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Evaluation of brain tumor recurrence by (99m)Tc-tetrofosmin SPECT: a prospective pilot study.

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Abstract

OBJECTIVE: The differentiation between brain tumor recurrence and post-irradiation injury remains an imaging challenge. Computed tomography (CT) and magnetic resonance imaging (MRI) cannot always distinguish between the two. Although glioma cell line studies substantiated a plausible imaging superiority of (99m)Tc-tetrofosmin ((99m)Tc-TF) over other radiopharmaceuticals, little has been reported on its in vivo imaging properties. We assessed (99m)Tc-TF single-photon emission CT (SPECT) in cases where morphologic brain imaging was inconclusive between recurrence and radionecrosis.

METHODS: A total of 11 patients (7 men, 4 women) were evaluated. The initial diagnosis was glioblastoma multiforme (4), anaplastic astrocytoma (1), anaplastic oligodendroglioma (3), grade-II astrocytoma (2), and low-grade oligodendroglioma (1). All patients had been operated on and then received adjuvant external-beam radiotherapy. After a mean follow-up period of 25 months, there was clinical suspicion of recurrence, for which (99m)Tc-TF SPECT was performed.

RESULTS: In 8/11 cases, an abnormally increased tracer uptake appeared in the region that CT and/or MRI indicated as suspicious; in half of these cases, recurrence was confirmed histologically after surgery and in the other four by growth of the lesion over a 6-month follow-up period, and clinical deterioration. The remaining 3/11 patients had faint tracer uptake in the suspicious region, compatible with radiation injury; these lesions remained morphologically unaltered in a mean 12-month follow-up period, with no clinical deterioration in the patient's condition, a course strongly favoring the diagnosis of radiation injury.

CONCLUSIONS: Metabolic brain imaging by (99m)Tc-TF could offer useful information in the workup of treated brain tumors, where radiomorphologic findings between recurrence and radionecrosis are inconclusive.

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MeSH Terms, Substances

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