

Image guided radiosurgery of spinal metastases using Elekta Axesse™

Institution:	William Beaumont Hospital, USA
Patient:	61-year-old male
Diagnosis:	Adenocarcinoma lung with spinal metastases
Plan:	11-field, coplanar, unopposed beam arrangements
Treatment system:	Elekta Axesse™
Treatment:	18Gy single fraction

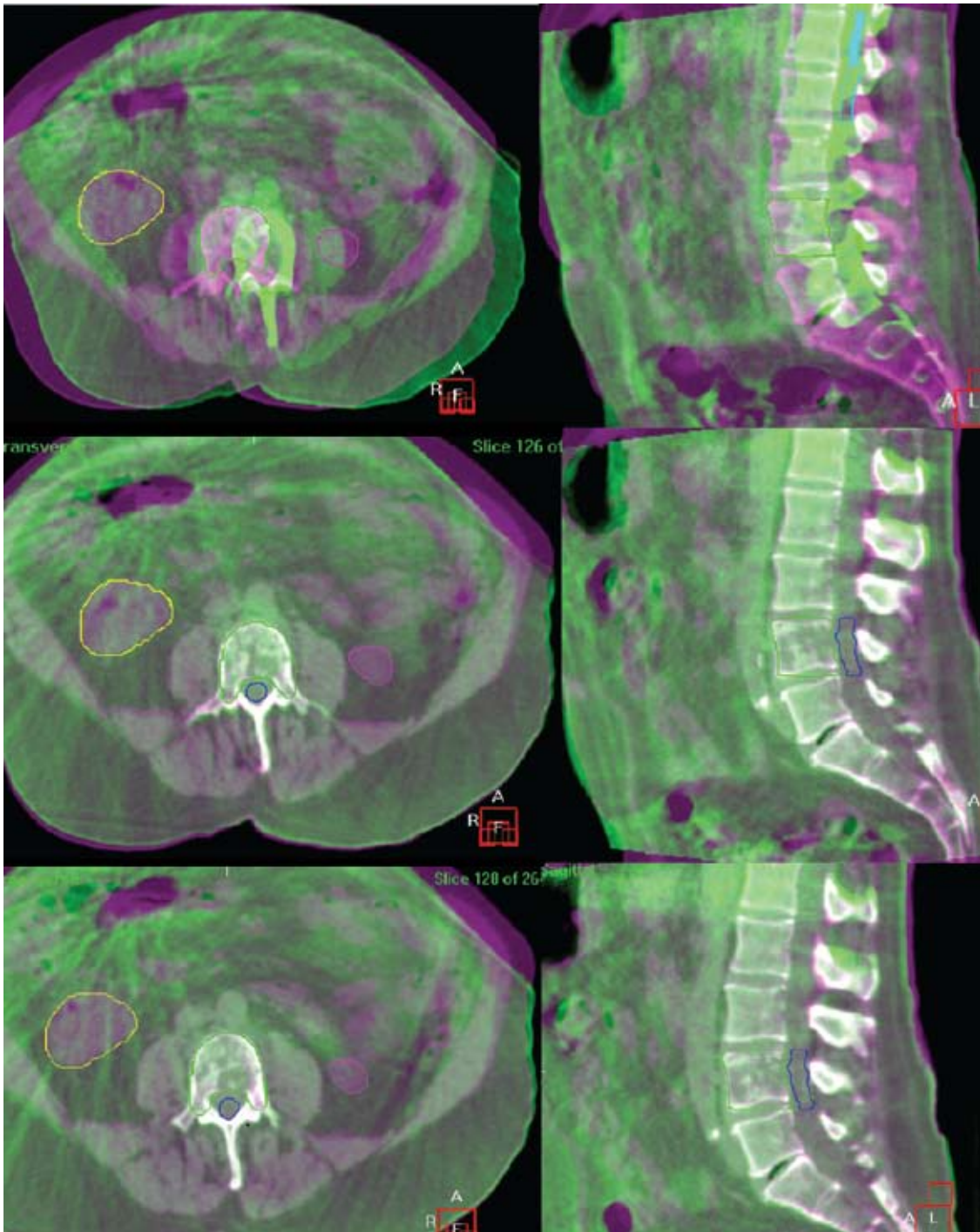


Figure 3: transverse and sagittal views of the patient undergoing on-line image-guided spine SBRT.

