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# Mayo Clinic finds early success with laser that destroys tumors with heat

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Physicians at Mayo Clinic's Florida campus are among the first in the nation to use a technique known as MRI-guided laser ablation to heat up and destroy kidney and liver tumors. So far, five patients have been successfully treated — meaning no visible tumors remained after the procedure.

They join their colleagues at Mayo Clinic's site in Rochester, Minn., who were the first to use laser ablation on patients with recurrent prostate tumors.

Although the treatment techniques are in the development stage, the physicians say the treatment is potentially beneficial against most tumors in the body — either primary or metastatic — as long as there are only a few in an organ and they are each less than 5 centimeters in size (about 2 inches in diameter). Patients also cannot have a pacemaker or certain metallic implants, since the procedure is done inside an MRI machine.

"Laser ablation offers us a way to precisely target and kill tumors without harming the rest of an organ. We believe there are a lot of potential uses of this technique — which is quite exciting," says Eric Walser, M.D., an interventional radiologist who has pioneered the technique at Mayo Clinic, Florida.

In the United States, laser ablation is primarily used to treat brain, spine and prostate tumors, but is cleared by the U.S. Food and Drug Administration (FDA) for any soft tissue tumor. Only a few centers have

adapted the technique to tumors outside of the brain.

Dr. Walser has been using laser ablation since June. He learned the technique in Italy, where its use is more common, and he adapted it for patients at Mayo Clinic, Florida, many of whom are on a liver transplant waiting list. The clinic is a large liver transplant center, and a number of patients with cirrhosis have small tumors in their liver. "We treated the tumors to keep them at bay because we could not use chemotherapy in these patients, who are quite ill and are waiting for a new liver," he says. He also adapted it for use in treating kidney tumors.

The outpatient procedure is performed inside an MRI machine, which can precisely monitor temperature inside tumors. A special nonmetal needle is inserted directly into a tumor, and the laser is turned on to deliver light energy. Physicians can watch the temperature gradient as it rises, and they can see exactly in the organ where the heat is. When the tumor and a bit of tissue that surrounds it (which may harbor cancer cells) is heated to the point of destruction — which can be clearly seen on monitors — the laser is turned off. In larger tumors, several needles are inserted simultaneously.

Patients are given anesthesia because, during the 2.5-minute procedure they should not move, Dr. Walser says. Post-treatment side effects include some local pain and flulike symptoms as the body reacts to, and absorbs, the destroyed tissue, he says. These side effects usually subside in three days to one week.

Dr. Walser adds that laser ablation is a much more precise technology than similar methods that use probes, such as radiofrequency ablation, which also raises a tumor's temperature, and cryotherapy, which freezes tumors.

David Woodrum, M.D., Ph.D., from Mayo Clinic, Rochester, has also

reported success using the new technique.

At the March meeting of the Society of Interventional Radiology, Dr. Woodrum, presented results from the first known cases of using MRI-guided laser ablation to treat prostate tumors. He said then that the safe completion of four clinical cases using the technique to treat prostate cancer in patients who had failed surgery "demonstrates this technology's potential."

Dr. Woodrum has now treated seven patients, including a patient with melanoma whose cancer had spread to his liver.

"MRI-guided ablation may prove to be a promising new treatment for prostate cancer recurrences," he says. "It tailors treatment modality (imaging) and duration to lesion size and location and provides a less invasive and minimally traumatic alternative for men."

Mayo is the country's leader in adapting the use of MRI-guided ablation for tumors outside of the brain, say the physicians, who have been collaborating on expanding use of the technology with Visualase Inc., of Houston. The company received FDA clearance in October 2009 for use of laser ablation. Neither Dr. Walser nor Dr. Woodrum has a financial arrangement with the company or a conflict of interest.

Provided by Mayo Clinic

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