Evaluation of Per-Rectal Portal Scintigraphy in Hepatic Cirrhosis.


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Methods

Ten mCi of $^{99m}$TcO$_4^-$ in a 3 ml solution was instilled into the upper part of rectum. Scintigrams were taken sequentially at 15-second interval by time-lapse camera and the radioactivities were recorded with VTR for ten minutes.

Results

1. The scintigrams by time-lapse camera.

   In 3 patients without hepatic or cardiac diseases and 8 cases with chronic hepatitis, the scintigrams visualized the portal system, liver and heart successively.

   In 20 of 21 cases with hepatic cirrhosis however, the scintigrams did not visualize the portal system and liver but clearly visualized the heart.

2. Radioactivities at the liver or heart sequentially followed with VTR.

   a) The appearance-time

   In chronic hepatitis, appearance-time of radioactivities at the liver was earlier than that at the heart. But, in 19 of 21 cases with hepatic cirrhosis, appearance-time at the liver was later than that at the heart.

   b) The speed of initial increase of radioactivities on the liver was compared to the speed on the heart.

   The ratio (liver/heart) was more than 1.6 in normal subjects, more than 0.6 in cases with chronic hepatitis but less than 0.6 in 13 of 21 cases with hepatic cirrhosis.

   c) The shunt index.

   The shunt index was less than 10% in normal subjects, and 10% to 21% in chronic hepatitis.

   The index was more than 25% in all cases with hepatic cirrhosis and more than 35% in 19 of 21 cases with hepatic cirrhosis.

   In conclusion, our per-rectal portal scintigraphy is a non-invasive, useful method for analysing the portal circulation and has great diagnostic significance particularly in hepatic cirrhosis.

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Measurement of Hepatic Plasma Volume Using Tc 99m Albumin by Double Injection-Single Sampling Method

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In order to measure the hepatic plasma volume, mean transit time of plasma in portal circulation of the liver was measured by the double injection single sampling method. Change of plasma volume in the liver before and after the hepatic nerve stimulation was also assessed.

Principle

The mean transit time ($\bar{t}$) was calculated by a equation

\[
\frac{1}{XO X_T} \int (X_1(t) - X_v(t)) dt = \quad \cdots \quad (1)
\]

where $XO$ is the activity in the organ after the injection, before any indicator is washed out. $X_T$ is the background activity. $X_1(t)$ is the activity curve contributing external counts following a bolus injection of the indicator at the inlet to the liver. $X_v(t)$ is the activity curve recorded by the external counting system following outlet bolus
injection.

This method is a relatively simple method to measure \( i \), without effect of the activity due to the reappearance of the indicator washed out from the organ.

Method

Five mongreal dogs weighing about 10 kg, anaesthetized with sodium pentobarbital (30 mg/kg), were kept in a supine position. Two catheters were positioned at the inlet of the portal vein to the liver and at the outlet of the hepatic vein. Bolus injection of 500 \( \mu \)Ci of Tc 99m albumine was performed firstly at the inlet of the liver, secondly at the outlet. The activity curves were externally monitored with gamma camera positioned over the liver. The data was stored on a magnetic tape and the time activity curves were recorded in the liver, at the inlet and outlet of the liver.

Results

Mean transit time (\( i \)) in 5 dogs ranged from 13.6 to 27.5 sec, average of 19.5 sec. By hepatic nerve stimulation with 20 c/s the portal pressure elevated 1.6 times average compared with control and \( i \) was shortened to 62% of control time.

This suggests that the hepatic nerve stimulation excreted 38% of plasma volume, blood volume if Ht is not changed before and after the stimulation, from the liver.

The Evaluation of Hepatoscintigram on the Diagnostic Ability of Metastatic Tumor, in Reference to Operative Findings

The Evaluation of Hepatoscintigram on the Diagnostic Ability of Metastatic Tumor, in Reference to Operative Findings

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The hepatoscintigram was evaluated on the diagnostic ability for the liver metastasis, in referring to the actual operative findings among the cases treated in the Surgical Department of Sawara Prefectural Hospital.

Up to September 1976, 53 cases of malignant tumors, mainly of stomach cancer, were pre-operatively examined with hepatoscintigram. Out of these, 40 cases had the coincidental result with operative findings. Thirteen cases without coincidental results were studied on the cause of failure. The factors were supposed to be the size of metastasis, respiratory movement, defects around the inferior border of liver image and swollen shadow of liver.

The conclusion was summarized as follows;
1) The detectable size of metastatic tumor of liver was over 2 cm in diameter.
2) The diagnostic ability of the hepatoscintigram with respiratory movement was lowered by about 15%.
3) Defects of the inferior liver border, especially around the porta hepatitis were the most difficult in diagnosis.
4) The findings of swollen liver shadow especially of right lobe or of both lobes were very suggestive of the existence of liver metastasis.