcinoma, and 3 of 28 with metastatic carcinoma.

The combination studies with both  $^{99\text{m}}\text{Tc}$  colloid and  $^{67}\text{Ga}$  citrate scintigraphy, and AFP determination were quite informative in differentiating hepatocellular carcinoma from other focal lesion in the liver.

### The Hepatic Scan In The Chronic Liver Diseases

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The liver scans were studied on 81 patients with diffuse parenchymal liver diseases, all of which were diagnosed with aids of laparoscopic findings and histological examinations as follow; 11 cases of chronic active hepatitis (CAH), 15 of chronic inactive hepatitis (CIH), 6 of fatty liver (FL), 6 of drug induced phospholipidosis (DIP) and 43 of liver cirrhosis, including 25 of posthepatic cirrhosis (PHLC), 14 of postnecrotic cirrhosis (PNLC) and 4 of nutritional cirrhosis (NLC). After the intravenous administration of  $^{198}\text{Au}$ -colloid, the clearance rate of the colloid from blood ( $T_{1/2}$ ) was measured with arm-counter. On the anterior scan, left and right widths were measured according to Hisada, and left/right ratio (L/R) was calculated. The mean value of  $T_{1/2}$  was as follow;

12.1 min for PNLC, 10.8 min for NLC, 8.7 min for PHLC, 8.0 min for DIP, 7.5 min for CAH and 6.3 min for CIH.  $T_{1/2}$  of PNLC was significantly larger than that of PHLC or CH. L/R of PHLC was 0.79, DIP 0.74, PNLC 0.64, FL 0.63, CAH 0.62, NLC 0.61 and CIH 0.60 respectively. L/R of PHLC was significantly larger than that of PNLC or CH. Furthermore, in case of PHLC, a good correlation was observed between the value of L/R and the degree of the histological changes of the liver such as inflammatory infiltration in glisson's capsule and fibrosis. These results suggest that the liver scan findings and the value of  $T_{1/2}$  may show characteristic patterns depending on the types of liver cirrhosis and chronic hepatitis.