

## **CyberKnife Radiosurgery for Trigeminal Neuralgia**

**Romanelli P, Heit G, Chang SD, Martin D, Pham C, Adler JR.**

Department of Neurosurgery, Stanford University Medical Center, Stanford, CA, USA

Background: We present preliminary results using CyberKnife radiosurgery as a noninvasive treatment for trigeminal neuralgia (TN).

Methods: Ten patients with medically refractory TN who were deemed unsuitable for conventional surgery underwent CyberKnife radiosurgery using CT cisternography for localization.

Results: Pain relief was achieved in 7 patients, in 5 of them within 24-72 hours after irradiation.

Conclusion: CyberKnife radiosurgery can achieve early-onset pain relief in a subset of TN patients. Improvements using this technique include the absence of a stereotactic ring, potentially improved targeting accuracy produced by CT cisternography and improved dose homogeneity.

Romanelli P et al: CyberKnife radiosurgery for trigeminal neuralgia. *Stereotact Funct Neurosurg* 81(1-4):105-109, 2003.

---

## **Preliminary Visual Field Preservation after Staged CyberKnife Radiosurgery for Perioptic Lesions**

**Pham CJ, Chang SD, Gibbs IC, Jones P, Heilbrun MP, Adler JR.**

Department of Neurosurgery, Stanford University Medical Center, Stanford, CA, USA

Objective: The limited radiation tolerance of the optic nerves and the optic chiasm makes it a challenge to treat immediately adjacent lesions with radiosurgery. Staged or hypofractionated radiosurgery has the virtue of combining the accuracy and conformality of radiosurgery with the normal tissue-sparing benefits of fractionation. We describe a consecutive series of patients with meningiomas and pituitary adenomas abutting the anterior visual pathways who were treated with staged, image-guided radiosurgery.

Methods: Thirty-four patients with either meningiomas (20 patients) or pituitary adenomas (14 patients) within 2 mm of the optic apparatus were treated. Several patients had previously been treated with conventional fractionated radiotherapy (5 patients) or subtotal surgical resection (23 patients). Radiosurgery was delivered in two to five stages to a cumulative average marginal dose of 20.0 Gy. Visual testing and clinical examinations were performed before treatment and at follow-up intervals beginning at 6 months after treatment.

Results: The mean follow-up period was 29 months (range, 15-62 months). Pre- and post-treatment vision was unchanged in 20 patients, improved in 10, and worse in 3. One patient died during follow-up as a result of an unrelated cardiac event. Visual loss was accompanied by tumor progression in two cases. In a third patient with a multiple recurrent adrenocorticotrophic hormone-secreting pituitary adenoma, injury to one optic nerve occurred after both a prior course of radiotherapy and three separate sessions of radiosurgery.

Conclusion: Staged radiosurgery resulted in high rates of tumor control and preservation of visual function. Ninety-one percent of patients retained their pre-surgical vision. Staged radiosurgery may be a safe and effective alternative to either surgery or fractionated radiotherapy for selected lesions adjacent to the optic apparatus.

Pham CJ et al.: Preliminary visual field preservation after staged CyberKnife radiosurgery for perioptic lesions. *Neurosurgery* 54(4):799-812, 2004.

---

## **Phase I Study of Stereotactic Radiosurgery in Patients with Locally Advanced Pancreatic Cancer**

**Koong AC, Le QT, Ho A, Fong B, Fisher G, Cho C, Ford J, Poen J, Gibbs IC, Mehta VK, Kee S, Trueblood W, Yang G, Bastidas JA.**

Department of Radiation Oncology, Stanford University Medical Center, Stanford, CA, USA

**Purpose:** To determine the feasibility and toxicity of delivering stereotactic radiosurgery to patients with locally advanced pancreatic cancer.

**Methods and Materials:** Patients with Eastern Cooperative Oncology Group performance status  $\leq 2$  and locally advanced pancreatic cancer were enrolled in this Phase I dose escalation study. Patients received a single fraction of radiosurgery consisting of either 15 Gy, 20 Gy, or 25 Gy to the primary tumor. Acute gastrointestinal toxicity was scored according to the Radiation Therapy Oncology Group criteria. Response to treatment was determined by serial high-resolution computed tomography scanning.

**Results:** Fifteen patients were treated at 3 dose levels (3 patients received 15 Gy, 5 patients received 20 Gy, and 7 patients received 25 Gy). At these doses, no Grade 3 or higher acute gastrointestinal toxicity was observed. This trial was stopped before any dose-limiting toxicity was reached, because the clinical objective of local control was achieved in all 6 evaluable patients treated at 25 Gy.

**Conclusions:** It is feasible to deliver stereotactic radiosurgery to patients with locally advanced pancreatic cancer. The recommended dose to achieve local control without significant acute gastrointestinal toxicity is 25 Gy.

Koong AC, et al.: Phase I study of stereotactic radiosurgery in patients with locally advanced pancreatic cancer. *Int. J. Radiation Oncology Biol. Phys.* 58(4): 1017-1021, 2004.