

2.4%-53.8%), and increased in 1 patient (by 23.4%). In this patient, new abnormal MET uptake was seen at the edge of the PTVs. At 6 months following SIB, the uptake value in the PTV-1 was reduced in all 7 patients (average 32.6%, range, 7.3%-61.9%) compared to baseline. The uptake value in the PTV-2 at 6 months following SIB was also reduced in all 7 patients (average 27.0%, range, 6.3%-56.1%). However, in 3 of those 7 patients, new abnormal MET uptake at the edge of PTVs was seen.

Conclusions: The SIB technique with TMZ planned by MET-PET demonstrated significant efficacy in control of the regional tumor in the early phase of the disease, and appeared to have no severe side effects or neurological toxicity. Preliminary results demonstrated that the uptake value of MET decreases after SIB at the PTV-2 of 40 Gy, as well as at the PTV-1 of 56 Gy in the majority of patients. In some cases, however, it is still difficult to prevent tumor recurrence at the edge of the resection cavity, even if the original tumor was well controlled.

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2089 Radiotherapy, Temozolomide, and Bevacizumab Followed by Irinotecan, Temozolomide and Bevacizumab in Newly Diagnosed Glioblastoma Multiforme: Preliminary Results from an Ongoing Phase II Trial

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Purpose/Objective(s): Despite decades of intensive research, the outcome for malignant gliomas remains poor. While the addition of temozolomide (TMZ) to radiotherapy (XRT) has significantly improved outcome, the results are modest - most patients with WHO Grade IV gliomas survive less than 18 months. Preliminary results from a Phase II trial combining XRT, TMZ, an anti-angiogenic agent and a topoisomerase I inhibitor, in newly-diagnosed high-grade glioma patients, are presented. The primary study objective is to estimate overall survival, with secondary objectives of assessing progression-free survival and treatment-related toxicities.

Materials/Methods: Newly diagnosed adult patients with histologically confirmed glioblastoma multiforme or gliosarcoma, status-post biopsy and/or surgery, were eligible for enrollment in this IRB-approved protocol. XRT, TMZ, and bevacizumab (BVZ) were given concurrently beginning 3-5 weeks post surgery. The XRT consisted of 25-28 fractions to the pre-operative T2-weighted volume expanded 2 cm followed by 8-5 fractions to the postoperative resection cavity plus any contrast-enhancing T1-weighted volume expanded 1.5 cm, all at 1.8 Gy per day (59.4 Gy total.) Following completion of XRT, patients without evidence of disease progression on MRI received 6 cycles of BVZ, TMZ, and irinotecan. Patients were followed closely for adverse events - particularly hematologic toxicity and thromboembolic events - as well as disease progression.

Results: To date, a total of 29 patients (17/12 M/F) have been enrolled with a median age of 52 years of age (range, 27-68 years). Median follow-up, calculated from the start of XRT, is 2.0 months (range, 0-6.7 months). Of these patients, 28 are alive, with the cause of death in the sole deceased patient progressive tumor. One other patient developed a right lower extremity DVT 19 and 16 days after starting XRT and BVZ, respectively. No other thromboembolic events have been reported. One case of Grade 3 and no cases of Grade 4 thrombocytopenia have been observed; 1 patient developed Grade 2 elevation of liver enzymes during XRT. No patient exhibited wound dehiscence. Of the 9 patients completing XRT and undergoing a post-XRT MRI, 6 have proceeded on to receive irinotecan, BVZ, and TMZ.

Conclusions: While it is premature to assess outcome in this study, the combination of XRT, TMZ, and BVZ appears to be well-tolerated. At this very early stage, the incidence of thromboembolic and hematologic toxicities appears consistent with the rates reported in patients receiving TMZ and XRT alone.

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2090 ¹⁸F Fluoroethyltyrosine-Positron Emission Tomography-guided Radiotherapy for High-grade Glioma

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Purpose/Objective(s): To compare the morphological gross tumor volumes (GTVs), defined as pre- and postoperative gadolinium enhancement on T₁-weighted magnetic resonance imaging and biological tumor volumes (BTVs), defined by the uptake of ¹⁸F fluoroethyltyrosine (FET) for the radiotherapy planning of high-grade glioma, using a dedicated positron emission tomography (PET)-CT scanner equipped with three triangulation lasers for patient positioning.

Materials/Methods: Nineteen patients with malignant glioma were included into a prospective protocol using FET PET-CT for planning purposes. To be eligible, patients had to present with residual disease after surgery. Planning was performed using the clinical target volume (CTV = GTV BTV) and planning target volume (PTV = CTV + 20 mm). First, the BTV-interobserver variability was assessed among three observers. Second, the BTV and GTV were quantified and compared. Finally, the geometrical relationships between GTV and BTV were assessed.

Results: The BTV estimates were not significantly different between the observers ($p = 0.66$). Although, BTVs and GTVs were not significantly different ($p = 0.56$), CTVs (mean $57.8 \pm 30.4 \text{ cm}^3$) were significantly larger than BTVs (mean $42.1 \pm 24.4 \text{ cm}^3$; $p < 0.01$) or GTVs (mean $38.7 \pm 25.7 \text{ cm}^3$; $p < 0.0001$). In 13 (68%) and 6 (32%) of 19 patients, FET uptake extended ≥ 10 and 20 mm from the margin of the gadolinium enhancement. Likewise, gadolinium enhancement extended ≥ 10 and 20 mm from the margin of the FET uptake in 12 (63%) and 4 (21%) of 19 patients.

Conclusions: In this prospective planning protocol using FET PET-CT, BTVs can be reliably determined among observers for glioma delineation. The size and geometrical location of GTVs and BTVs differed in the majority of high-grade glioma patients.

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