

Focusing on Prostate Cancer Treatment Without Surgery

High-intensity focused ultrasound, HIFU therapy, offers an alternative for one-third of patients with prostate cancer.

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As part of Ken Cleary's usual health checks and monitoring that are typical for a man in his 60s, he learned his level of prostate-specific antigen, or PSA, a protein that can indicate cancer, was high enough to concern his doctor.

While Cleary waited for his biopsy results, he was already strategizing with his doctor. Cleary sees a hematologist/oncologist regularly because he was born with idiopathic thrombocytopenic purpura, an autoimmune disorder in which the immune system attacks and destroys a person's blood-clotting platelets.

Cleary, who lives in Bothell, Washington, said his medical team told him he had "the most virulent instance of ITP they have ever run into." Before he started kindergarten, he'd had his spleen removed. By the time he was 12, he'd taken hundreds of milligrams of prednisone, which can lead to bone loss. "Over the years, I've had many of my joints rebuilt," said Cleary, who has endured multiple surgeries related to his autoimmune disorder.

There didn't seem to be any obvious correlation between Cleary's elevated PSA and ITP, but treating prostate cancer would require an innovative approach because surgery was out of the question.

"Even though I didn't yet have a cancer diagnosis, we know that my body often overreacts," said Cleary. He brainstormed with his hematologist/oncologist to get ahead of the situation. Prostate removal wasn't advisable because surgery to take out the organ would interfere with scar tissue from previous surgeries.

"My vascular surgeon said, 'I won't operate on you again because it would cause problems where abdominal adhesions shut your system down and you can't eat food.'"

The next best option appeared to be [proton therapy](#), which targets a precise area for highly specialized radiation treatment. But it was ruled out because it would involve minor surgery to breach the skin to accurately locate the proton beams.

During Cleary's consult at Fred Hutchinson Cancer Center's Proton Center, he learned about [HIFU, high-intensity focused ultrasound](#), a noninvasive, targeted treatment. "I had never even heard of it, but it seemed like the best of all the options I had," said Cleary, who said his career in biotech/pharmaceutical drug and medical device manufacturing had made him comfortable with emerging biotechnologies.

Cleary met with [George Schade, MD](#), to learn about the procedure. HIFU is a type of focal therapy, a treatment that use an energy source that is not radiation to kill tissue.

HIFU isn't appropriate for every patient with prostate cancer; good candidates are those who have cancer involving only a small portion of their prostate. At the same time, their cancer needs to be aggressive enough to benefit from treatment but not so aggressive that there is a risk of undertreatment.

In 2015, the U.S. Food and Drug Administration initially approved HIFU for prostate cancer treatment. Three years later, a newer type of HIFU got the green light. Medicare covers the treatment and more recently, some private payers have begun to follow suit.

Fred Hutch was the first cancer center in the Puget Sound region to offer HIFU. "The U.S. has been a late adopter," said Schade. "However, we are arriving at a new era of focal treatments for men who are good candidates."

To understand how HIFU works, Schade said it can be helpful to envision the childhood science experiment of using a magnifying glass on a sunny day to focus sunlight and burn a hole in a leaf. HIFU's intensity is one thousand times more intense than the energy emitted by diagnostic ultrasound at its focus. HIFU's focus field is about the size of a grain of rice; each second-long pulse of HIFU energy kills the cancer cells.

HIFU for prostate cancer takes about two hours and is performed under general anesthesia. Patients go home with a catheter for a week because the prostate swells afterward. There is little pain typically associated with the procedure, but it can take several weeks for uncomfortable bladder spasms and irritating urinary symptoms to subside. That said, long-term side effects of surgery (erectile dysfunction and urine leakage) or radiation (loss of sexual function and bowel changes) for prostate cancer tend to be more severe.

"Localized prostate cancer is difficult to study because it's slow-growing, so you need 10 to 15 years of follow-up," said Schade. "As a result, there is limited head-to-head outcomes data comparing HIFU and surgery or HIFU and radiation."

The few available studies are encouraging, said Schade, whose research involves exploring other uses for HIFU. "We estimate that a third of men with prostate cancer are candidates for focal therapy," he said. "If you change the intensity of HIFU and the duration of pulses, you can vaporize tissue."

There are clinical trials in Europe assessing the use of HIFU for endometriosis and other trials

examining its effectiveness in heating areas of the brain to treat tumors, Parkinson's disease and essential tremor.

A post-HIFU biopsy showed that Cleary's cancer was completely cleared by his treatment.

"I was a textbook responder," he said. "I didn't think it was possible for a procedure to have gone as well as it did. My PSA went from 7 to 0.4 so now I have the prostate of a 14-year-old boy. And the cancer is gone."

Cleary is doing regular follow-up PSA checks and said the procedure could not have been easier. "Who could have imagined a cancer procedure could be so simple?"

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