The Impact of Innovative CT Simulation Technology on Oncology Care

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The use of SOMATOM Definition AS Open at Froedtert & The Medical College of Wisconsin

Answers for life.
"We selected the SOMATOM Definition AS Open CT system for its hardware, image quality and flexibility... its large bore size, low imaging dose, 4D capabilities, and compact design were very attractive to us and met our needs."

Allen Li
Professor and Chief Physicist
Medical College of Wisconsin

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The use of SOMATOM® Definition AS Open at Froedtert & The Medical College of Wisconsin

The Kraemer Cancer Center at Froedtert Health St. Joseph’s Hospital in West Bend, WI, recently expanded its radiation therapy treatment options. Equipping the cancer center required a thorough evaluation of CT simulation solutions to find the system that would provide the most benefits—for patient care, staff satisfaction, and facility efficiency. The Kraemer Cancer Center is part of the Froedtert & The Medical College of Wisconsin Cancer Network with about 150 patients treated per day in its radiation oncology network.

Integral to Planning and Treatment
Dr. Li and his staff found that the SOMATOM Definition AS Open offered a number of key advantages. "The good imaging quality is beneficial for treatment planning and treatment delivery, because it allows us to define the treatment target and normal structures with high accuracy," says Dr. Li. "The AS Open has a larger power capacity, allowing us to increase power to improve soft-tissue contrast, if needed. For pancreas cases, for example, if we want to improve soft tissue contrast between the pancreas and the duodenum, we could increase mAs for image acquisition."

Further Dr. Li notes the system offers smooth connectivity with the simulation package and with treatment planning systems. "Image transfer between these systems works well. The image quality, when we test it, has been very good," continues Dr. Li. "The system also allows us to do adaptive radiation therapy, which is a major ongoing research project in our program. And the large bore size means we can use CT on rails for almost all cases, including prone set-up for large breast cases."

In fact, CT on rails is particularly useful for hard-to-treat locations, including pancreas, prostate, brain, head and neck, and lung cancers. "The low image dose and high soft-tissue contrast are among our reasons for using CT on rails for daily IGRT of the partial breast or tumor bed boost in our clinic," notes Dr. Li.
Expanded Capabilities

Designed to provide excellent image quality on which precise contouring can be based, the SOMATOM Definition AS Open provides intelligent applications to enhance clinical confidence. “High image quality is certainly invaluable in radiation oncology,” says Dr. Li. “The AS Open provides several tools, including some that allow us to manipulate the image through postprocessing. This gives us some freedom to improve image quality using low imaging dose. We might not be able to do this with older CTs or systems from other vendors.”

Staff at both cancer centers are also able to perform 4D gating studies, which enable them to capture the location and movement of tumors, as well as any other organs. They typically use 4D gating for lung scans and abnormal cases. “The AS Open allows us to acquire either 4D or gated CT images,” says Dr. Li. “With 4D CT, we can assess the patient’s specific margin and account for respiratory motion. If 4D CT shows the motion is large, for example larger than 8 millimeters, we use respiratory gating during radiation delivery.”

Positive Patient and Staff Experiences

“One of the nice features with the system’s gating tool is that the same system can be used for both CT and LINAC. So we can use the same gating system for simulation and treatment, which reduces costs and eliminates the need to convert gating signals from one to another. This improves accuracy and workflow. And for the patients, the scan time is quick and the noise is low. The patient impression is positive,” continues Dr. Li.

Dr. Li and his staff are finding other features of the SOMATOM Definition AS Open helpful as well, particularly in imaging obese patients. The large bore size and extended field of view, up to 80 cm, work well for this patient population. In fact, the team recently treated a patient who weighed in excess of 500 lbs. To image this patient, they used the system’s extended field of view out to 80 cm. “Without that capability, we would not have been able to put through that case,” says Dr. Li. “Today in radiation oncology, I think the first thing you have to consider, based on the patient population, is the field of view. Image quality, imaging dose, 4D capability, and workflow are also important factors for selecting a system.”

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