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STUDIES FOR HEPATIC RESECTION WITH Au-198 COLLOID SCINTIGRAMS.

K. Mizukawa, T. Tamai, M. Tanabe, K. Sato, Y. Takeda, T. Ueda*, H. Mimura* and R. Ban** Department of Radiation Medicine and *First Department of Surgery; Okayama University Medical School, and **Shimazu Seisakusho Ltd.

We have evaluated the effective liver volume by matrix ROI (region of interest) data of Au-198 colloid scintigrams. The obtained liver volume corresponded well to that by CT images.

On 14 preoperative patients of hepatectomy, the accumulation rates (K) of Au-198 colloid in the liver were determined. The value of the following calculation was prepared as the index of resectable liver volume.

$$\frac{\text{Estimated volume of residual liver}}{\text{Total effective liver volume}} \times \frac{\text{Patient's K}}{\text{Normal K}^{***}}$$

***0.184: determined in our laboratory

The calculated values of two patients who developed liver failure after the hepatic resection were 0.205 and 0.361, and of the others without severe complications were more than 0.384. The results indicate that this value may be useful for determing the indication of hepatectomy.

The evaluation of effective liver volume was also useful for the studies of the liver remnant regeneration.

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QUANTITATIVE ASSESSMENT OF HEPATIC RADIOISOTOPE ANGIOGRAPHY.

S.Nakano, Y.Hasegawa, K.Shiomura, K.Ibuka, and T.Hashizume. Department of Nuclear Medicine, The Center for Adult Diseases, Osaka.

1) The relative arterial and portal blood flow to the liver was assessed quantitatively according to Boyd's and Sarper's methods. We studied 58 patients (6 normal, 14 chronic hepatitis, 17 liver cirrhosis, 5 metastatic liver tumor, and 16 hepatoma). After injection of 5-10 mCi dose of Tc-99m Sn colloid as a bolus into an antecubital vein, 60 images were acquired at 1 sec per image. Time activity curves were generated over the right lobe of the liver, the abdominal aorta, and the kidney. The ratio $\tan\alpha_1 / \tan\alpha_2$, and ΔT by Boyd, and arterialization index (AI) by Sarper were measured. Value of these indices of normal subjects was as follows, $\tan\alpha_1 / \tan\alpha_2$; 1.5 ± 0.5, ΔT ; 11.5 ± 2.1, and AI ; 0.77 ± 0.31. Between normal and liver cirrhosis and between normal and hepatoma, significant differences were found in all three indices.
2) Through the tube which was inserted into the hepatic artery for infusion therapy of unresectable hepatic tumor, Tc-99m Sn colloid was infused and frame data were acquired at 10 second intervals for a total of 15 minutes. On the generated time activity curve over whole liver and spleen, the difference between the plateau and the minimum value after infusion appears to show the fraction of the infused cytostatica which distributed to the tumor.

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THE METHOD OF HEPATIC BLOOD FLOW MEASUREMENT USING LIVER SCINTIGRAPHY FOR THE DEGREE EVALUATION OF LIVER CIRRHOSIS.

T. Tanaka, T. Ueno, K. Ishikawa, J. Ushiki, M. Tanaka, S. Iida, K. Mori, Y. Arakawa and K. Nagase. Department of Radiology, Juntendo University Tokyo

Bleeding varices and hepatic failure are common cause of death in cirrhotic individuals. So early diagnosis and treatment of esophageal and/or gastric varices is always required. The closed correlation between the classification of supine and upright liver scintigraphy and pathology were encountered in our series. Use of multi-crystal gamma camera to measure the hepatic blood flow, the disappearance of radioisotope from the liver in a patient with liver cirrhosis was slower than normal patient.
The more fibrosis in the liver, in other word, the degree of portal hypertention has been occured, the slower the disappearance of radioisotope from the liver was obtained.

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HEPATOBILIARY SCINTIGRAPHY USING I-123 ROSE BENGAL.

T.Yamasaki, K.Fukushi, T.Irie, O.Inoue, K.Tamate, M.Uoji, F.Shishido, Y.Tateno, Y.Murakami National Institute of Radiological Sciences. Chiba

The preparation of the I-123 labeled rose bengal and its clinical application was reported. The I-123 used in this study was produced on the National Institute of Radiological Sciences Cyclotron using the $^{127}I(p,5n)^{123}Xe$ and $^{123}Xe \xrightarrow[2,1\ hr]{\beta^+,EC} {}^{123}I$ reaction. Iodination of the rose bengal was performed by the isotope exchange reaction (specific activity was more than 1mCi/mg). 13 cancer patients were studied. They were not prepared by fasting but were given meals which were used as the preparation diet for the barium enema, excepting 3 patients who were given ordinary diets. Each patient was injected intravenously with 1.4 - 2.8 mCi of I-123 rose bengal and then sequential images were taken. Simultaneously the data were also stored for subsequent playback analysis. Subsequently, time activity curves from regions of interest, and several kinds of functional images were displayed on a CRT. Time-activity changes in selected regions were analyzed in each case. From these data, it was concluded that I-123 rose bengal was one of the best hepatobiliary imaging agents, especially for hepatobiliary functional analysis.