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CASE STUDY

LEFT OPTIC NERVE MENINGIOMA (WHO GRADE 2)

BARROW Neurological Institute®

St. Joseph's Hospital and Medical Center CHW

Barrow Neurological Institute CyberKnife® Team:

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CyberKnife Center:	Saint Joseph Hospital Barrow Neurological Institute Phoenix, AZ

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LEFT OPTIC NERVE MENINGIOMA (WHO GRADE 2)

DEMOGRAPHICS

Sex:	Male
Age:	75 years
Histology:	Meningioma

CLINICAL HISTORY

Referred by:	Neurosurgery
Previous Treatment:	Previously resected

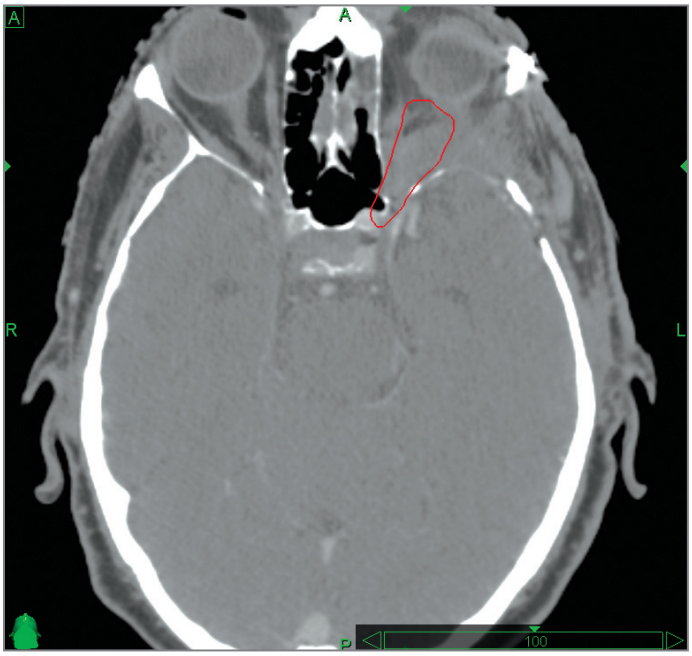
Case History

History of progressive loss of visual acuity and peripheral vision. Patient was referred for resection. Patient complained of post-surgical retrobulbar pain and discomfort.

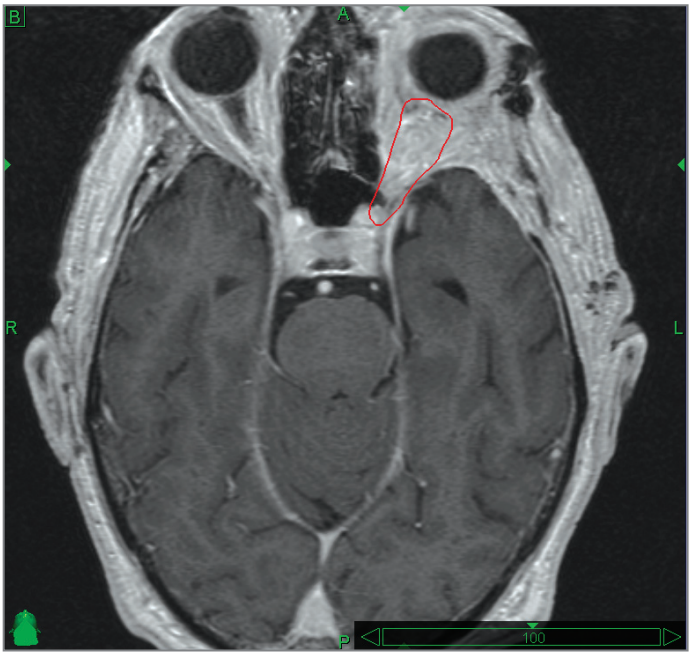
CyberKnife® Treatment Rationale

This lesion is prone to recurrence so a recommendation to perform adjunctive radiosurgery to the resection bed was made by the neurosurgeon.

Due to the risk of recurrence and intimate association of the lesion with the optic nerve, the CyberKnife® System was selected. SRS will reduce the risk of encroachment into the optic chiasm and risk to the sighted eye. Studies report hypofractionation to be safer and effective for optic nerve menigiomas.[1]



Pre-treatment CT image showing target lesion.



Pre-treatment MR image showing target lesion.

