ORIGINAL ARTICLE

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Clinical usefulness of positron emission tomography with fluorine-18-fluorodeoxyglucose in the diagnosis of liver tumors

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We studied various liver tumors by positron emission tomography with fluorine-18 fluorodeoxyglucose (FDG-PET) to examine the diagnostic usefulness of this technique. We also examined the relation between findings on FDG-PET and the characteristics of hepatocellular carcinoma.

FDG-PET was performed in 78 patients with liver tumors, including 53 with primary liver cancer [48 hepatocellular carcinomas (HCC) and 5 cholangiocellular carcinomas (CCC)], 20 with metastatic liver cancer, 2 with liver hemangioma, and 3 with focal nodular hyperplasia. For quantitative evaluation, a region of interest (ROI) was placed over the entire tumor region, at the level of the maximum diameter of the tumor. A background ROI was then placed over the non-tumor region of the liver. The average activity within each ROI was subsequently corrected for radioactive decay, and the standardized uptake value (SUV) was calculated by dividing the tissue activity by the injected dose of radioactivity per unit body weight. SUV ratio was expressed as the tumor-to-non-tumor ratio of the SUV.

The median SUV was significantly lower in HCC than in metastatic live cancer or CCC, and the median SUV ratio was significantly lower in HCC than in metastatic liver cancer or CCC. The median SUV was not higher in multiple HCC than in single HCC, but the median SUV ratio was significantly higher in multiple HCC than in single HCC. The median SUV and the median SUV ratio were significantly higher in the presence of portal vein thrombosis than in the absence of such thrombosis. The Cancer of the Liver Italian Program score and the α-fetoprotein value correlated significantly with both the SUV and SUV ratio. These results suggest that FDG-PET is clinically useful not only for the differential diagnosis of liver tumors but also for evaluation of the clinical characteristics of HCC.

Key words: FDG-PET, hepatocellular carcinoma, cholangiocellular carcinoma, metastatic liver cancer