CYBERKNIFE® EXPERIENCE: RECURRENT PROSTATE CANCER

This case study demonstrates the versatility of the CyberKnife® Treatment Delivery System enabling treatment to be delivered to complex and challenging cases.

WHO/WHERE
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Epic Care, Walnut Creek, CA

ABOUT EPIC CARE
Epic Care began as a physician practice in San Leandro, CA and grew into a multi-specialty, multi-site practice which offers outpatient infusion, radiation therapy, lab and diagnostic imaging services, across the San Francisco Bay area.

TECHNOLOGY SOLUTIONS
Accuray CyberKnife® Solution

CHALLENGE
Treat patient originally diagnosed with favorable intermediate risk prostate cancer (cT1c, GS 3+4, PSA 9.7). Imaging work-up demonstrated no evidence of disease outside the prostate.

WHAT IS CYBERKNIFE SYSTEM:

The CyberKnife System is a non-invasive treatment for cancerous and non-cancerous tumors and other conditions where radiation therapy is indicated. It is used to treat conditions throughout the body, including the prostate, lung, brain, spine, head and neck, liver, pancreas, and kidney, and can be an alternative to surgery or for patients who have inoperable or surgically complex tumors. CyberKnife treatments are typically performed in 1 to 5 sessions. The CyberKnife System has more than two decades of clinical proof and has helped thousands of cancer patients.

WHY WE CHOSE TO TREAT WITH THE CYBERKNIFE SYSTEM:

Epic Care is a multi-specialty practice with five community cancer centers each with its own linac. We have 17 Medical Oncologists and 5 Radiation Oncologists. We needed our ablative platform to have the following features:

- Able to treat the entire body
- Minimize clinical overlap and cannibalization of our existing linacs
- Have marketing cachet and bring in self-referred patients
- Technology with regional market distinction
- Was not just a linac with added SRS capability

THIS CASE STUDY DEMONSTRATES THE VERSATILITY OF THE CYBERKNIFE® TREATMENT DELIVERY SYSTEM ENABLING TREATMENT TO BE DELIVERED TO COMPLEX AND CHALLENGING CASES.

Patient was originally diagnosed with favorable intermediate risk prostate cancer (cT1c, GS 3+4, PSA 9.7). Imaging work-up demonstrated no evidence of disease outside the prostate. He was treated with definitive Palladium-103 (Pd-103) brachytherapy (125 Gy) and had an initially excellent biochemical response. However, the patient subsequently had a PSA failure several years later and imaging with biopsy confirmed a local recurrence of his prostate cancer.

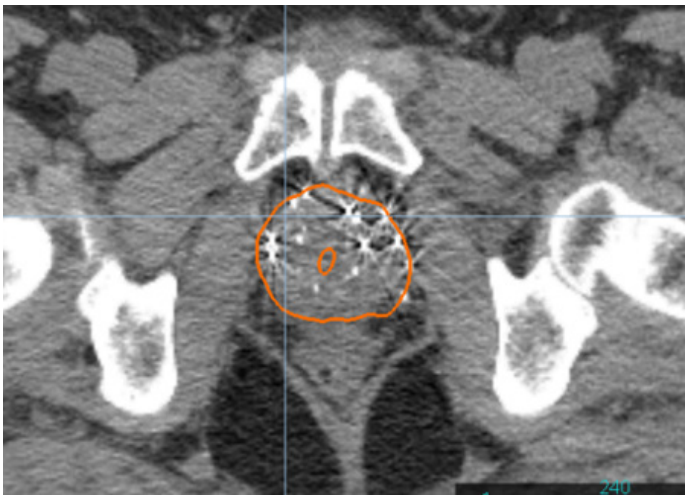

Figure 1a: CyberKnife treatment plan isodose

CyberKnife®

TREATMENT PREPARATION:

In our institution, the pre-treatment process for all patients receiving CyberKnife treatment for prostate cancer includes the implantation of four gold fiducial markers and a rectal hydrogel placed under TRUS guidance. This is done either by the Urologist or Radiation Oncologist. The rectal hydrogel is used to minimize dose to the rectum. Planning MRI prostate and CT sim are performed approximately one week after fiducial and rectal hydrogel placement. Prior to CT sim and prior to every treatment fraction the patient is asked to empty bladder and use a Fleet enema. Patients are positioned for treatment, supine with a knee rest for support.

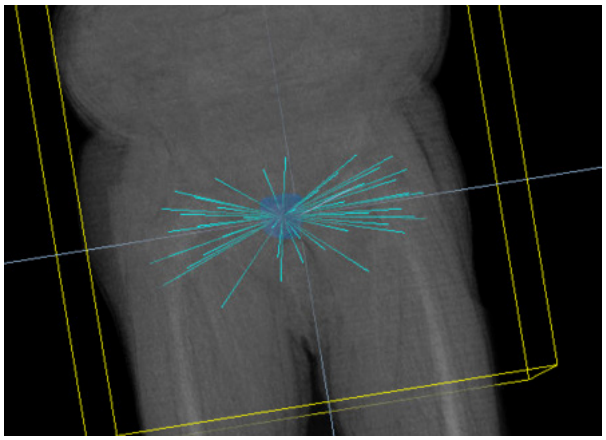

Figure 1b: Beam geometry for CyberKnife®

TREATMENT PLANNING AND DELIVERY:

- 47 non-coplanar beams using sing InCise™ MLC
- 34 Gy in 5 fractions prescribed to 57.3% of maximum dose (mean 44 Gy, max 59 Gy)
- A modification of Dr. Fuller et al. (2015) protocol[1] was used. We were able to create an HDR-like dose distribution to avoid hot spots in the urethra and preferentially irradiate the prostate and the periphery, particularly the gross disease.
- With VOLO™ optimization, beam-on time was 24 minutes per fraction

POST-TREATMENT:

Patient reported acute toxicity as expected. One year after treatment, he is still doing well, urinary symptoms have returned to pre-disease state, and he has had persistent PSA response.

REFERENCE:

1. Fuller, D., Wurzer, J., Shirazi, R., Bridge, S., Law, J., & Mardirossian, G. (2015). High-dose-rate stereotactic body radiation therapy for postradiation therapy locally recurrent prostatic carcinoma: Preliminary prostate-specific antigen response, disease-free survival, and toxicity assessment. Practical Radiation Oncology, 5(6), e615-e623. doi: 10.1016/j.prro.2015.04.009

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