

Usefulness of technetium-99m methoxyisobutylisonitrile liver single photon emission computed tomography to detect hepatocellular carcinoma

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Technetium-99m methoxyisobutylisonitrile (Tc-99m MIBI) has been shown to be useful in identifying several types of tumors, such as breast, lung and thyroid cancers. The usefulness of Tc-99m MIBI liver imaging in detecting hepatocellular carcinoma (HCC) is still controversial. In this study, 22 patients with HCC performed Tc-99m MIBI liver single photon emission computed tomography (SPECT). Twenty of 22 patients (90.9%) showed negative liver SPECT findings without significant Tc-99m MIBI uptake in HCC, and only 2 patients (9.1%) showed positive liver SPECT findings with significant Tc-99m MIBI uptake in HCC. In addition, no significant correlation between liver SPECT findings with sex, age, alpha fetoprotein serum level, HCC differentiation, and virus hepatitis status was found. We concluded that Tc-99m MIBI liver SPECT is not a sensitive tool to detect HCC.

Key words: Technetium-99m methoxyisobutylisonitrile, hepatocellular carcinoma, single photon emission computed tomography.

Technetium-99m methoxyisobutylisonitrile (Tc-99m MIBI), a member of the isonitrile class of coordination compounds, is a lipophilic cation used for myocardial perfusion imaging [14]. In addition, Tc-99m MIBI has been shown to be useful in identifying several types of tumors, such as breast, lung and thyroid cancers [1, 12]. Although its uptake mechanisms are not completely understood, it has been hypothesized that flow and metabolic status of cells are important with intracellular uptake dependent on mitochondria and the Na⁺/K⁺ pump. However, there were only a few reports in the literature for Tc-99m MIBI uptake in hepatocellular carcinoma (HCC), and the results were conflicting [1, 5, 17]. HCC is the most common cancer in this country due a high prevalence of chronic HBV and HCV infection [2, 3, 19]. Therefore, the aim of this study was try to use Tc-99m MIBI liver single photon emission computed tomography (SPECT) to detect HCC and investigate the relationship between SPECT findings and various clinical parameters.

Material and methods

Patients. Twenty-two patients (19 men, 3 women; age range, 23–73 years old; mean age 61.3 ± 13.4 years) with pathological proven HCC were enrolled in this study. No patient had been treated previously. Twelve cases had chronic hepatitis B virus infection, 5 cases had chronic hepatitis C virus infection, 2 cases had both chronic hepatitis B and C viral infections, and the remaining 3 cases had no known cause of HCC.

Technetium-99m methoxyisobutylisonitrile liver single photon emission computed tomography. Before Tc-99m MIBI liver SPECT, there is a delay of 30 min from the oral intake of 500 mg perchlorate to the start of SPECT to prevent abnormal uptake of free Tc-99m pertechnetate. A commercial MIBI preparation (max. 5.56 Gb (150 mCi) in approximately 1 to 3 ml) is obtained from Dupont Company (Cardiolite). The labeling and quality control procedures are carried out according to the manufacturer's instructions. Labeling efficiencies are always higher than 95 percent. Each patient received intravenous injection of 20 mCi

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