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Cancer treatment breakthrough: GPS-like radiotherapy tracks tumor motions

This means lesser time lying still on the couch, lesser exposure to radiation, and fewer side effects

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Radiation therapy just received a major upgrade. The leading-edge technology, TrueBeam Radiotherapy System from Varian Medical Systems, delivers more powerful cancer treatments with the most precise, pinpoint accuracy available on the market today.



That means significantly lesser time lying still on the treatment couch, lesser exposure to radiation, and fewer side effects.

TrueBeam, distributed locally by Siemens Healthineers, is now available at St. Luke's Medical Center (SLMC) Global City for almost the same price as the older technology.

This innovative breakthrough in cancer treatment features new imaging and motion management technologies, now making it more possible than ever to track tumor motions and deliver treatments more precisely.

“The image guidance is like a GPS attached to the machine. Some tumors have organ motion, like tumors of the prostate or of the GI tract,” said Dr. Juan Martin Magsanoc, head of the Department of Radiation Oncology at SLMC Global City.

Lung, breast and upper abdomen tumors are subject to respiratory motion.

With the Varian Real-Time Position Management system, it is now possible to monitor a patient's breathing and compensate for movement of the tumor as the dose is delivered.

Hot area of research

Treating tumor motions has been a hot area of research for more than a decade now. But with TrueBeam's GPS-like image guidance capable of producing high-resolution images, Magsanoc said tumors are now more readily distinguished from a host of other organs and tissues.

“It used to be that when we treat tumors, some parts, like normal tissues, are [inevitably] also included. But now everything is image-guided and more precise—less damage to the normal tissues and fewer side effects,” he said.

The older technology also called for the machine to turn around and treat a tumor in seven segments, typically taking about 10 to 15 minutes, depending on the tumor. But with TrueBeam's Volumetric Arc Therapy, or Varian RapidArc, the machine is able to rotate 360 degrees very quickly, treating the tumor in one go.

A radiotherapy treatment that typically lasts 15 minutes can now be done in under two minutes.

Lesser time lying still on the treatment couch means fewer movements by the patient, resulting in more precise treatments.

And, Magsanoc said, instead of treating only 12-15 patients, between 7 a.m. and 3 p.m., they can now accommodate 30 or more patients.

Faster, more comfortable

"It is faster and, therefore, it is more comfortable for the patients. It lessens the anxiety," said Dr. Arturo dela Peña, president and CEO of St. Luke's Medical Center. "These are nontangible things so that overall it might cost a little bit higher, but the quality of treatment that you will receive from this technology will be beneficial to the patients."

Since the treatment is now precise and powerful—the dose delivery rates are 40 to 140-percent higher than earlier generations of Varian technology—a 42-session treatment for prostate cancer, for example, can now be cut down to 28 sessions.

Instead of the usual 30 sessions for spine and brain tumors, sessions can now be trimmed down to five to six sessions. GI tumors like the liver or pancreas, typically requiring 33 sessions, can now even be done in just one session.

That's good news for anyone about to undergo radiotherapy treatment, especially since the treatment requires patients to commute to the hospital every day, five times a week until the prescribed sessions are met.

"It's really the comfort, that is the value proposition we are advocating in treating cancer patients," Dela Peña said. "It is not the peso value that you get, but the value proposition from the treatment that you get. If you can now map the tumor more accurately, you can deliver the treatment more precisely and, therefore, the results would be better."

The treatment couch, where the patient lies down, has a fully integrated Perfect Pitch 6 Degrees of Freedom that is designed to make procedures such as stereotactic radiosurgery or stereotactic body radiotherapy become more accurate and flexible, reducing patient setup error without compromising tumor target positioning.

According to the Department of Health and the Philippine Statistics Agency, cancer remains one of the leading causes of mortality in the Philippines, with breast cancer topping the list.

Other forms of cancer in the Top 10 include lung, colon, rectum, liver, cervix, ovary, uterus, prostate and head and neck.

Four of 10 cancer cases are female.