

Usefulness of Tc-99m MIBI SPECT in predicting multidrug resistance gene expression levels in non-small cell lung cancer—a preliminary report

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In this study we investigated whether Tc-99m hexakis 2-methoxy isobutyl isonitrile (Tc-99m MIBI) single-photon emission computed tomography (SPECT) has a correlation with the multidrug resistance (MDR1) and multidrug resistance-associated protein (MRP1) gene expression levels in non-small cell lung cancer (NSCLC). Fifteen patients with NSCLC were studied. SPECT images were obtained 15 (early) and 120 (delayed) min after injection of Tc-99m MIBI. We chose only one transverse section and set the region of interest over the tumor and out of the body. The mean counts in the tumor on early and delayed images were corrected by using those in the background and represented as Te and Td, respectively. Resected tumor specimens were frozen with liquid nitrogen and each positive control cell line was cultured. After the total ribonucleic acid (RNA) was extracted from specimens and cell lines, the complimentary deoxyribonucleic acid (cDNA) was amplified by the reverse transcription-polymerase chain reaction (RT-PCR) method. Each product was electrophoresed and fluorointensity was measured. The gene expression level was represented as the ratio of that of the positive control cell line. Te and Td indicated a significant correlation with the MDR1 gene expression level ($p = 0.015$ and $p = 0.022$), but not the gene of MRP1 ($p = 0.100$ and $p = 0.145$). In conclusion, Te and Td are useful parameters in predicting the MDR1 gene expression level, but not MRP1 in NSCLC.

Key words: non-small cell lung cancer, Tc-99m MIBI, MDR1, MRP1, RT-PCR