COMMENTARY

^{99m}Tc-Tetrofosmin SPECT for Glioma Evaluation

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Dear Editor,

We read with great interest the recent article by Yamamoto et al. [1] concerning the usefulness of ¹¹C-acetate (ACE)-positron emission tomography (PET) for the evaluation of brain glioma and differentiation of high-grade gliomas, in comparison with ¹¹C-methionine (MET) and 2-Deoxy-2-18F-fluoro-D-glucose (FDG)-PET. The authors reported that ACE, MET, and FDG did not allow differentiation between grades II and III gliomas and between III and IV gliomas. When grades III and IV gliomas were grouped together as high-grade gliomas, only ACE and FDG uptake values were significantly higher in high-grade gliomas compared to low-grade gliomas [1].

For the diagnosis and treatment of brain tumors, it is essential to evaluate the grade of the malignancy and proliferation potential. For that reason, tissue sampling through biopsy or over the course of a craniotomy may be required. A major goal of nuclear medicine is therefore the development of new radiolabeled tracers to evaluate non-invasively tumor's aggressiveness *in vivo*. Functional metabolic imaging by PET and single-photon emission CT (SPECT) has been evaluated. Although PET has been introduced as the most sophisticated and state-of-the-art imaging modality, PET studies are often cost-prohibitive and not widely available. As a result, there has been rising interest on the use of SPECT as a feasible functional imaging alternative. Various radiotracers have been extensively evaluated. ²⁰¹Thallium and technetium-99m-sestamibi (^{99m}Tc-sestamibi) provided satisfactory results. We currently investigate the imaging properties of technetium-99m-tetrofosmin (^{99m}Tc-TF), another tumor-seeking tracer routinely used for myocardial perfusion imaging. Several *in vitro* studies on glioma cell lines have substantiated a potential superiority of ^{99m}Tc-TF over ^{99m}Tc-sestamibi in imaging brain tumors [2, 3]. In our *in vivo* research we evaluated the relationship between ^{99m}Tc-TF uptake in gliomas and meningiomas and their cellular proliferative

potential (as assessed by the immunohistological index Ki-67 and by flow cytometry). In both tumor types we verified a strong positive linear correlation between tracer uptake and tumor proliferative potential and aggressiveness [4–6]. Furthermore, we reported that ^{99m}Tc-TF SPECT could hold a role in differentiating tumor recurrence from radiation necrosis and neoplastic from non-neoplastic intracerebral hemorrhage [7, 8]. We therefore propose ^{99m}Tc-TF SPECT as a cost-effective functional imaging modality that offers a noninvasive method for quantitating cellular proliferation in gliomas thus assisting therapeutic decision-making and prognosis estimation.

References

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