Oncologists use real-time system to plant 'seeds' against cancer

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Radiation oncologists and urologists at the Kimmel Cancer Center at Jefferson and Thomas Jefferson University Hospital in Philadelphia have begun using a real-time system to implant radiation-emitting seeds in prostate cancer patients. While the system, which is made by Nucletron, a technology company based in The Netherlands, is only being used for imaging and planning purposes so far, it ultimately will help with the actual placement of the seeds. To date, Jefferson is the first medical center in the Delaware Valley to begin employing the new system.

The multidisciplinary team of urologists, surgeons, radiation oncologists, radiation physicists and others involved in using the device are hoping that the new federal Food and Drug Administration-approved technology will make an already good system even better, adding scientific precision to a treatment that currently relies mainly on physician experience and skill.

“The device is a step above the traditional technique because it makes use of a more sophisticated approach that allows for a coordinated, real-time imaging-based implantation of seeds,” Richard Valicenti, M.D., associate professor of radiation oncology at Jefferson Medical College of Thomas Jefferson University, says about the Nucletron device.

Patients have two options for treatment for localized, low-risk prostate cancer confined to the prostate: surgery or radiation therapy. In brachytherapy, tiny pellets – seeds – about the size of a grain of rice

blanket the prostate, giving off radiation that travels only a few millimeters to kill nearby cancer cells. The seeds are carefully placed inside the cancerous tissue and positioned to efficiently attack the cancer. Brachytherapy has been proven to be very effective and safe, providing a good alternative to surgical removal of the prostate, while reducing the risk of certain long-term side effects, such as impotence. The seed radioactivity decays with time, while the seeds stay within the treatment area.

“This new approach is automated, so what normally takes us many steps to do we can do very quickly,” he says, noting that brachytherapy is highly operator-dependent. “For example, putting in the rectal ultrasound probe has to be done slowly by hand. Now, the device does it and takes measurements of the size and location automatically of the target gland.” It collects the imaging information – the dimensions of the patient’s prostate – and downloads this into a computer system, where it is rapidly processed.

The doctors, radiation physicists and other specialists then specify the parameters of treating the cancer, such as how much dose to give the prostate, how much extra dose to give to the area of the tumor and the positions in which to give the radiation, all in less time than previously possible with standard techniques, Dr. Valicenti says.

“Up until recently, we would produce a plan in the outpatient setting that we hoped to recapitulate in the operating room,” explains Adam Dicker, M.D. Ph.D., professor of radiation oncology at Jefferson Medical College. “But there was always the concern that what we saw initially might not match the situation later.” Planning, he explains, can be affected by the patient’s position and the location – and condition – of his prostate.

Because the device enables real-time planning in the operating room, he

says, “If an area is under-dosed, you can find out right away and make corrections.” The system provides a multidimensional view of the prostate and the “ability to process and accumulate more precise information, constantly updating and readjusting the treatment plan.”

Source: Thomas Jefferson University