

UCLA offers high-intensity focused ultrasound treatment for prostate cancer



UCLA's Department of Urology is offering a new, minimally invasive alternative for treating prostate cancer — high-intensity focused ultrasound (HIFU) — which uses sound waves to selectively target and destroy diseased tissue.

UCLA participated in the first HIFU clinical trial in the United States in 2009 and was the lead enroller in the multi-center trial, which assessed the effectiveness of HIFU in the treatment of prostate cancer that has recurred following radiation. The results of that trial led to U.S. Food and Drug Administration (FDA) approval in October 2015 of the first clinical use of HIFU in the nation for the ablation of prostate tissue.

HIFU has been in clinical use outside the U.S. for over a decade, and has now received regulatory authorization in over 40 countries. Prostate cancer treatment is the technology's leading application. The FDA previously approved the use of focused ultrasound for treating uterine fibroids in 2004 and for pain from bone metastases in 2012.

Targeted and non-invasive

HIFU's chief advantages are its precision and non-invasive nature. It destroys diseased prostate tissue by delivering ultrasound energy, not radiation, to the targeted tissue without the need for an incision. The sound waves are transmitted through the

Targeted biopsy for prostate cancer

UCLA's expertise in high-intensity focused ultrasound (HIFU) builds on the foundation of its successful targeted prostate biopsy program for diagnosing prostate cancer.

Targeted prostate biopsies employ advanced MRI (magnetic resonance imaging) technology, developed at UCLA, to visualize prostate cancer, then fuses MRIs with real-time ultrasound to guide systematic tissue sampling.

Before MRI, doctors could not see the location of prostate cancer and had to perform biopsies essentially "blind." Using the image-fusion technology, UCLA biomedical engineers create virtual 3D models as road maps to guide urologists directly to the suspect spot — which often results in the urologists finding tumors missed by conventional prostate biopsy.

The same software is used in the targeted biopsy program and the HIFU technology, strengthening UCLA's experience with the new treatment option.

"Our goal, both in diagnosis and in treatment, is individualized treatment and localization of any cancerous tissue," says Leonard S. Marks, MD, professor of urology and the Jean B. deKernion, MD, Chair in Urology. "This is true precision medicine at work."

rectal wall and focused at locations within the prostate identified through advanced magnetic resonance imaging (MRI) and confirmed by ultrasound imaging.

The ultrasound energy is concentrated similar to how a magnifying glass can focus the sun's rays. Each HIFU treatment spot is about the size of a grain of rice, enabling extremely precise treatment. Guided by real-time imaging, the urologist can zero in on diseased tissue while minimizing damage to healthy tissue and nerves around the prostate.

Critical experience

UCLA urologists and prostate-cancer specialists are leaders in defining the tissue margins needed to treat cancer effectively, with extensive experience gained in a series of clinical trials involving laser treatments. UCLA urologists have also been at the forefront in the use of targeted prostate biopsy, which uses image-fusion technology to better diagnose prostate cancer (see page 1 sidebar).

UCLA acquired the latest HIFU equipment in mid-2016 and began offering the treatment to qualified patients. The technology is currently being used both as an initial therapy for prostate cancer and to treat patients whose cancer recurs following radiation treatment. Eligible patients are those with intermediate-risk prostate cancer whose prostates are under 40 cc in volume. Patients with advanced prostate cancer are not considered candidates for HIFU.

HIFU is an outpatient procedure, however, patients must be able to tolerate general anesthesia, which is used to maintain exact positioning throughout the procedure and ensure precise delivery of the ultrasound beam.

UCLA Prostate Cancer Program

HIFU is part of the UCLA Prostate Cancer Program's advanced treatment options, which include radical prostatectomy, typically using laparoscopic and/or robotic techniques, as well as radiotherapy and cryotherapy. The UCLA Prostate Cancer Program uses a team approach that encompasses a wide range of specialists, including urologists, medical oncologists, radiation oncologists, pathologists, surgeons, radiologists and clinical-trial nurses.

Working together, these specialists are able to evaluate each patient and design a personalized treatment plan. In addition, patients benefit from the program's research activities. Currently, UCLA urologists are planning research to standardize HIFU treatment and track outcomes over time.

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