Elekta VolumeView™ images (pink = planning CT image, green = VolumeView image) show uncorrected (top) and corrected (middle) positions.

Post-treatment images (bottom) were also acquired to examine patient movement during the treatment course.

Image guided radiosurgery of spinal metastases using Elekta Axesse™

Radiation Oncologists: James Fontanesi, MD

Medical Physicists: Tiezhi Zhang, PhD, Jennifer L. Wloch, Di Yan, DSc.

Patient diagnosis and history

This chiropractor presented in July 2006 with increasing cough. The patient underwent bronchoscopy in August 2006 and was diagnosed with a moderately differentiated adenocarcinoma of the lung. He underwent chemotherapy consisting of Gemzar and Carboplatin. The patient was doing well until January 2008, when he attended for routine follow-up bone scan and new onset of disease at L4 was discovered. There was also questionable activity noted in the sternal region. A PET scan was obtained and it was positive in the same regions.

Based on the images that were obtained and reviewed today, the physician felt this patient would be an excellent candidate for single-fraction stereotactic treatment to the spine. The superior aspect of the left iliac crest also would benefit from single-fraction irradiation.

Planned treatment

An eleven-field, coplanar unopposed beam arrangement using 6MV photons was prepared (Figure 1). The isocenter was set in the center of target L4. The prescription dose was 18Gy administered in a single fraction to the planning target volume. The maximal dose to the cord thecal sac was 9.9Gy and maximal dose to both kidneys was 7.9Gy (Figure 2). About 95% of the target volume received at least 18Gy and the maximal target dose was about 22Gy. The left iliac crest was also treated with a total dose of 6Gy using two oblique beams at the same isocenter as target L4.