TREATMENT DETAILS

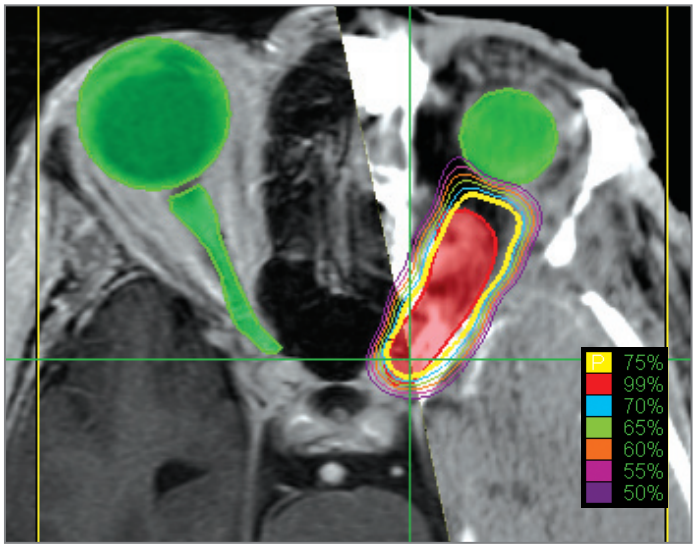
Tumor Volume:	3.1 cc	Fractions / Treatment Time:	5 / 50 minutes per fraction
Imaging Technique(s):	CT, MRI	Path Template:	3 path 800 mm
Rx Dose & Isodose:	25 Gy to 75%	Tracking Method:	6D Skull Tracking
Conformality Index:	1.3	Collimator(s):	10 mm
Tumor Coverage:	95.7%		
Number of Beams:	170		

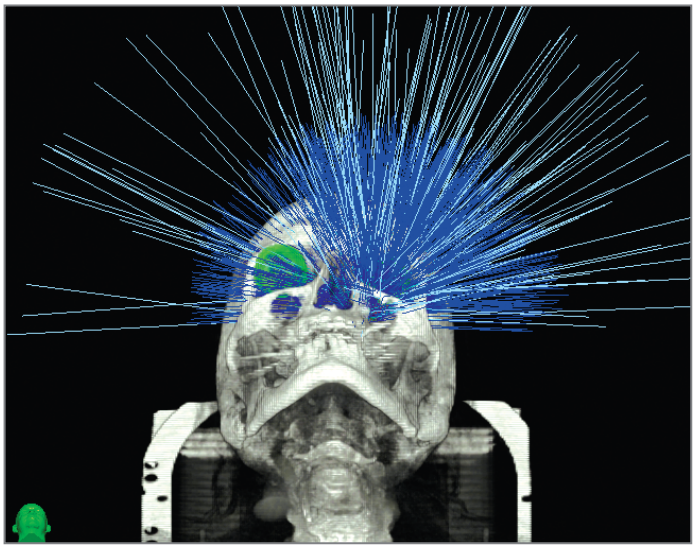
Planning Process and Goals

The treatment plan that was developed covered 95.7% of the tumor target volume with the 75% isodose line. The patient underwent thermoplastic immobilization and simulation, followed by CT and MR imaging localization for CyberKnife treatment planning purposes.

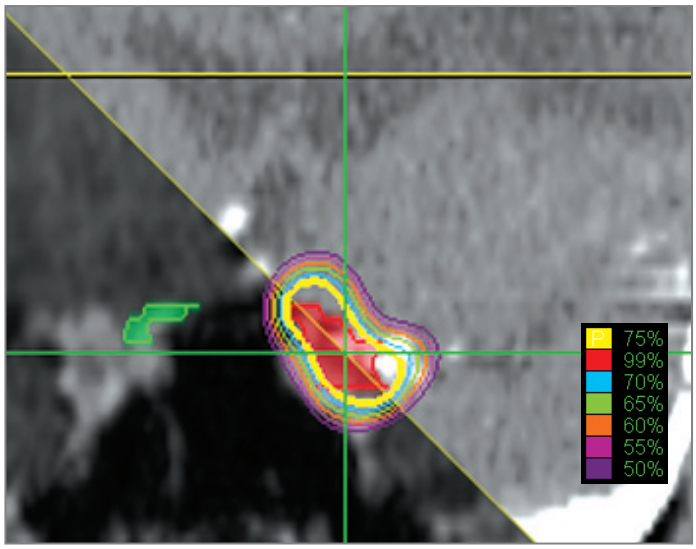
Treatment Delivery

The prescription was set at 25 Gy, delivered in five fractions of 5 Gy each. The treatment was delivered without difficulty. The patient tolerated the procedure well with some vague mild complaints of left frontal sinus irritation. He specifically denied any headaches, nausea, vomiting, reduced vision in the left eye, or cranial neuropathies.

