Annals of Nuclear Medicine Vol. 6, No. 4, 253–260, 1992

Single photon emission computed tomography using ^{201}Tl chloride in pulmonary nodules: comparison with ^{67}Ga citrate and ^{99m}Tc-labeled hexamethyl-propyleneamine-oxime

Kazuo ITOH,* Hironori TAKEKAWA,** Eriko TSUKAMOTO,* Kazuhiko NAGAO,* Kunihiro NAKADA,* Shosaku ABE,** Yoshikazu KAWAKAMI** and Masayori FURUDATE*

*Departments of *Nuclear Medicine and **First Department of Internal Medicine, Hokkaido University School of Medicine*

A single photon emission computed tomography (SPECT) with ^{201}Tl chloride (Tl-201) was carried out prospectively in 50 patients with pulmonary nodules and its diagnostic value was compared with those of ^{67}Ga citrate (Ga-67) and ^{99m}Tc-labeled hexamethyl-propyleneamine-oxime (Tc-99m-HMPAO). Tl-201 SPECT provided 88% (early)–91% (delayed) sensitivity, 85% (early and delayed) specificity and 87% (early)–89% (delayed) accuracy. The sensitivity of the Tl-201 planar image was 56 (early)–62% (delayed), which was significantly lower than that of SPECT. Delayed SPECT images at 2 hour postinjection were more preferable to disclose the malignant pulmonary nodule than early SPECT images at 15 minutes postinjection. The application of SPECT with Ga-67 failed to improve the sensitivity of planar imaging for malignant pulmonary nodules. Tc-99m-HMPAO was concentrated in 62% of 13 patients with malignant pulmonary nodules, which was slightly higher than Ga-67 in 54% of 28 patients. In an analysis of the histologic types of lung cancer, the sensitivity of Tl-201 was not significantly different in all types. On the other hand, Ga-67 was positive only in 25% of 12 patients with adenocarcinoma.

A combination of SPECT and Tl-201 is the best choice among routine scintigraphic techniques for depicting malignant pulmonary nodules. The Tl-201 SPECT image may play a complementary role in the characterization of pulmonary nodules which are revealed on a plain radiograph and computed tomography.

Key words: single photon emission computed tomography (SPECT), ^{201}Tl chloride, ^{67}Ga citrate, ^{99m}Tc-hexamethyl-propyleneamine-oxime, lung cancer