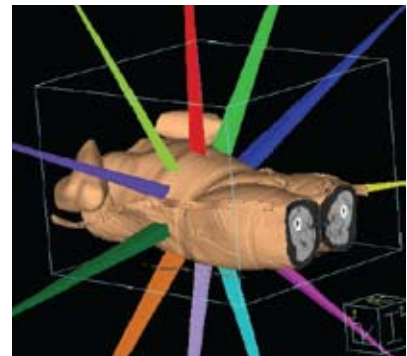


Figure 1: Beam arrangement of eleven-fields for target L4

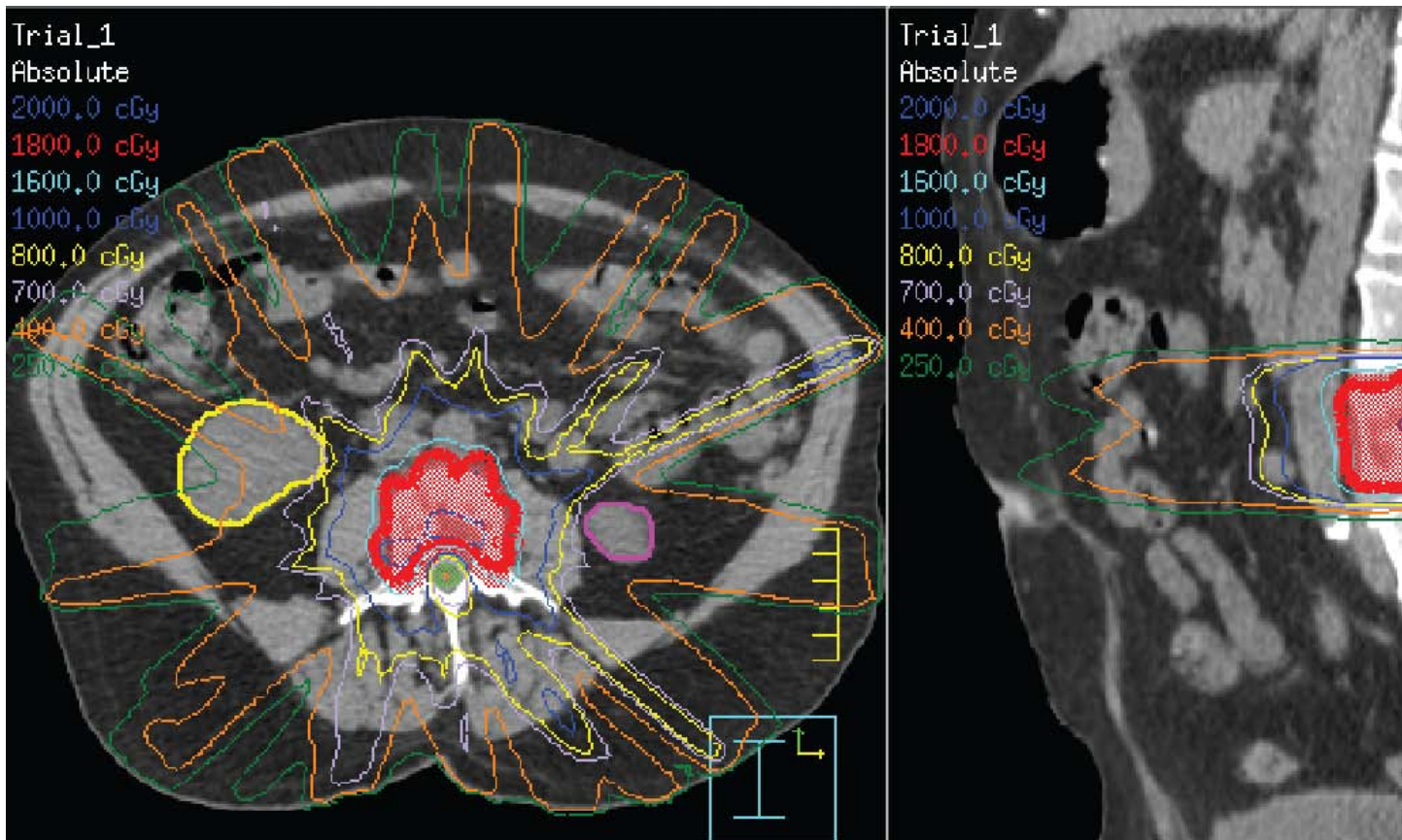


Figure 2: dose distribution of the eleven-field image guided radiosurgery plan with conformal limits to cord thecal sac and kidneys.

