

## ABSTRACT

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Recurrent Glioma: Does Qualitative Simultaneous 18F-DOPA PET/mp-MRI Improve Diagnostic Workup? An Initial Experience.

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**RATIONALE OF THE STUDY:** Neuroimaging modalities such as contrast-enhanced MRI and PET provide significant insight in the evaluation of gliomas. However, their reliability in successfully differentiating the tumor recurrence with treatment-related changes is still technologically challenging. The current study aims to qualitatively investigate the potential of the hybrid PET/multiparametric MRI modality to noninvasively distinguish between these 2 outcomes of brain tumor diagnostics for optimum and early patient management.

**PATIENTS AND METHODS:** A cohort of 26 suspected recurrent glioma cases proved on histology and/or clinicoradiological outcome forms the part of this study. A 3-point visual analytical scale was used to qualify lesions as recurrent or posttreatment radiation effects on PET, conventional MRI, dynamic susceptibility contrast-perfusion-weighted imaging, apparent diffusion coefficient, and the MR spectroscopy according to their level of suspicion.

**RESULTS:** Of the 26 patients, 21 patients were classified as recurrence and 5 as radiation necrosis. Advanced MRI parameters (perfusion, diffusion, and spectroscopy) integrated with 18F-DOPA PET imaging resulted in superior diagnostic performance obtained on visual assessment with an accuracy of 95%, sensitivity of 96%, and specificity approaching up to 100% over individual modalities.

**CONCLUSIONS:** The combination of multiple MR parameters evaluated together with 18F-DOPA PET offers an attractive approach to noninvasively distinguish true recurrence from radiation necrosis. However, further prospective studies with larger cohorts are warranted with additional neuropathological validations.

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