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## **Image guided stereotactic radiosurgery for lesions in proximity to the anterior visual pathways: a preliminary report.**

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The incidence of optic neuropathy after stereotactic radiosurgery (SRS) is related to the total dose, fraction size, and treatment volume. Theoretically, fractionated SRS can decrease this risk. In this paper, we report our technique for fractionated SRS and assess its potential role in the management of tumors located adjacent to the anterior visual pathways. Since 1997, thirteen patients (median age: 50, range 21-76) with lesions in close proximity to the anterior visual pathways were treated on the CyberKnife image guided SRS system (Accuray, Inc., Sunnyvale, CA).

The CyberKnife is a 6MV linear accelerator mounted on a robotic arm which can monitor and adjust to changes in the target position in real time thus eliminating skeletal frame immobilization and allowing for convenient multi-fraction SRS treatments. Magnetic Resonance Imaging (MRI) and computerized tomography (CT) imaging for treatment planning were obtained with the patients head immobilized in an aquaplast mask.

After image fusion, the target and critical structures were delineated. Two to five fractions were prescribed with approximately a 24-hour interfraction interval. The patients received 25 Gy in 5 fractions (n=5), 21 Gy in 3 fractions (n=5), or 20 Gy in 2 fractions (n=3) to the 75-95% isodose line. Ten of the thirteen patients had good pretreatment vision. In nearly all instances, the volume of the optic nerve that received 80% of the prescribed dose was  $< 0.05 \text{ cm}^3$ . In all instances, the volume of the optic nerve that received 50% of the prescribed dose was  $\leq 0.5 \text{ cm}^3$ . Only one patient received more than a 5 Gy daily dose to  $> 0.03 \text{ cm}^3$  of optic nerve.

With median follow up of 18 months (range 12 to 54), four patients have had improvement in their vision. No visual deterioration has been observed in any of the other patients. In addition, there has been no tumor progression within the treated field. Fractionated SRS using the CyberKnife is technically feasible and may decrease the risk of optic neuropathy. Greater patient accrual and longer follow up will be necessary to further determine the clinical benefit of this approach.

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