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99mTc-Methionine Hybrid SPECT/CT for Detection of Recurrent Glioma: Comparison With 18F-FDG PET/CT and Contrast-Enhanced MRI.

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Abstract

OBJECTIVES: Posttherapy changes in treated glioma patients cannot be reliably differentiated from tumor recurrence. We evaluated the role of Tc-methionine SPECT/CT for the detection of recurrent glioma and compared the same with F-FDG PET/CT and contrast-enhanced MRI (CeMRI).

METHODS: Forty-four patients with histologically proven, previously treated glioma and clinical suspicion of recurrence were prospectively enrolled in the study. Of these 44 patients, 39 (28 male and 11 female subjects; age, 38.05 ± 9.7 years) underwent Tc-methionine SPECT/CT, F-FDG PET/CT, and CeMRI of the brain and were included for final analysis. Combination of repeat imaging, biopsy, and/or clinical follow-up (6-36 months) was taken as reference standard. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were calculated. Diagnostic values among modalities were compared.

RESULTS: Positive predictive value and negative predictive value for Tc-methionine SPECT/CT, F-FDG PET/CT, and CeMRI were 95.6% and 56.2%, 92.3% and 61.5%, and 79.4% and 42.9%, respectively. Sensitivity and specificity for the 3 modalities were 75.9% and 90%, 82.8% and 80%, and 87.1% and 30%. Specificity of Tc-methionine SPECT/CT was significantly higher than that of CeMRI ($P < 0.0001$) but not of F-FDG PET/CT ($P = 0.36$). No significant difference was seen between the modalities for sensitivity and accuracy.

CONCLUSIONS: Tc-methionine is a promising tracer for detection of recurrent glioma. Diagnostic values of Tc-methionine SPECT/CT are similar to F-FDG, although it is more specific than CeMRI. So it may be used as a cost-effective alternative and also where PET/CT is not available.

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