11C-methionine PET for grading and prognostication in gliomas: a comparison study with 18F-FDG PET and contrast enhancement on MRI.

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Abstract
The aim of this study was to compare the grading and prognostic value of l-[methyl-(11)C]-methionine ((11)C-MET) PET in glioma patients with (18)F-FDG PET and contrast-enhanced MRI.

METHODS: Patients (n = 102) with histopathologically confirmed gliomas were followed up for an average of 34.6 ± 3.8 mo after PET. The median survival was 18 ± 4.7 mo in the high-grade glioma group and 58 ± 27 mo in the low-grade glioma group. Patients underwent (18)F-FDG PET, (11)C-MET PET, and MRI in the diagnostic and preoperative stage. The ratio of the mean standardized uptake value in the tumor to mean standardized uptake value in contralateral normal cortex (T/N ratio) was calculated. Kaplan-Meier survival analysis and ANOVA were performed.

RESULTS: T/N ratios for (11)C-MET PET and (18)F-FDG PET were significantly higher in high-grade gliomas than in low-grade gliomas (2.15 ± 0.77 vs. 1.56 ± 0.74, P < 0.001, and 0.85 ± 0.61 vs. 0.63 ± 0.37, P < 0.01, respectively). Median survival was 19 ± 5.4 mo in patients with a T/N ratio greater than 1.51 for (11)C-MET PET and 58 ± 26.7 mo in those with a T/N ratio less than 1.51 (P = 0.03). Among the LGGs, median survival was lower in patients with a mean T/N ratio greater than 1.51 for (11)C-MET PET (16 ± 10 mo; 95% confidence interval, 1-36 mo) than in those with a T/N ratio less than 1.51 (P = 0.04). No significant difference in survival in LGGs was based on (18)F-FDG uptake and MRI contrast enhancement.

CONCLUSION: (11)C-MET PET can predict prognosis in gliomas and is better than (18)F-FDG PET and MRI in predicting survival in LGGs.

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