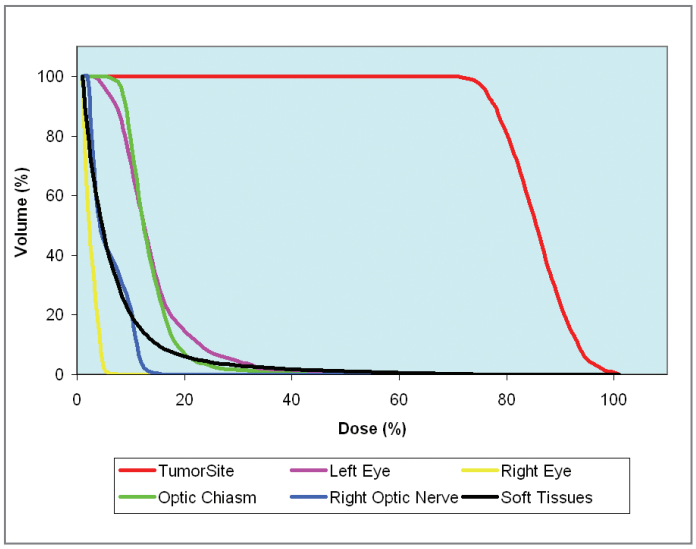




Non-isocentric beam geometry of the solution.



Fused (MR/CT) - Axial and Coronal view of target and dose distribution.

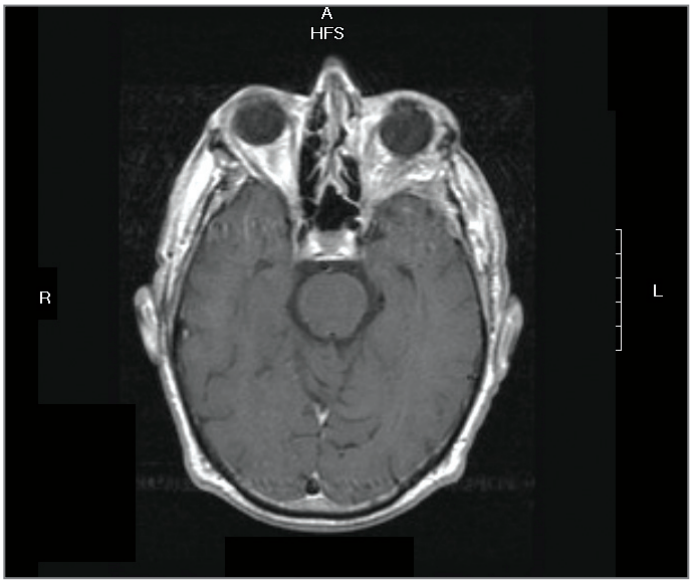


Dose Volume Histogram for target volume and critical structures.

Outcome and Follow-Up

MRI follow-up was completed three months post-treatment. The film review showed the tumor is stable.

3D representation of target volume, critical structures, and prescription isodose volume.



3 month follow-up MRI.

CYBERKNIFE AT BARROW NEUROLOGICAL INSTITUTE / ST. JOSEPH'S HOSPITAL (www.thebni.com)

The Barrow Neurological Institute (BNI) is an internationally renowned medical center that offers care for people with brain and spine diseases, disorders and injuries. Dr. Robert Spetzler, one of the world's leading neurosurgeons, is the Director of the Institute. There are 4,000 neurological procedures performed at BNI each year including up to 500 radiosurgical procedures. CyberKnife radiosurgery began at BNI in September 2003. The Center's CyberKnife population has been 71% intracranial, 21% spine and 8% whole body. The CyberKnife System is used on those patients for whom traditional radiosurgery is not possible or in situations where patients specifically request this procedure over other treatment options.

References

1. Pham CJ, Chang SD, Gibbs IC, Jones P, Heilbrun MP, Adler Jr, JR: Preliminary Visual Field Preservation after Staged CyberKnife Radiosurgery for Perioptic Lesions. Neurosurgery, 54(4):799-812, 2004.

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