

GAMMA KNIFE PERFEXION® RADIOSURGERY FOR INTRAOCULAR TUMOR - TECHNIQUE ESTABLISHMENT AND PRELIMINARY RESULTS

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Purpose : Radiosurgery plays an important role in treating patients with intraocular tumor and retained visual function aiming at organ-conservation. Gamma knife stereotactic radiosurgery (GKRS) provides a relatively non-invasive and less time-consuming procedure for treating patients with choroidal melanoma comparing with plaque brachytherapy. It also has the potential radiosurgery to provide effective treatment for other ophthalmologic indication. We presented a new treatment protocol using GKRS to treat patient with intraocular tumor and evaluated the safety and precision of GKRS as a primary treatment for intraocular tumor.

Methods : Two patients with uveal melanoma and one patient with breast cancer orbital metastasis treated with the Leksell Gamma Knife® Perfexion stereotactic radiosurgery in our hospital. Retrobulbar anesthesia following fixation of the treated eye by suturing two extraocular muscles to the stereotactic frame were performed in order to immobilize the eye in the whole treatment procedure. The dose to the tumor margin was 25-30 Gy prescribed at 50-55% isodose line. Contrast-enhanced MRI was used for Gamma Plan dose planning. CT scans were done after eye fixation, immediate before and after the GKRS to confirm the accuracy of tumor localization. We compared tumor volume, tumor and lens gravity point deviation, and tumor coverage in the 3 sets of CT scans to check the precision of immobilization and eye fixation.

Results : The eye movement analysis revealed that the gravity point coordination deviation of the tumor and lens between CT-1 and CT-2, or CT-1 and CT-3 was less than 0.120 mm. At least 95% of the tumor volume was covered by the prescription dose in the 3 sets of CT image. After GKRS, tumor shrinkage and serous retinal detachments disappearance were noted by ophthalmoscopy and orbital MRI in two patients. No major complication was found during follow up.

Conclusion : GKRS using our treatment protocol is a relatively non-invasive, organ-conserving, and less time-consuming single fraction treatment for intraocular tumor. Our eye fixation method reveals high accuracy. Larger study with long term follow up is needed to evaluate the dose response result of the patients.