Clinical potential of [^{18}F]FET PET in patients with circumscribed astrocytic glioma

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Supplementary Material (Online Resource 1)

SUPPLEMENTAL METHODS

PET Imaging

The tracer [^{18}F]FET was produced as described previously (*1,2*). Following the international practice guidelines for glioma imaging using PET with radiolabeled amino acids (*3*), all patients fasted for at least 4 hours before PET measurements. After intravenous injection of 2.5 - 3 MBq of [^{18}F]FET/kg of body weight, static (20-40 minutes post-injection) or dynamic PET images (0-40 and 0-50 minutes post-injection) were acquired using an ECAT EXACT HR+ PET scanner, Biograph PET/CT, or simultaneously with 3T MR imaging using a BrainPET insert (all PET scanners manufactured by Siemens, Erlangen, Germany). PET images were analyzed on a Hermes workstation (Hermes Medical Solutions; Stockholm Sweden) or PMOD Software (Bruker's Preclinical Imaging; Fällanden, Switzerland).

PET Data Analysis

Metabolic tumor volumes were assessed semi-automatically using a tumor-to-brain ratio (TBR) of > 1.6. The maximal and mean standardized uptake value (SUV) were evaluated as a ratio to the mean SUV of the healthy background (*4*), and served as measures for uptake intensity (TBR_{max} and TBR_{mean}). [^{18}F]FET PET scans were classified as having *no measurable* disease (absence of any visually increased signal in [^{18}F]FET PET), *non-measurable disease* (visible lesion with TBR_{max} < 1.6 or volume < 0.5 mL), or *measurable disease* (TBR_{max} > 1.6 and volume > 0.5 mL) according to PET RANO 1.0 criteria (*5*), and changes of [^{18}F]FET uptake for assessment of response were classified as *PET-based complete* or *partial response*, *PET-based stable disease*, or *PET-based progressive disease*.

Diagnosis of Tumor Progression and Treatment-related Changes

Supplementary Material (Online Resource 1)

The confirmation of tumor relapse was based on neuropathological analysis (i.e., presence of viable tumor tissue) after repeated biopsy or resection or confirmed clinicoradiologically if a neuropathological diagnosis was unavailable. For this, imaging or clinical worsening within six months after PET imaging prompting a change in treatment was considered tumor progression. Prominent necrosis with no or only minimal identifiable tumor remnants in neuropathological analysis confirmed treatment-related changes. Treatment-related changes were assumed if no treatment change was required for at least six months. These definitions, based on Young and colleagues (*6*), allowed a continued mild increase of enhancing lesions compared to the usual decrease or stabilization as long as no treatment change occurred during this period.

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