

METASTATIC BREAST CANCER TO THE SPINAL CORD

San Diego CyberKnife Center Team:

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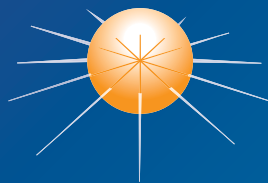
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CyberKnife Center:

San Diego CyberKnife Center

San Diego, California



SAN DIEGO
CYBERKNIFE CENTER, inc.

METASTATIC BREAST CANCER TO THE SPINAL CORD

DEMOGRAPHICS:

Sex: Female
Age: 43
Treat Date(s): July 2006

CLINICAL HISTORY:

Diagnosis: Breast cancer originally diagnosed 1996.
Previous radiosurgery in 2002 to two areas.
Now with disease metastatic to the spinal cord and brain

Case History:

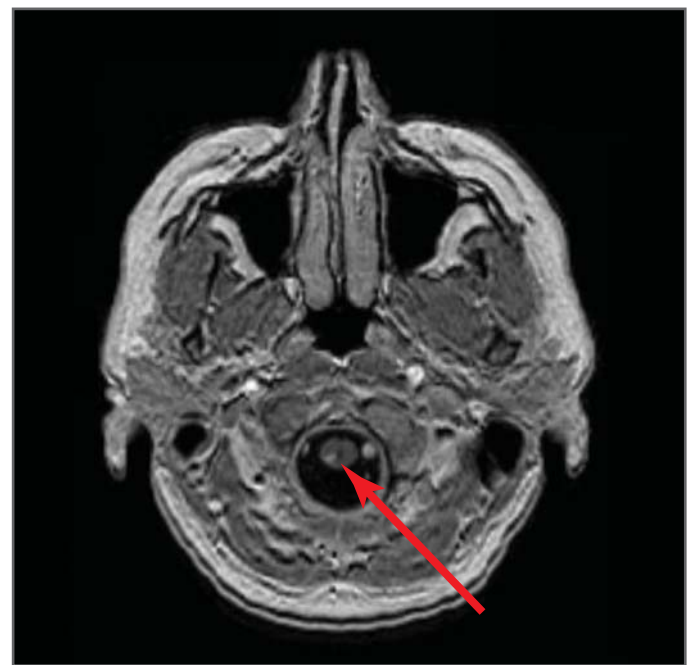
This 43 year old woman was originally diagnosed with breast cancer in 1996. She developed metastatic disease to the bone, lungs, mediastinum and brain in 2002. She underwent systemic chemotherapy along with whole brain radiotherapy. Gamma Knife radiosurgery was delivered as a boost to two brain lesions. She tolerated treatment well, with the exception of asymptomatic radiation necrosis in the posterior fossa from the radiosurgery. She did well until July of this year, when a routine MRI demonstrated new metastatic lesion within the spinal cord just below the foramen magnum. A second new lesion was present in the frontal lobe, adjacent to one of the areas that was treated with radiosurgery in 2002. MRI of the remainder of the spine was negative.

CyberKnife Treatment Rationale:

Due to its location, the lesion in the spinal cord was not surgically accessible, and it was too low to treat with Gamma Knife. Also, by giving several treatments, the lesion could be treated to a higher dose and with greater safety than with single-fraction radiosurgery. The lesion in the frontal lobe was immediately adjacent to an area which had previously been treated with radiosurgery, so the ability to deliver several radiosurgery treatments, instead of just one, was safer for the patient.



The Cyberknife Radiosurgery Device showing the components of the system



Enhancing lesion within the spinal cord. Note adjacent central cyst which the tumor has formed.