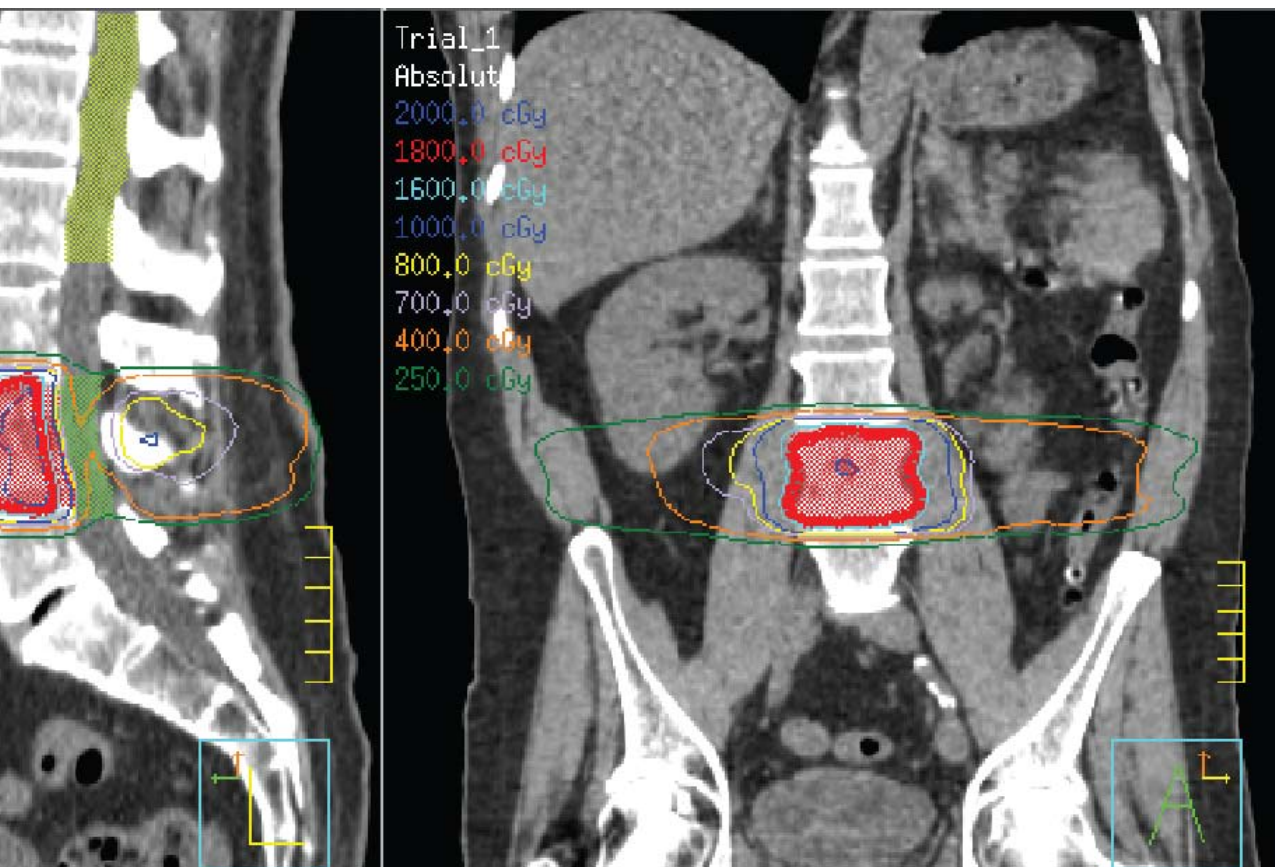
The patient was immobilized using Elekta Axesse™ body immobilization device. A planning CT scan obtained with the patient positioned in the body im... imaging was acquired and 3D reconstruction of the image data set was performed using Elekta Axesse 3D VolumeView image acquisition. Image registra... correction was made using Elekta Axesse Advanced 6D Patient Positioning System. The physician verified the position correction using post-correction El... the treatment very well and completed the treatment course without any delays. A third post-treatment VolumeView image set was acquired to examin...

Outcome and follow-up

The patient was completely pain free at one month follow-up with reduction in narcotic requirements.

Discussion

Stereotactic radiosurgery of this spine tumor was optimized with on-line position corrections using Elekta Axesse 3D VolumeView imaging capability. Hig... minimizes unnecessary exposure of the critical normal tissues. Elekta Axesse treatment field was large enough to treat the iliac crest target with the pati...



A immobilization device was used for treatment planning. Elekta Axesse VolumeView™
 motion correction system was used to perform on-line full 6D position correction. Patient position
 was verified using Elekta Axesse VolumeView imaging and orthogonal portal images. The patient tolerated
 the treatment well. No observable movement during the treatment. No observable movement was identified.

Treatment time = 52 minutes:

- 5 . – patient set-up
- 5 mins. – pre treatment
VolumeView™
- 2 mins. – patient realignment
- 3 mins. – VolumeView verification
- 5 mins. – MV image verification
- 30 mins. – treatment delivery
- 2 mins. – post treatment
VolumeView

High precision position correction ensures accurate dose delivered to the tumor and
 patient in the same position for set-up.

Fighting serious disease

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