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doi:10.1016/j.surneu.2008.09.023
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Neoplasm

Pseudoprogession after radiotherapy with concurrent temozolomide for high-grade glioma: clinical observations and working recommendations

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Received 12 June 2008; accepted 24 September 2008. Available online 15 January 2009.

Abstract

Background

Treatment of newly diagnosed GBM with postoperative RT and concomitant TMZ followed by 6 months of TMZ maintenance therapy has been shown to significantly improve overall survival compared with RT alone. Standard clinical assessments of these patients include Gd-MRI as well as neurologic evaluation. Frequently, patients exhibit immediate post-RT changes in enhancement on Gd-MRI that mimic tumor progression (ie, pseudoprogession or radiation-induced imaging changes). With the introduction of concomitant RT plus TMZ for treatment of malignant glioma, there appears to be an increasing incidence of pseudoprogession.

Case Description

In our experience, pseudoprogession after concomitant RT plus TMZ is typically not observed at first imaging immediately after completion of the therapy; but delayed focal enhancement mimicking tumor progression frequently occurs during the 6 months of maintenance therapy with TMZ. Pseudoprogession may reflect the radiosensitizing effect of TMZ during concomitant therapy, and retaining patients on treatment allows them to have enhanced survival and preserved quality of life. We observed 3 cases of pseudoprogession among 54 consecutive patients who were treated with this regimen. These patients developed pseudoprogession within 2 to 6 months after completion of concomitant RT plus TMZ, but all 3 patients completed maintenance chemotherapy and remained progression free for at least 15 months after diagnosis.

Conclusion

Functional imaging may improve the noninvasive diagnosis of pseudoprogession, but randomized prospective studies are needed to evaluate the real impact of pseudoprogession and validate neuroradiological techniques able to make a reliable distinction between tumor recurrence and pseudoprogession.

Keywords: Glioblastoma; High-grade glioma; Temozolomide; Concomitant therapy; Radiation therapy; Pseudoprogession

Abbreviations: EORTC/NCIC, European Organization for Research and Treatment of Cancer and National Cancer Institute of Canada; ^{18}F -FDG PET, ^{18}F fluoro-2-deoxy-D-glucose positron emission tomography; GBM, glioblastoma; Gd-MRI, gadolinium-enhanced magnetic resonance imaging; ^{123}I -2-T SPECT, ^{123}I iodo-2-tyrosine single photon emission computed tomography; MET, ^{11}C carbon methionine; MGMT, O^6 -methylguanine-DNA methyltransferase; MRS, magnetic resonance spectroscopy; RT, radiotherapy; ^{201}Tl , thallium chloride 201; TMZ, temozolomide; WHO, World Health Organization

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