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TREATMENT DETAILS:

Tumor Volume: Cord lesion: .09 cc
Brain lesion 1 cc

Imaging Techniques: CT, MRI

Rx Dose & Isodose: Cord lesion: 21Gy to 86% isodose line in 3 fractions
Brain lesion: 21 Gy to 85% isodose line in 3 fractions

Conformality Index: Cord lesion 1.28
Brain lesion 1.81

Fractions / Treatment Time: 3 / 90 minutes per tx

Path Template: Two collimator long path

Tracking Method: 6D skull tracking

Collimator(s): 5 mm and 7.5 mm

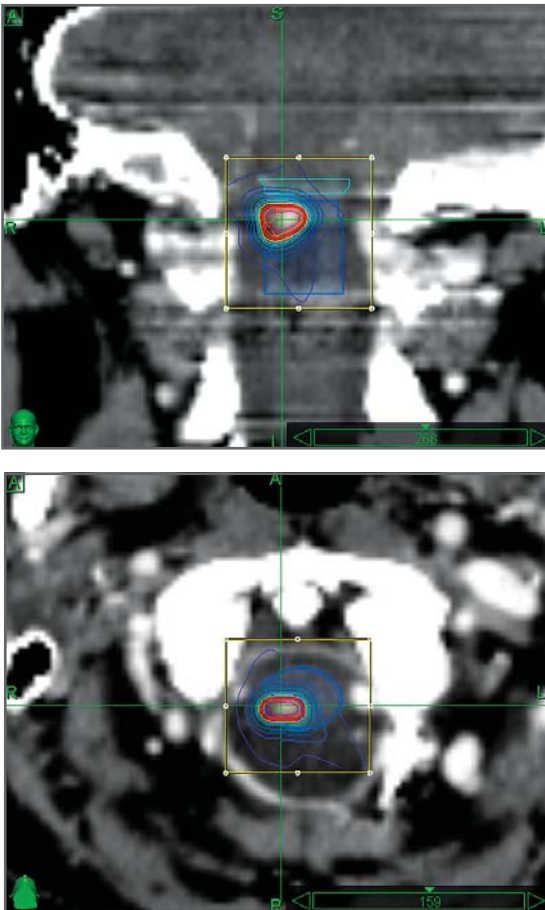
Number of Beams: 35, 89

Planning Process and Goals:

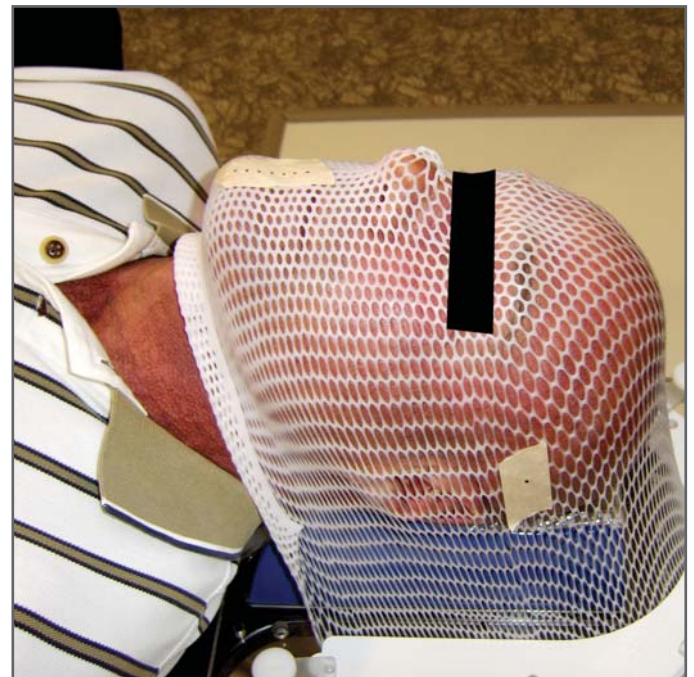
The spinal cord lesion measured .09 cc., while the frontal lobe lesion measured 1 cc. The spinal cord, normal brain, and tumor volumes were contoured to fully reconstruct three-dimensional tumor target and critical structure volumes. The treatment plan was 2100 cGy in three fractions over 5 days. Treatment was delivered to the 86% isodose line for the spinal lesion and the 85% isodose line for the frontal lobe lesion. The conformality index was 1.28 for the spinal lesion and 1.81 for the frontal lobe lesion.

