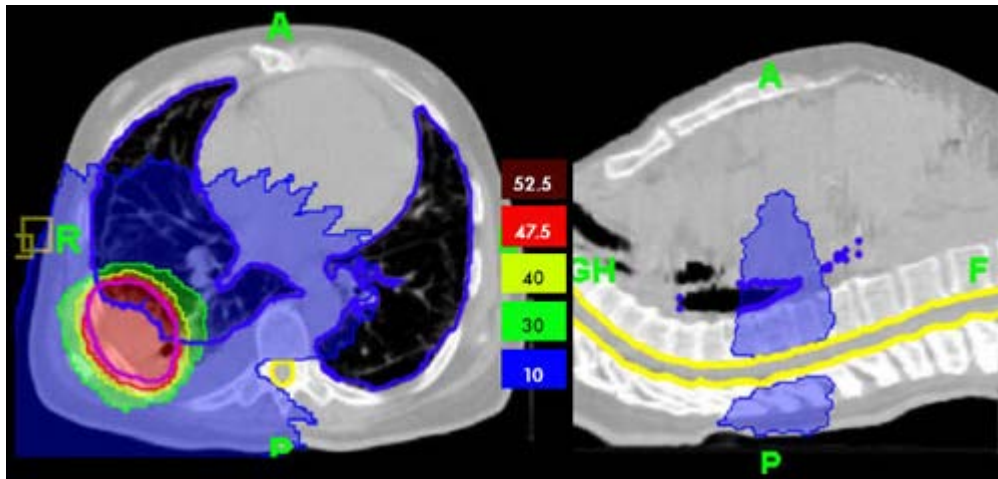


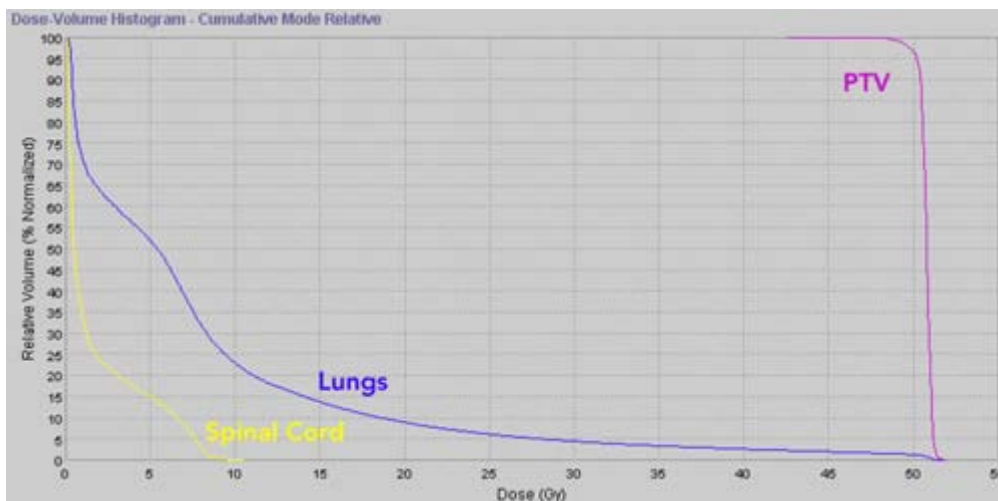
# TomoTherapy<sup>®</sup> CTrue<sup>™</sup> Adaptive Lung Case

This clinical case study demonstrates how the TomoTherapy<sup>®</sup> Hi·Art<sup>®</sup> treatment system's CTrue<sup>™</sup> technology provides true dose guidance. Only *TomoTherapy's* **daily 3D imaging** reveals anatomical changes and their dosimetric impact at every fraction.

