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IMAGE OF THE MONTH

Increased TSPO PET signal after radiochemotherapy in IDH-wildtype glioma—indicator for treatment-induced immune activation?

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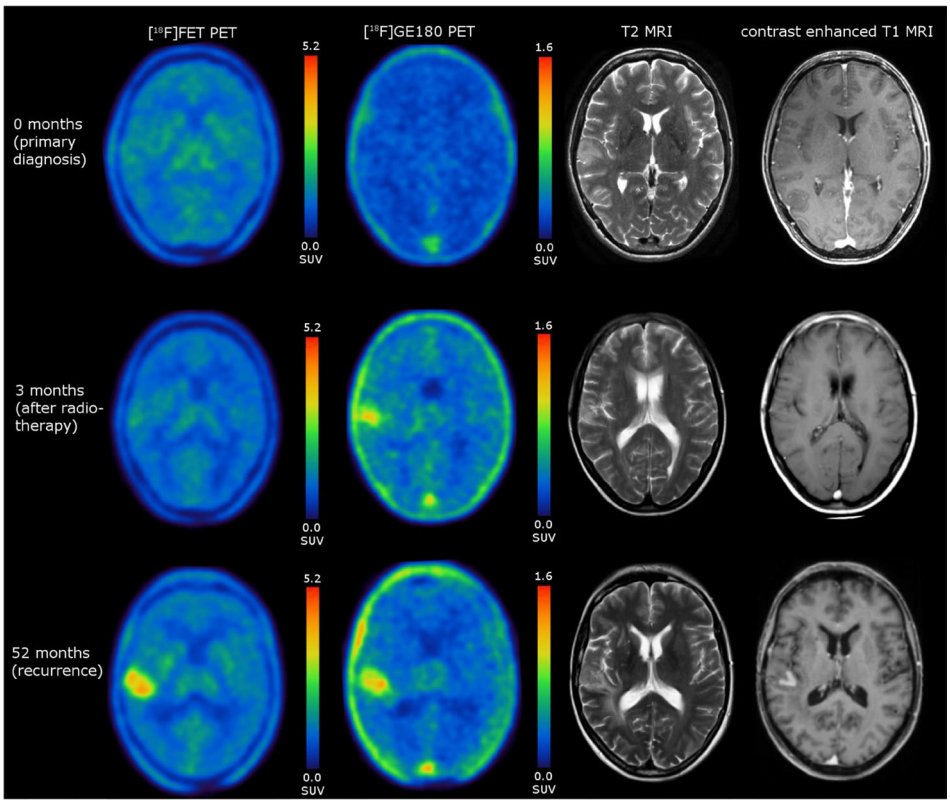

This article is part of the Topical Collection on Image of the month

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A 51-year-old female patient presented with newly onset seizure. MR imaging revealed a T2-hyperintense lesion without contrast enhancement in the right temporoinsular region showing low uptake on both amino acid PET with [^{18}F]FET and TSPO PET with [^{18}F]GE180. Stereotactic biopsy revealed an IDH-wildtype glioma, *MGMT*-methylated, with a TERT promoter mutation and a proliferation index of 10%, consistent with a WHO grade 4 glioblastoma according to the current classification [1]. After radiochemotherapy according to EORTC/NCIC protocol [2], [^{18}F]FET uptake remained continually low, while [^{18}F]GE180 PET showed a focally increased uptake in the treated area. The patient remained stable for a remarkably long period, until tumor recurred locally after 4.3 years. At recurrence, both [^{18}F]FET PET and [^{18}F]GE180 PET showed an equally strong uptake.

TSPO expression has not only been linked to malignant tumor cells [3–6], but is particularly known as an inflammation marker [7–9]. As such, increased [^{18}F]GE180 uptake immediately after therapy in the absence of [^{18}F]FET uptake might reflect treatment-related inflammation as has been described after radio- [10, 11] or chemotherapy [12]. This is the first human case demonstrating diverging amino acid and TSPO PET findings after radiochemotherapy in a glioblastoma patient with favorable treatment response. Although low initial FET uptake also indicates favorable outcome and no tissue samples are available for histological correlation immediately after therapy, it is intriguing to speculate that the distinct uptake patterns in dual tracer PET imaging might capture therapy-induced immune response, which may serve as interesting biomarker and should be evaluated in future studies.

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Declarations

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare no competing interests.

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