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Interesting RI accumulation in hepatic images with Tc-99m GSA SPECT scintigraphy in idiopathic portal hypertension

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The authors report a case of idiopathic portal hypertension (IPH), which showed interesting RI accumulation on Single Photon Emission CT (SPECT) images, with Tc-99m galactosyl human serum albumin (GSA) scintigraphy. Accumulation of Tc-99m GSA was decreased in the periphery of the liver where strong enhancement was revealed only in the arterial phase on dynamic CT. These findings imply that portal flow is decreased in the periphery of the liver where arterial flow is dominant. It was thought that secondary reduced activity of GSA due to a decrease in portal flow results in reduced radioactivity in the periphery of the liver in IPH. This interesting accumulation of Tc-99m GSA may be one of the sign of IPH.

Key words: liver, Tc-99m GSA, SPECT, idiopathic portal hypertension

INTRODUCTION

IPH is a rare disease characterized by splenomegaly, anemia, and portal hypertension of unknown cause. In IPH, intrahepatic portal veins show occlusive changes with resultant parenchymal atrophy secondary to portal circulatory insufficiency.[1]

The authors report a case of IPH in which SPECT images with Tc-99m GSA scintigraphy demonstrated reduced accumulation in the peripheral area of the liver where strong enhancement was revealed only in the arterial phase on dynamic CT.

CASE REPORT

A 71-year-old man was admitted to our hospital because of liver dysfunction. Histological diagnosis of IPH was established by liver biopsy. Esophageal varices were revealed by endoscopy, and endoscopic sclerotherapy was started. In the arterial phase of dynamic CT, strong enhancement was revealed in the peripheral region of the liver (Fig. 1), but in the portal phase the entire liver was homogeneously enhanced (Fig. 2).

To evaluate the liver function, Tc-99m GSA scintigraphy was performed. After intravenous injection of 185 MBq of Tc-99m GSA (Nihon Medi-Physics, Japan), dynamic images were obtained for 16 minutes. After acquisition of planar images, SPECT images were obtained. SPECT images were obtained with a matrix size of 128 by 128, a step angle of 5°, an acquisition time of 10 sec and 24 acquisition directions with 3 detectors. The planar images showed almost homogeneous distribution of the radioisotope (Fig. 3). On the other hand, SPECT images clearly demonstrated reduced RI accumulation in the peripheral region of the liver corresponding to the region where strong enhancement was revealed only in the dynamic phase on dynamic CT (Fig. 4).

DISCUSSION

In IPH, the entire portal vein system was involved with thrombophlebosclerosis and perivascular fibrosis, and the peripheral portal veins were scarred or had disappeared resulting in parenchymal atrophy secondary to portal circulatory insufficiency.[1]

Portograhpy can directly show paucity of medium-sized portal branches, irregular and obtuse-angled division in the peripheral branches, and occasional abrupt interruptions of the peripheral branches, and also

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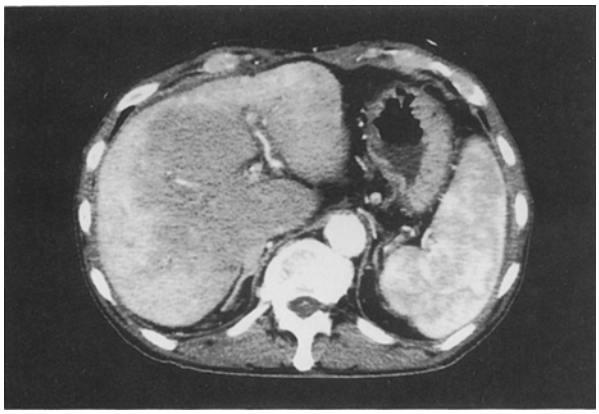

Fig. 1 In the arterial phase of dynamic CT, strong enhancement was revealed in the peripheral region of the liver.

