

The Role of Fractionated Stereotactic Radiotherapy in the Primary Treatment of Optic Glioma and Meningioma

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Abstract

Objectives: Evaluation of treatment results in patients with optic glioma and meningioma treated with fractionated stereotactic radiotherapy (FSRT).

Methods: Twenty-five patients with optic glioma and meningioma who were treated with FSRT between July 2007 and September 2014 were retrospectively analyzed. All treatments were applied with CyberKnife® (Accuray Inc., Sunnyvale, CA, USA). Median age was 40 years (4-67 years). Twenty-one (84%) patients were female, and 4 (16%) were male. The diagnosis was glioma in 7 (28%), and meningioma in 18 (72%) patients, respectively, based on magnetic resonance imaging (MRI). The intracranial part of the optic nerve was invaded in 11 (44%) patients. Median tumor size was 21 mm (10-45 mm). Patients received a median dose of 22.5 Gy (20-25 Gy) FSRT in median 5 fractions (3-5). Maximum dose on plan was median 28.5 Gy (25-32 Gy) and the gross tumor volume (GTV) was median 4 cm³ (0.4-23 cm³). Mean doses of the ipsilateral eye, ipsilateral lens, ipsilateral optic nerve and optic chiasm were median 25 Gy, 7.7 Gy, 26 Gy, and 9 Gy, respectively.

Results: Median follow-up was 40 months (3-99 months). During the follow-up 9 lesions regressed, 14 stayed stable, and 2 progressed. Local tumor control rate was 92%. The 2- and 5-year rates of overall survival (OS) were 100% and 100%, and local progression-free survival (LPFS) 100% and 82%, respectively. Age, MRI diagnosis, tumor size, intracranial extension and FSRT dose (=22.5 Gy vs >22.5 Gy) were not effective on tumor control. Out of 16 patients whose vision was also followed the sight was better in 3, diminished in 8, and stable in 5 patients, respectively. Age, MRI diagnosis, tumor size, intracranial extension and FSRT dose were not effective on the last vision status. When the doses to the optic structures were evaluated, significant reduction in sight was detected in patients with ipsilateral eye dose >25 Gy (p=0.008), and a trend for diminished sight was present for patients with optic chiasm dose >9 Gy (p=0.086).

Conclusions: FSRT can achieve excellent disease control in patients with optic glioma and meningioma. Because of the high fraction doses given with this treatment technique, mean doses to the optic structures should be evaluated carefully in order to prevent a more deteriorated vision.

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Abstract

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