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Prognostic Value of Early [(18)F]Fluoroethyltyrosine Positron Emission Tomography After Radiochemotherapy in Glioblastoma Multiforme.

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Abstract

PURPOSE: Early detection of treatment response in glioma patients after radiochemotherapy (RCX) is uncertain because treatment-related contrast enhancement in magnetic resonance imaging can mimic tumor progression. Positron emission tomography (PET) using the amino acid tracer [(18)F]fluoroethyltyrosine (FET) seems to be a promising tool for treatment monitoring. The aim of this prospective study was to evaluate the prognostic value of early changes of FET uptake after postoperative RCX in glioblastomas. **METHODS AND MATERIALS:** Twenty-two patients with glioblastoma were treated by surgery and subsequent RCX (whole dose 60-72 Gy). The FET-PET studies were performed before RCX, 7-10 days and 6-8 weeks after completion of RCX. Early treatment response in PET was defined as a decrease of the maximal tumor-to-brain ratio (TBR(max)) of FET uptake after RCX of more than 10%. The prognostic value of early changes of FET uptake after RCX was evaluated using Kaplan-Maier estimates for median disease-free survival and overall survival. **RESULTS:** The median overall and disease-free survival of the patients was 14.8 and 7.8 months. There were 16 early responders in FET-PET (72.7%) and 6 nonresponders (27.3%). Early PET responders had a significantly longer median disease-free survival (10.3 vs. 5.8 months; $p < 0.01$) and overall survival ("not reached" vs. 9.3 months; $p < 0.001$). No statistically significant differences between the patient subgroups were found concerning the defined prognostic parameters. **CONCLUSIONS:** FET-PET is a sensitive tool to predict treatment response in patients with glioblastomas at an early stage after RCX. Copyright © 2010 Elsevier Inc. All rights reserved.

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