CYBERKNIFE® EXPERIENCE: LOCALLY ADVANCED MELANOMA

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

WHO/WHERE
Gautam Prasad, M.D., Ph.D, Radiation Oncologist
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
Provide non-invasive treatment of an elderly patient who was originally diagnosed with early stage uterine cancer, and later presented with melanoma.

WHAT IS THE 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.
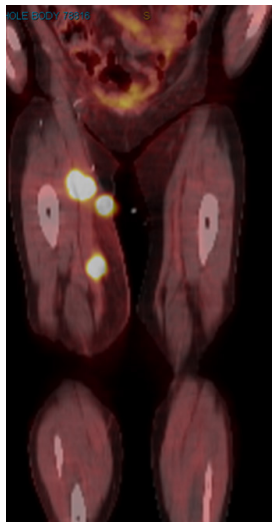

Figure 1: Staging PET/CT

WHY WE CHOSE TO TREAT WITH 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

CLINICAL HISTORY:

Patient was originally diagnosed with early-stage uterine cancer treated with surgery alone. Low-risk features did not necessitate postoperative chemotherapy or radiation therapy. She was subsequently followed closely by Gyn. Oncology team. One year later she re-presented with an apparent vaginal recurrence. A biopsy was performed and pathology confirmed the presence of a melanoma. She underwent resection followed by post-operative brachytherapy and external radiation therapy.

Patient subsequently underwent multiple surgeries and multiple immunotherapy treatments which failed to control her cancer. She developed an ulcerating lesion on the inside of her thigh. The PET scan showed that the lesion extended more deeply than expected. Typically, electrons can be used to treat skin lesions but given the required depth and irregularity of the target, electrons were deemed clinically unsuitable.

Despite surgery and immunotherapy, she had persistently growing disease resulting in lower extremity edema and ulceration through the skin. The patient remained ambulatory and was referred for consideration of CyberKnife treatment.
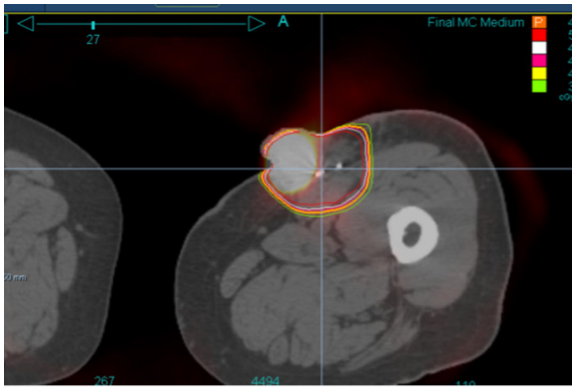
CyberKnife®
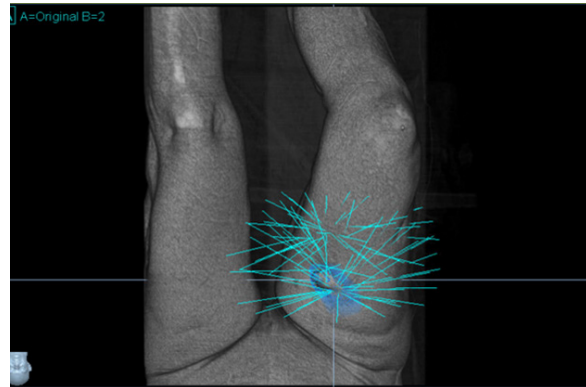
Figure 2a: Treatment plan isodoses

Figure 2b: Beam geometry for CyberKnife® System

TREATMENT DELIVERY:

- The patient was positioned supine, feet first with her lower extremeties immobilized using a vacuum bag, with the right leg slightly abducted
- Bolus was applied during treatment
- To track the tumor in real-time, a single fiducial marker was implanted in the dominant mass
- Treatment prescription: 60 Gy in 5 fractions (equivalent to eleven weeks of conventionally fractionated radiotherapy)
- 99 robotically delivered non-coplanar beams delivered using the CyberKnife System

POST-TREATMENT:

There was a month-long delay in response to treatment. There was some tanning and hyperpigmentation in the area; there was no discernible skin breakdown observed. Clinically, the ulcerating tumor disappeared within one month. A robust skin reaction was observed which was limited to a 1 cm zone around the tumor. Two months later, PET/CT showed a complete metabolic and anatomic response (Figure 3b).

Figure 3a:
Photograph of lesion
one-month post-treatment
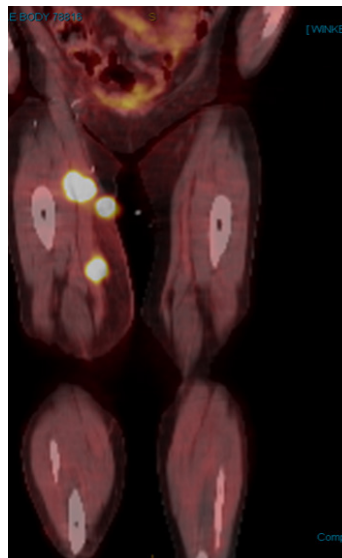
Figure 3b:
Pre-treatment staging
PET/CT scan
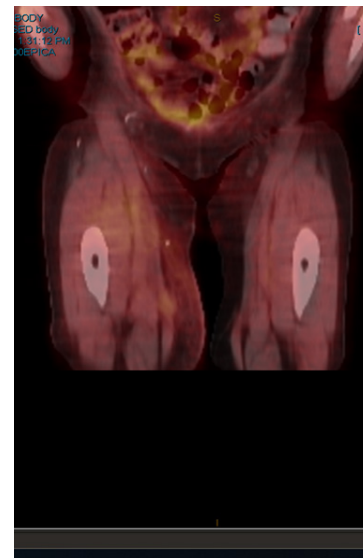
Figure 3c:
Response PET/CT scan 2 months after
completion of treatment

CyberKnife®