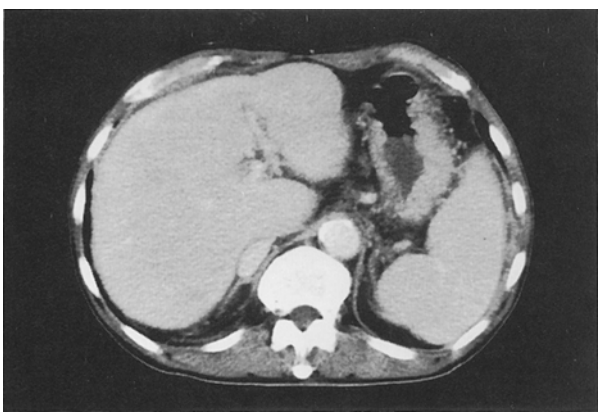

Fig. 2 In the portal phase of dynamic CT, the entire liver was homogeneously enhanced.

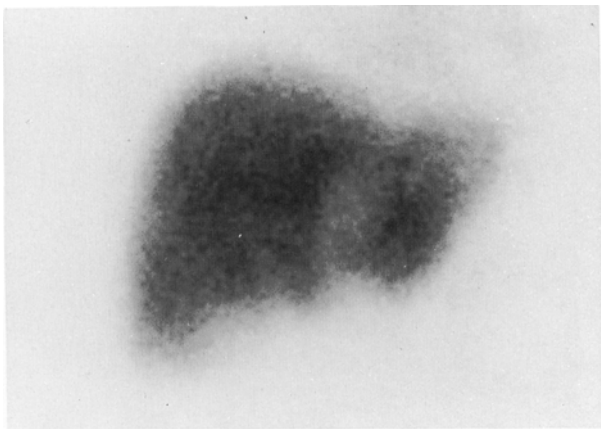

Fig. 3 RI distribution seems to be relatively homogeneous in planar image.

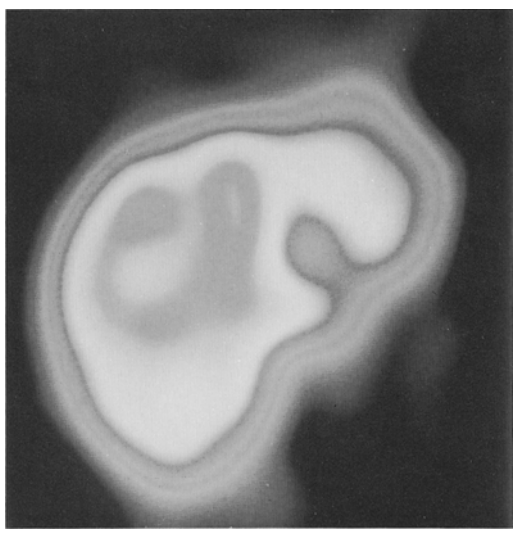

Fig. 4 SPECT image of Tc-99m GSA clearly demonstrated the reduced RI accumulation in the peripheral region of the liver corresponding with the region where strong enhancement was revealed only in the dynamic phase on dynamic CT.

demonstrate an avascular area beneath the liver surface in IPH.[2] Wedged retrograde portography demonstrates multiple blocks or occlusions in the peripheral portal branches.[3] CT during arterial portography shows multiple patchy low-density areas with unclear margins and abnormally short distances between some of the medium-sized portal branches and the liver surface.[4] These methods are useful in the differentiation of IPH from liver cirrhosis, but these are invasive.

MRI findings in IPH have also been reported.[5] Intrahepatic periportal abnormal high intensity was seen on T2-weighted images, and may reflect clusters of dilated vessels around the portal vein with fibrosis.

CT findings without dynamic enhancement cannot differentiate IPH from liver cirrhosis. There is no report referring to findings of IPH with dynamic enhanced CT.

Tc-99m GSA is a synthetic radioligand that binds to the asialoglycoprotein receptors on the plasma membrane of the hepatocytes. The accumulation of the radio-tracer correlates well to the function of the hepatocytes.[6] In normal liver, portal blood flow is dominant. Decreased portal blood flow could results in hepatocellular damage and decreased accumulation of GSA.

Tc-99m GSA scintigraphy can simultaneously evaluate the function of hepatocytes and hepatic blood flow.

Reduced accumulation of the tracer implies hypofunction of the hepatocytes caused by the decrease in portal flow.

Although only one case of a similar distribution of the tracer in IPH has been reported,[7] the reduced accumulation of Tc-99m GSA in the periphery of the liver, which was clearly revealed by SPECT images due to its better resolution for accumulation of the tracer, may be a characteristic sign of IPH.

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