

AbstractID: 9291 Title: Large field Intraoperative Radiation Therapy (IORT) for soft tissue and retroperitoneal sarcomas

Intraoperative radiation therapy (IORT) consists of delivering a large, single fraction dose of radiation to a surgically exposed tumor or tumor bed at the time of surgery. With the availability of a mobile linear accelerator in the OR, IORT procedures have become more feasible for medical centers and more accessible to cancer patients. Over the past decades IORT became more and more widely used for treating soft tissue sarcomas of the extremities and retroperitoneal sarcomas. Often the area requiring irradiation is larger than the standard treatment applicators would allow (10cm circular). Clinically, field sizes up to 20cm are desirable. To perform such a treatment using standard applicators, two abutting fields commonly are used. Unfortunately, the divergence and scattering of the electron beam may cause significant dose variations in the region of the field junction. To avoid complicated matching of the fields a set of rectangular and oblong shaped sarcoma applicators for the Mobetron 1000 has been developed. Specifically, the following sizes are provided: 7x12cm 9x12cm, 8x15cm, 8x20cm. Each sarcoma applicator is a two-piece system, consisting of an aluminum base and a stainless steel tip with a 0° and 20° bevel angle. Each applicator tip also has a 5 mm fitted plastic bolus. To provide adequate flatness of the beam for 8x15cm applicator, a secondary flattening filter was designed using Monte Carlo Simulations. To handle the 8x20cm field, a D-shaped applicator was developed similar to the approach described in Heidelberg paper. Junction dose is controlled through the use of a custom bolus with a built-in spacer. Our measurement results using 3D scanning show that beam flatness within 10 % over the whole region perpendicular to the beam at dMax can be achieved. No clinically significant cold spots in the corners were detected for energies of 6 and 9 MeV