ORIGINAL ARTICLE

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Tc-99m MIBI SPECT in prediction of prognosis in patients with small cell lung cancer

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Purpose: The purpose of this study was to evaluate whether the degree of technetium-99m methoxyisobutylisonitrile (MIBI) uptake and its retention in delayed imaging in small cell lung cancer (SCLC) was correlated with the response to multiagent chemotherapy and to investigate if there was a relationship between the survival time of patients with SCLC and Tc-99m MIBI SPECT tumor uptake parameters at the time of diagnosis. ***Methods:*** Between 1998 and by December 2004, 40 patients with SCLC were studied with Tc-99m MIBI SPECT at the time of diagnosis. The patients were classified by a follow-up CT as good responders (complete or partial remission) and poor responders (stable disease or progressive disease). Following i.v. administration of 740 MBq Tc-99m MIBI, SPECT imaging at 30 minutes (early) and 2 hours (delayed) was performed. Regions of interests were placed over the tumors and contralateral normal lung tissue on one transverse section. The uptake ratio of the lesion to that in the contralateral normal lung was obtained from early images (early ratio; ER) as well as delayed images (delayed ratio; DR). The retention index (RI%) was measured as: RI% = [(DR − ER)/ER] × 100. Tc-99m MIBI tumor uptake parameters were compared with chemotherapeutic response and survival time. ***Results:*** Of 40 patients, 29 patients were good responders (72.5%) and 11 patients were poor responders (27.5%). RI% of Tc-99m MIBI SPECT in the group of good response was significantly higher than in that with poor response ($p < 0.05$). On the other hand, there was no significant difference between the two groups with respect to ER or DR values. Four of 40 patients were still alive with disease (10%). The patient survival time varied from 1 to 70 months (mean survival time = 12.9 ± 13.4 months). There was no significant difference between the survival time of patients with respect to ER or DR of Tc-99m MIBI SPECT imaging. When median RI% was accepted as a cut-off value (−3.85%), patients with higher RI% values had a longer survival time (12 months) when compared with those with low RI% (8 months), $p < 0.05$. ***Conclusion:*** Our results suggest that Tc-99m MIBI SPECT could accurately predict the chemotherapy response in patients with SCLC. RI% of Tc-99m MIBI SPECT is recommended to differentiate patients with a poor response to chemotherapy and good responders, and RI% of Tc-99m MIBI SPECT appears as the only parameter that may be useful in predicting the survival of patients with SCLC.

Key words: Tc-99m MIBI, small cell lung cancer, multidrug resistance, chemotherapy