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The role of Tc-99m sestamibi imaging in predicting clinical response to chemotherapy in lung cancer

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Multidrug resistance (MDR) is a major problem in lung cancer. Tc-99m methoxyisobutyl isonitrile (MIBI) has been demonstrated to be a non-invasive marker to diagnose MDR1 related P-glycoprotein (Pgp) and multidrug resistance-associated protein (MRP) expression in various solid tumors. The aim of this study was to evaluate the relationship between the degree of Tc-99m MIBI uptake and its retention on delayed images and the response to chemotherapy in lung cancer. Twenty-three patients (1 woman and 22 men, age range 40–67 years) with lung cancer (9 small cell and 14 non-small cell) were examined with Tc-99m MIBI imaging before chemotherapy. After i.v. administration of 740 MBq Tc-99m MIBI, planar and SPECT imaging at 30 minutes and 2 hours was performed. Tumor to normal lung uptake ratio (T/N) and percent retention were measured. Response to chemotherapy was evaluated according to follow-up CT and grouped as complete responders (CR), partial responders (PR) and non-responders (NR). Clinical follow-up and CT evaluation revealed that 12 patients had partial remission, 4 patients had complete remission and 7 patients had no-remission after chemotherapy. Statistically, there was no significant correlation between early (30 min), delayed (2 hr) T/N ratios and percent retention of Tc-99m MIBI with chemotherapeutic response of the lung cancer among the three groups ($p > 0.05$). Results of the current study imply that Tc-99m MIBI uptake and the retention index may not correlate with chemotherapy response in lung cancer, so that the accuracy of this method needs to be verified in a larger series with additional investigation at the molecular level.

Key words: Tc-99m sestamibi, lung cancer, multidrug resistance