New Image Guided Radiation Therapy (IGRT) Improves on Current Radiation Techniques

Lakeland has obtained an image-guided linear accelerator, the next-generation technology in radio-therapeutic cancer treatment.

"IGRT provides a significant improvement in the accurate delivery of higher radiation does with similar or fewer side effects," commented Peter Lai, PhD, MD, Lakeland's Medical Director of Radiation Oncology. "With IGRT, a daily pre-treatment CT scan is taken prior to each patient treatment, which is then compared with previous treatment planning CT scans. If needed, the patient is then repositioned so that the radiation beam is aligned exactly with the tumor, as initially planned. This reduces side effects for the patient and increases the radiation dose we can deliver to the tumor."

Typically, traditional 2D radiation treatment technique utilizes the human bony anatomy as landmarks to design radiation treatment fields. The tumor and the adjacent soft tissue may experience day-to-day variability with respect to surrounding bony landmarks. Furthermore, over a typical course of 25-35 daily treatments, patients may experience weight loss, tumor regression and repositioning of internal organs. Sometimes, a tumor can move as much as a few centimeters, as observed in lung cancer patients during normal respiration. With IGRT, clinicians can precisely align the radiation beam to the location of the tumor during each radiation treatment.

Varian iX treatment machine with on board imaging and cone beam CT

In the past, radiation oncologists have compensated for organ movements by using larger treatment fields, thereby exposing more healthy tissue to radiation. With the current technology available at Lakeland, the technique of IMRT (Intensity Modulated Radiation Therapy) is used to preferentially deliver high doses of radiation to tumors and areas at risk while preserving/avoiding critical structures, i.e., parotid glands in head and neck cancers or rectum and bladder in pelvic cancers. In this way, radiation toxicity can be minimized to normal surrounding structures, which will greatly reduce side effects of radiation therapy. Now, with the addition of IGRT, we can ensure that the radiation beam is aligned on the tumor accurately, improving treatment related side effects.