Treatment Delivery:

The patient was immobilized with a mask and a custom body pillow. Treatment was delivered to the spinal lesion in 35 beams using the 5 mm collimator. Treatment to the frontal lobe lesion was delivered in 89 beams using the 7.5 mm collimator. The spinal cord dose was constrained so that no more than 1 cc received 1800 cGy. Each treatment took approximately 90 minutes.



Coronal and axial slices showing the spinal cord tumor with the 86% isodose line surrounding the enhancing mass. Note the rapid falloff of dose within the spinal cord (outlined in blue on the axial image).



Immobilization mask. The mask is made of plastic and is custom-made for each patient.

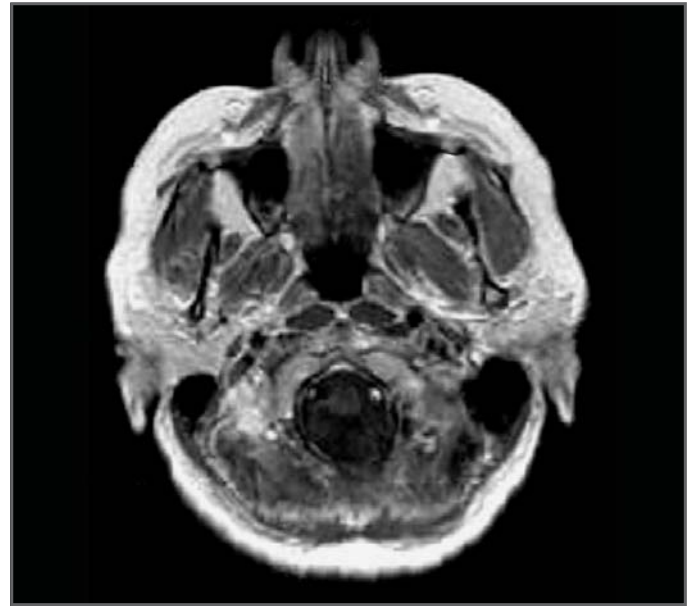
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Outcome and Follow-up:

The patient continues to do well, and remains asymptomatic. Follow up MRI demonstrates decreased enhancement for both lesions, and the spinal cord lesion has almost completely resolved.

Conclusion and CyberKnife Advantage:

The Cyberknife is a radiosurgical device which treats with submillimeter precision anywhere in the body without requiring a frame. Because of the frameless nature of the treatment, several treatments can be delivered with equal precision over several days, allowing for safer treatment when critical structures are close by. Because of the location of this patient's metastatic spine lesion, she was not treatable by Gamma Knife, but with the Cyberknife she was treated accurately to a high dose, comfortably, and on an outpatient basis.



Note decrease in size and enhancement of the spinal cord lesion. The associated cyst is also smaller.

CYBERKNIFE AT SAN DIEGO CYBERKNIFE CENTER (www.sdcyberknife.com)

San Diego CyberKnife Center, the first CyberKnife facility in San Diego, was installed in June 2006. The CyberKnife is an image-guided robotic radiosurgery system, allowing physicians to provide targeted, accurate high-dose radiation almost anywhere in the body. It has been extensively used for CNS, lung, pancreatic and liver lesions.

The San Diego CyberKnife Center was developed in partnership between Radiation Medical Group, Western Cancer Center and other local medical and surgical specialists. We strive to deliver clinical excellence and compassionate care.

References:

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4. Gibbs IC, Chang SD, Pham C, Adler JR: Radiation Tolerance of the Spinal Cord to Staged Radiosurgery. In: Kondziolka D (ed): *Radiosurgery* 2003. 5:22-28, Karger, Basel, 2004. {Stanford University Medical Center} See Abstract
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