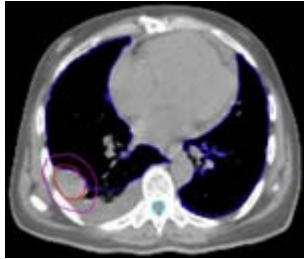
## Original Treatment Plan



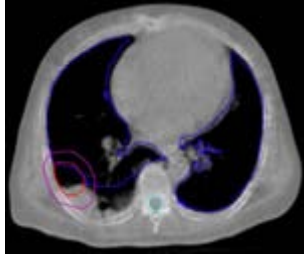
- 50 Gy in 25 fractions is prescribed to a mass in the right posterior lung.
- Excellent cord sparing (maximum of approx. 8 Gy) is achieved via optimization of a helical IMRT delivery.



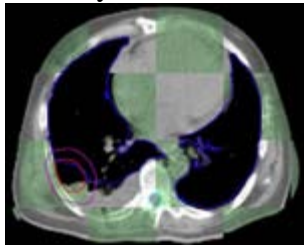
## Hypothetical Delivery



Original plan image

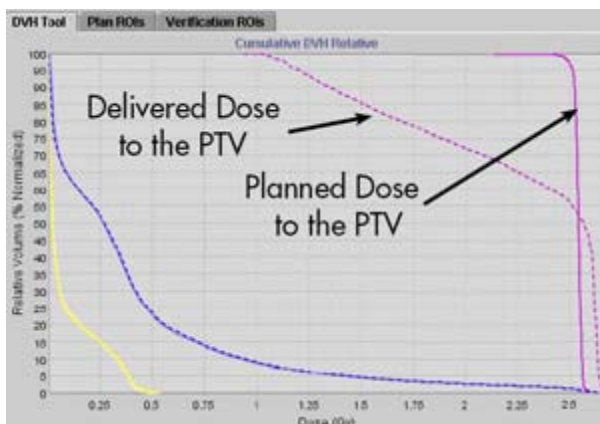


Five days into treatment (~1cGy MVCT)



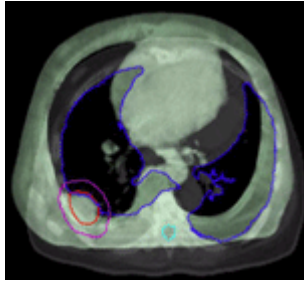
Registered image(Green= Daily CT;Grey=Planning CT)

- Over a one week period, a progressive posterior shift of the tumor occurs due to reduced pleural effusion.
- Daily patient alignment via external marks or bony anatomy would lead to a severe under-dosage of the tumor due to geographic miss.

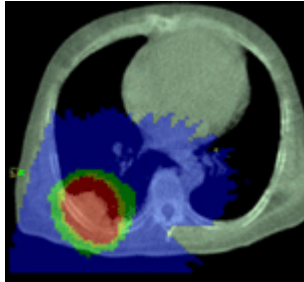


Dose calculation showing the results if treated by aligning to bone

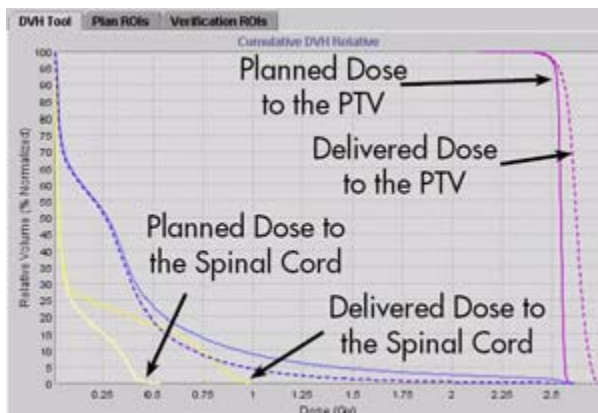
## Actual Delivery Using *CTrue* Technology



