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A NEW METHOD FOR MEASUREMENT OF HEPATIC ARTERIAL AND PORTAL BLOOD FLOW WITH Xe-133. Y. Yasuhara, K. Murase, S. Miyauchi, K. Akamatsu, Y. Watanabe, H. Mogami, A. Iio, K. Hamamoto. Ehime University School of Medicine, Ehime.

Liver consists of dual vascular systems and it is important to know these blood flow separately for the assessment of various disease state. And also it is important for determining the indication for TAE and predicting the prognosis in the cases with hepatoma.

We have developed a new technique to measure the portal blood flow using balloon occlusion technique. In order to measure the total hepatic blood flow, Xe-133 was injected into the common hepatic artery. Subsequently, Xe-133 was injected into the proper hepatic artery followed by interception of arterial blood flow by balloon occlusion to measure the portal blood flow. And then, we calculated these blood flows by using initial slope method.

We found the mean total hepatic blood flow of 82ml/100g/min and the mean portal blood flow of 66ml/100g/min in the cases without liver cirrhosis. The total hepatic and portal blood flow decreased when liver cirrhosis became severe. Our results well corresponded with the values obtained by the other methods.

This method was considered to have high accuracy and was thought available for measuring the portal blood flow separately.

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FACTOR ANALYSIS IN INTRAHEPATIC HEMODYNAMIC STUDIES WITH FIRST PASS RADIONUCLIDE ANGIOGRAPHY

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Factor analysis can automatically provide specific factors which correspond to various dynamic structures in a given organ (Di Paola and others, 1975). Using factor analysis algorithms, we showed quantitative assessment and images of portal blood flow to liver parenchyma.

Four patients were studied, two cases of partial intrahepatic portal vein obstruction due to hepatocellular carcinoma, one case of main portal obstruction with portal vein thrombosis due to liver cirrhosis and one normal control (liver hemangioma). The acquisition of images was made according to a conventional cardiac study after injection of Tc-99m HSA 20mCi. The anterior view was used. Analyses were made on sequences of 30 images taken with a duration of one second after radionuclide bolus was arrived in abdominal aorta.

Our studies show that factor analysis can be imaging to component of portal blood flow in the liver parenchyma, even when it has partial abnormality.

Factor analysis is useful method for liver dynamic study.

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Quantitative measurement of methionine uptake in liver and liver blood volume using C-11 methionine and C-11 CO; K. Yamaguchi, T. Matsuzawa, Y. Abe, M. Itoh, T. Fujiwara and T. Ido: Tohoku University, Res. Inst. Tbc. & Cancer, and CYRIC.

Liver imaging was performed with C-11 methionine and C-11 CO using ECAT. Liver uptake of methionine is lower in liver cirrhosis patients than that in normal volunteers and liver blood volume is decreased in patients with liver cirrhosis. <methods and materials>

1. Liver blood volume was estimated in 3 patients with liver cirrhosis and 2 normal volunteers. After a bolus inhalation of C-11 CO, ECAT imaging was performed for 3 or 5 minutes, and also blood sampling was performed.

2. Liver uptake of methionine was studied in 4 patients with liver cirrhosis and 2 normal volunteers. After a bolus injection of C-11 methionine (10-15mCi), ECAT imaging was performed every 5 minutes for a period of 40 minutes. Distribution absorption ratio (D.A.R.) was calculated as an indicator of C-11 methionine uptake in liver. <results>

1. Calculated liver blood volume was about 28vol% in normal volunteers, and 15vol% to 23vol% in liver cirrhosis patients.

2. Liver D.A.R. of C-11 methionine in normal volunteers was 7.7 to 8.2, and liver cirrhosis patients was 4.6 to 6.4.

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EVALUATION OF HEPATIC BLOOD FLOW OF CHRONIC LIVER DISEASE USING VENOUS INJECTION OF Xe-133.

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We evaluated the hepatic blood flow in chronic liver disease using venous injection of Xe-133 which is noninvasive and a few rate of recirculations. In this series, 12 patients with acute hepatitis, 13 with liver cirrhosis, 6 with chronic active hepatitis, 5 with fatty liver and 10 controls were performed this method. The patient at supine position whose hepatic right lobe had been marked by echogram, fitted face mask which was connected with Xe gas trap system. The two scintillation detector of dynamic function measurement system were placed over the hepatic right lobe and the lung. The time activity curve were obtained from two scintillation detector and these data recorded to computer after injection of 10 mCi Xe-133.

Hepatic curve from detector consisted two compartments. The mean  $\pm$  sd of hepatic blood flow were  $98 \pm 18$  ml/min/100g in controls,  $101 \pm 13$  in acute hepatitis,  $100 \pm 10$  in chronic active hepatitis,  $70 \pm 16$  in liver cirrhosis and  $68 \pm 14$  in fatty liver. Hepatic blood flow of acute and chronic active hepatitis were increased more than controls and liver cirrhosis and fatty liver group were decreased less than controls.