DIAGNOSIS OF LIVER TUMOR WITH COMDINED METHOD OF RADIONUCLIDE SCINTIPHOTOGRAPHY, COMPUTER SCINTIGRAM AND COMPUTER TOMOGRAPHY(CT)

Yasuhiro Yumoto, Ken Mitani and Hideo Nagashima
The First Department of Internal Medicine, Okayama University Medical School,Okayama,Japan

The livers of 98 patients comprising this report were examined by both method radionuclide scintipho-tography(RS), radioimmunoassay of AFP & CEA and CT. Each CT(CT/T produced by GE company) slice was per-formed during 20 second of apnea. RS was performed using Nuclea Chicago Pho/ III scinticamera fitted with LEAP collimator. In order to reduce the effect of blurring due to finite resolving power of the measuring system and to enhance the true information contained in the RI image, a digital filter using the high speed Hadamard transform of RI image was performed. The subjects comprised 48 cases with he-patocellular carcinoma(HCC),metastatic tumor(45), liver cyst(3), hemangioma of the liver(2), Liver-cirrhosis(LC)(5) and hospital control(5). Proof of diagnosis was obtained from pathological specimens, exploratory surgery, and laparoscopic examonation. CT demonstrated 45/48(94%),RS 44/48(92%), computer scintigram & subtraction scintigram 46/48(96%) of masses involving the liver. Becase of better resolu tion and sectioning capabilities, CT detect smaller and deper lesions than did RS. 2 out of 9 cases with hepatoma with LC, diagnosis of hepatoma was obtained first by means of subtraction scintigram, thereafter CT scan showed the liver tumor as a decreased area in CT number. In 2 of hepatoma with LC, computer scintigram showed multicentric defects where positive uptake of Ga-67-citrate were not detected, and by means of CT liver tumor was detect ed which marginal line was blurring in cases of diffuse type of hepatoma. CT number of 5 cases of normal control showed 33.8± 3.8, HCC: 21.6± 3.2, metastatic liver tumor: 12-22, hemangioma of the liver: 15.0- 18.0. While in the liver cirrhosis CT number showed relative low value compared to the normal liver and irregular distribution. CT scan showed superior power of differencial diagnosis of liver cyst or hemangioma and metastatic liver tumor.

Information obtained on the liver by RS and CT is more complementary than competitive for diagnosis of the liver tumor. In conclusion, many cases of hepatic tumors that were difficalt to diagnosed, were differentiated by simultanious application of serial determination of serum concentration of AFP,CEA computer scintigram, subtraction scintigram and CT.

A STUDY ON COMPUTERIZED DIFFERENTIAL DIAGNOSIS OF DIFFUSE LIVER DISEASES BY PATTERN CHARACTERIZATION OF HEPATIC SCINTIGRAM

Michimasa Matsuo*, Ryuji Ohnishi*, Yoshio Inoue*, Shuji Kimura*, Kazuo Ito*, Shoji Nishiyama* Kazuro Sugimura**, Kenji Kondo***, Shinjiro - Yoshimoto***, Jiro Tadokoro***, Syuzo Yoshida***, Yoshitake Shinji***, Takayoshi Uehara****, Sekizo Taniguchi*****, Susumu Fujii******,Yukio - Kaneda******, Shinji Hashimoto*******
*Department of Radiology, Kobe University School of Medicine. **Shimane Prefectural Hospital. ***Department of Radiology, ****Department of Inter-nal Medicine, *****Department of Surgery, Hyogo Prefectural Nishinomiya Hospital. ******Faculty of Systems Engineering, Kobe University. *******Hyogo Prefectural Children Hospital.

The clinical importance of the hepatic scintigram for the differential diagnosis of diffuse liver diseases has been reported in various studies to-gether with the diagnostic criteria. However, most of the criteria proposed are based on manual measure-ments and/or visual inspection, and thus, the per-sonal subtle deviation of criteria is inevitable. In this study,the characterization of patterns of right lateral view of the liver obtained by the computerized processing of the hepatic scintigrams is investigated as a basis of an automated differ-ential diagnosis of diffuse liver diseases, such as acute hepatitis, inactive chronic hepatitis, active chronic hepatitis, liver cirrhosis in early stage and liver cirrhosis.

Several methods are examined to extract the region of interest from the digitized image,finding that intensity methods with threshold levels based on the variance and gradient criteria can be effectively applied. Two methods, named the rectangular method and the circular method, are also proposed in this study for the characterization of the hepatic patterns. The diagnostic effectiveness of each combination of methods for the region extraction and the pattern characterization was evaluated by applying multiple discriminant analysis. Based on the results of the reclassification of all sample cases, the rectangular method with the intensity method based on the variance criterion for the region extraction was found to be promising for the automated differential diagnosis of diffuse liver diseases.