Registered images using PTV contour & dose to position tumor for treatment

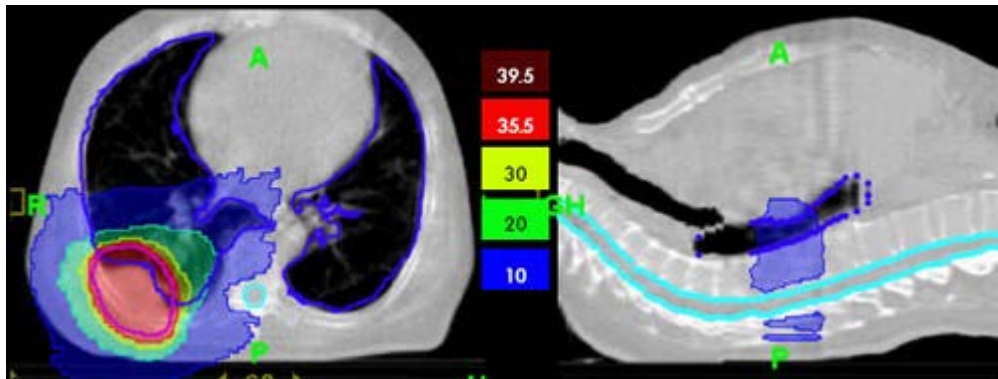


- Using *CTrue* technology, the shifting tumor can be correctly aligned before every fraction and dose can be overlaid to check target coverage and organ sparing.
- Spinal cord dose remains within tolerance thanks to the *TomoTherapy Hi-Art* system's helical delivery, and treatment is continued with the initial plan up to and including the 5th fraction.
- Taking advantage of *CTrue* images and adaptive therapy technology, the clinician decided that after the 5th treatment session, the plan will be re-optimized for the remaining fractions.

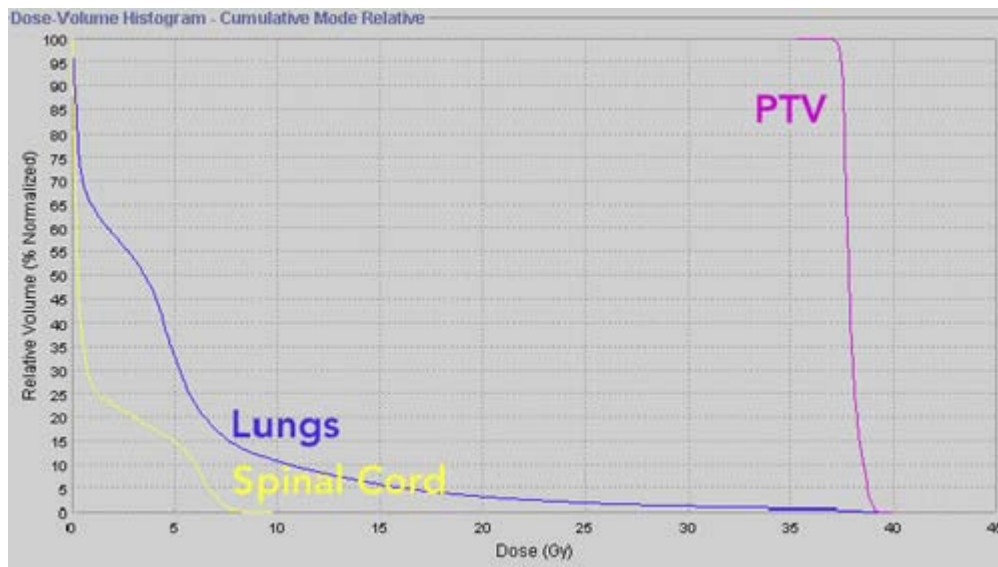


Dose calculated on the daily CT image.

## Adapted Plan



- Using *CTrue* technology, every daily image is suitable for treatment planning since pixel values are true representations of tissue density.
- The day-5 *CTrue* image is used to re-plan the case using the true anatomy.
- After re-optimization, the cord is once again spared effectively along with excellent dose coverage of the target at its new location.



DVH for re-optimized plan, showing low cord dose and homogeneous target dose.

\* Original treatment plan and images courtesy of Richard Hudes, MD, St. Agnes Cancer Center, Baltimore, MD. Used by permission.