radiotherapy (3D-CRT) techniques and compared with IMRT plans. The 3D-CRT plans were prepared using 3-4 fields and IMRT plans consisted of 7-8 fields. The primary objective was to treat the planning target volume and to minimize the dose to organs at risk (OAR). Volumetric analysis, target coverage and conformity of prescribed doses were used in plan comparison.

Results: Treatment tolerance was very good in all patients. Only 12 patients needed steroids during treatment. Adjustment of the dose distribution to the target volume was improved and the critical structures were better spared in the IMRT plans than in 3D-CRT plans. For all patients the mean dose and the maximum dose to OAR were significantly reduced in IMRT plans. With respect to target volume, IMRT technique reduced the maximum dose while increasing the minimum dose, resulting in improved conformity. In some patients with tumors located very close to OAR it was impossible to give 60Gy for target volume with 3D-CRT technique because of not acceptable doses in OAR.

Conclusion: The IMRT technique combined with concurrent temozolomide is well tolerated and offers significant advantages comparing to 3D-CRT. Application of IMRT allows dose reduction at OAR without compromising target coverage.

Purpose or Objective: To report preliminary results of re-irradiation with proton therapy (PT) for large-volume recurrent high-grade gliomas (rHGG).

Material and Methods: Between January and September 2015, eight patients (pts) with rHGG (7 glioblastoma - GBM, 1 anaplastic oligodendroglioma - AOD) were re-irradiated with PT. Age at re-irradiation was between 40 and 64 years while Karnofsky performance status was 60-100%. Minimum time between prior radiotherapy and PT was 8 months. Target definition was based on CT, MR, and 18F-DOPA PET imaging. GTV included any area of contrast enhancement at MR imaging after contrast medium administration plus any uptake regions at PET imaging. CTV was generated by adding to GTV a 3-mm uniform margin manually corrected in proximity of anatomical barriers. CTV was expanded by 4 mm to create PTV. PTV volume varied between 55 and 260 cc. The patient with AOD received 50.4 GyRBE in 28 fractions (fx) while GBM pts 36 GyRBE in 18 fx. Four GBM pts also received concomitant temozolomide (75 mg/m2/day, 7 days/week). All pts were treated with active beam scanning PT using 2-3 fields with single field optimization technique.

Results: All pts completed the treatment without breaks. Registered acute side effects (according to Common Terminology Criteria for Adverse Events versione 4.0) include skin erythema with pruritus, alopecia, fatigue, conjunctivitis, and headache. All the side effects were grade 1 or 2. There were no grade 3 or higher toxicities. One patient developed grade 1 neutropenia. Three pts started PT under steroids (2-8 mg/day); two of them reduced the dose during PT, one kept the same steroids dose. None of remaining pts needed steroids therapy. During follow-up two pts developed radionecrosis (diagnosed at imaging) with mild symptoms controlled with steroids. All pts are alive. Four pts have stable disease one months after PT, three pts have stable disease three months after PT, and one pts progressed five months after PT.

Conclusion: PT re-irradiation of large volume rHGG is feasible and safe even with concomitant chemotherapy administration. Longer follow-up is necessary to assess definitive efficacy.