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J Nucl Med. 2011 Jun;52(6):856-64.

### O-(2-18F-Fluoroethyl)-L-Tyrosine PET Predicts Failure of Antiangiogenic Treatment in Patients with Recurrent High-Grade Glioma.

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#### Abstract

The objective of this study was to compare MRI response assessment with metabolic O-(2-(18)F-fluoroethyl)-L-tyrosine ((18)F-FET) PET response evaluation during antiangiogenic treatment in patients with recurrent high-grade glioma (rHGG).

**METHODS:** Eleven patients with rHGG were treated biweekly with bevacizumab-irinotecan. MR images and (18)F-FET PET scans were obtained at baseline and at follow-up 8-12 wk after treatment onset. MRI treatment response was evaluated by T1/T2 volumetry according to response assessment in neurooncology (RANO) criteria. For (18)F-FET PET evaluation, an uptake reduction of more than 45% calculated with a standardized uptake value of more than 1.6 was defined as a metabolic response (receiver-operating-characteristic curve analysis). MRI and (18)F-FET PET volumetry results and response assessment were compared with each other and in relation to progression-free survival (PFS) and overall survival (OS).

**RESULTS:** At follow-up, MR images showed partial response in 7 of 11 patients (64%), stable disease in 2 of 11 patients (18%), and tumor progression in 2 of 11 patients (18%). In contrast, (18)F-FET PET revealed 5 of 11 metabolic responders (46%) and 6 of 11 nonresponders (54%). MRI and (18)F-FET PET showed that responders survived significantly longer than did nonresponders (10.24 vs. 4.1 mo,  $P = 0.025$ , and 7.9 vs. 2.3 mo,  $P = 0.015$ , respectively). In 4 patients (36.4%), diagnosis according to RANO criteria and (18)F-FET PET was discordant. In these cases, PET was able to detect tumor progression earlier than was MRI.

**CONCLUSION:** In rHGG patients undergoing antiangiogenic treatment, (18)F-FET PET seems to be predictive for treatment failure in that it contributes important information to response assessment based solely on MRI and RANO criteria.

PMID: 21622893 [PubMed - in process]

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