with radiologic diagnostic of high grade glioma without biopsy. We contour a CTV1 with 2–2.5 cm and a CTV2 with 1–1.5 cm of margin at GTV. Expansion of GTV to CTVs not including anatomical barriers. For PTVs (PTV1 and PTV2) we add 3 mm to CTV. Image-guided radiation therapy (IGRT) is used. The squeme of "integrated boost" is: 25 fractions of 1.9 Gy/day (total dose 45.5 Gy) for PTV1 and 2.3 Gy/day (total dose 57.5 Gy) for PTV1, 5 days a week.

Results. All patients have completed treatment. Median follow-up was 9 months (1–19 months) and median overall survival 9 months (1–19 months). Two patients with GM and AA have died at 6 and 4.5 months due to tumoral progression.

Conclusions. Although the series is small, acute toxicity was similar to the conventional treatments. The radiotherapy has been completed as planned. With the integrated boost technique involves a higher doses per fraction that achieves a higher biological effective and more local control. Total treatment time take five weeks. It is presume to involve an increase in survival, longer follow up is require.

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Mathematical model predicts response to radiotherapy of grade II gliomas

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Background. We present a mathematical model for grade II glioma progression and response to radiotherapy (RT) able to predict the long-time response to treatment.

Materials and methods. The model describes the evolution of the tumor cell density as a function of time-space incorporating: (i) tumor cell infiltration, as diffusion coefficient D accounting for the cellular motility measured in mm^2/day and (ii) proliferation with an average rate r (1/day). The response to radiation is modelled as the evolution of the density of damaged cells that are assumed to complete an average number of k mitosis before dying [Typical parameters: diffusion around 0.0075 mm^2/day and proliferation rates in the range $r = 0.01$–0.001 day^{-1}]. The fraction of tumor cells damaged by a radiation dose is estimated by the L-Q model. Different radiotherapy schemes were simulated including the standard one of 54 Gy in 30 fractions of 1.8 Gy over a time range of 6 weeks.

Results. The model output was compared with recently published clinical results (Pallud et al, Neuro-Oncology, 2012) and with those of clinical trials (Van den Bert et al, Lancet, 2005; Shaw et al, J. Clin. Oncol., 2002) with excellent agreement. Proliferation rates determine the response to RT. The smaller the proliferation rate, the longer the progression-free interval and survival rates. Highly proliferative tumors respond earlier to RT but bear an adverse prognosis. Cell motility does not significantly affect early response, but has a relevant impact on survival. Deferring radiotherapy or splitting doses does not affect survival. This concept justifies splitted treatment strategies. The response of the tumor can be fed into the model to provide information regarding proliferation rate and rough estimates for the time of transition to malignancy. The mathematical analysis of the model also gives an equation for the tumor time of birth.

Conclusions. The model provides an explanation to published observations and suggests novel radiation therapy strategies potentially useful.

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MGMT-methylation & IDH-1-mutation as prognostic factors in high-grade gliomas

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Background. High-grade gliomas (III and IV) are not curable tumors and they have a poor prognosis with consensus or experimental treatments. Molecular biology markers could help us to predict response to chemoradiotherapy and evolution of the disease in each patient.

Objectives. This prospective study aims to evaluate the relationship between IDH1 (isocitrate deshydrogenase-1) mutation and MGMT methylguanine-DNA methyltransferase) methylation and overall and disease-free survival. Methods: We included all patients diagnosed with multiform glioblastoma GBM) and anaplastic astrocytoma (AA) treated with surgery followed by chemoradioterapy. Radiotherapy (RT) consisted in 60 Gy in two phases with conventional schedule. Variables: IDH1-mutation (amplification through PCR and sequencing), MGMT-methylation (methylation-specific PCR assay), anatomopathology, Karnofsky, surgery, chemotherapy. Overall and disease-free survival was estimated with the Kaplan-Meier method.

Results. Between November 2010 and June 2012, there were 38 patients. 60% men, 56 years old average. Men were younger (8 years) than women. 24 GBM, 10 AA and 4 with GBM-AA mixed. 84% had more than 80% Karnofsky. 6 biopsied, 24 partial resections and 8 large resections/lobectomies. 83% of GBM and mixed were treated with surgery, RT and concomitant temozolamide. 60% of AA were treated with surgery, RT and sequential PCV. 17 were MGMT-methylation (59%GBM, 23,5%AA) and 5 were IDH1-