

## Stereotactic Radiosurgery As An Alternative Treatment Modality In Ocular Melanomas

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### Abstract

**Objectives:** Hypofractionated stereotactic radiation has been our standard treatment option for selected peri-papillary ocular melanomas not amenable to Ru-106 or I-125 plaque brachytherapy. Since 2010 we have migrated the treatment of these patients to our Cyberknife unit. We aim to report our technical experience with this new stereotactic radiotherapy technique. **Methods:** We retrospectively analyzed 7 patients treated on the Cyberknife radiosurgery system of the Centre Hospitalier de l'Université de Montréal with a Cyberknife from October 2010 to September 2011. All patients had non-metastatic peripapillary choroidal melanomas with no evidence of extrascleral tumor extension at initial ultrasound. A custom device with light and camera was designed to maintain and monitor the position of the treated eye. Tumors were delineated with the help of MRI co-registration and clinical (fundoscopy, ultrasound) reports – a combined CTV/PTV margin of 2.5-3 mm was applied. The planned dose for all patients was 60Gy in 10 daily fractions. **Results:** Six patients were treated for a newly diagnosed ocular melanoma and one patient was treated for a marginal failure of plaque brachytherapy. The median age for patients was 51 years (range: 24-67). Three patients were staged to have small melanomas according to the Collaborative Ocular Melanoma Study, while four had medium tumors. The median gross tumor volume (GTV) was 0.3 cm<sup>3</sup> (range: 0.1 – 0.4 cm<sup>3</sup>), whereas the median planning tumor volume (PTV) was 1.0 cm<sup>3</sup> (range: 0.5 – 2.8 cm<sup>3</sup>). Three patients were treated with a single 7.5mm collimator, two with 10mm and two with 12.5 mm. The median minimum and mean GTV doses were 62.2 Gy (range: 59.2 - 67.9 Gy) and 70.1 Gy (range: 68.5 - 75.9 Gy). The median minimum and mean doses to the PTV were 54.46 Gy (range: 51.9 - 59.8 Gy) and 66.44 Gy (range: 64.3 - 69.0 Gy). The mean PTV coverage was 95.1% (SD 3.5%) while the mean new conformity index was 1.3 (range: 1.2 -1.4). The median maximum doses to organs at risk were: 3.9 Gy (range: 2.4 – 5.6 Gy) for the ipsilateral lens, 60.9 Gy (range: 59.9 – 63.9 Gy) for the ipsilateral optic nerve, 33.2 Gy (range: 16.9 – 69.9 Gy) for the ipsilateral lachrymal gland and 0.6 Gy (range: 0.3 – 0.6 Gy) for the contralateral eye. Treatment delivery was well tolerated. Plans were optimized down to a median of 42 beams, for planned delivery times of 8.8 to 15 minutes. The mean follow-up was 8 months. No patient has yet presented a clinically significant change in visual acuity.

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With this early follow-up, no patient has had a local progression. Two patients have suffered Grade 2 toxicities: one patient presented an exudative retinal detachment, in addition the patient treated for the recurrent disease presented ocular pain secondary to a neovascular glaucoma treated by topical medication and analgesics. Conclusion: While further follow-up is warranted, initial results indicate that hypofractionated Cyberknife stereotactic radiotherapy is technically feasible and well tolerated in the management of peri-papillary ocular melanoma.

