

AbstractID: 4987 Title: Dedicated PET-CT and MR-Simulators in a State-Of-The-Art Radiation Treatment Facility

Purpose: To provide dedicated, integrated PET-CT and MR simulation and imaging devices in the radiation treatment clinic for purposes of advanced oncologic imaging.

Method and Materials: A planning team was established for design of radiation oncology facilities as part of a new comprehensive cancer center. Physicist input included emphasis on combined biological-anatomical (termed “bioanatomic”™) imaging for a research program in Bioanatomic Imaging and Treatment (BAIT), provision of state-of-the-art treatment devices for IMRT, radiosurgery, and HDR, and analyses of digital medical informatics. PET-CT and MR simulator specifications were delineated at a time of rapid technology development for both modalities, and included capabilities for gated PET-CT acquisition and high-resolution MR spectroscopy.

Results: Facility design includes dedicated rooms for Conventional, PET-CT, and MR simulation. BAIT simulator devices selected are 8-slice PET-CT and 3.0T MR, each with “marking” lasers and virtual simulation tools. PET-CT simulation includes respiratory gating. 3.0T MR simulation includes spectroscopic, diffusion, and perfusion imaging. Radiation safety aspects include shielding for ionizing radiation (PET-CT) and radiofrequency and magnetic fields (3.0T MR). PET-CT and MR simulators are centrally located to facilitate patient flow and physician access. PET-CT and MR simulations are being performed under the auspices of multidisciplinary clinical and research oversight committees. Operators are paired as one imaging technologist (PET-CT or MR) and one radiation therapist per simulator.

Conclusion: Vision for the Bioanatomic Imaging and Treatment Program has been coupled with the opportunity for a new comprehensive cancer center facility to provide multi-slice PET-CT and 3.0T MR simulation in the radiation treatment clinic. Using a collaborative multidisciplinary approach, image-based research protocols have been developed for specific disease sites, and experience is being gained with use of dedicated, integrated PET-CT and MR simulation.

Conflict of Interest: BAIT Program research partners include Varian Medical Systems and GE Healthcare.