A NEW METHOD FOR MEASUREMENT OF HEPATIC ARTERIAL AND PORTAL BLOOD FLOW WITH XE-133. Y. Yasubara, K. Murase, S. Miyouchi, K. Akamatsu, Y. Watanabe, H. Mogami, A. Ito, 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 states. 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. Sequentially, 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 82 ml/100g/min and the mean portal blood flow of 66 ml/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.


Liver imaging was performed with C-11 methionine and C-11 CO2 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 CO2, 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 (10-15 mCi), 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 280 ml% in normal volunteers, and 150 ml% to 230 ml% in liver cirrhosis patients.

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


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 ± sd of hepatoc blood flow were 98 ± 18 ml/min/100g in controls, 101 ± 13 in acute hepatitis, 100 ± 10 in chronic active hepatitis, 70 ± 16 in liver cirrhosis, and 68 ± 14 in fatty liver. Hepatic blood flow of acute and chronic active hepatitis was increased more than controls and liver cirrhosis and fatty liver group were decreased less than controls.