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Imaging After Gliasite Brachytherapy: Prognostic MRI Indicators of Disease Control and Recurrence.

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PURPOSE: In this study, we analyzed the magnetic resonance imaging (MRI) changes in patients after Gliasite treatment and characterized the prognostic MRI indicators in these patients. **METHODS AND MATERIALS:** A total of 25 patients with recurrent glioblastoma multiforme were treated with the Gliasite Radiation Therapy System. Patients at the Johns Hopkins Hospital with recurrent glioblastoma multiforme underwent surgical resection followed by Gliasite balloon implantation. Available MRI scans for 20 patients were obtained throughout the post-Gliasite treatment course. These were reviewed and analyzed for prognostic significance. **RESULTS:** After Gliasite treatment, all patients developed some degree of T(1)-weighted contrast and T(2)-weighted hyperintensity around the resection cavity. The development of enhancement on T(1)-weighted contrast-enhanced imaging and the size of these lesions, in the absence of increasing T(2)-weighted hyperintensity, before clinical progression was not associated with decreased survival. Patients with T(1)-weighted enhancement >1 cm had a median survival of 13.6 months and those with T(1)-weighted lesions \leq 1 cm had a median survival of 8.5 months ($p = .014$). In contrast, the development of larger areas of T(2)-weighted hyperintensity surrounding the resection cavity was significantly associated with poorer survival ($p = .027$). **CONCLUSION:** After Gliasite treatment, characteristic T(1)- and T(2)-weighted changes are seen on MRI. Greater T(1)-weighted changes in the absence of increasing edema appears not to indicate disease progression; however, greater T(2)-weighted changes were associated with decreased survival. These findings suggest that T(1)-weighted enhancement in the absence of concomitant edema after Gliasite treatment might represent pseudoprogression. Conversely, increasing T(2)-weighted hyperintensity might reflect infiltrative disease progression. These results provide a framework for the analysis of disease control in future prospective studies of Gliasite treatment.

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