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Radiofrequency energy sizzles tumors without surgery

Bethesda, Maryland — Research conducted at the Warren Grant Magnuson Clinical Center, National Institutes of Health (NIH) shows that by using radiofrequency energy, doctors can now "cook" tumors without actually removing them. The non-surgical technique, used increasingly for kidney and liver cancers, can also be used on cancers elsewhere in the human body.

In an NIH Clinical Center study, 31 kidney tumors in 25 patients underwent radiofrequency ablation (RFA), with a follow-up conducted between two and 24 months on 24 tumors. In 79 percent of the tumors, growth and enhancement were stopped. The remaining tumors were followed with diagnostic imaging, retreated with RFA, or surgically removed. Subsequently, 40 tumors in 33 patients have been treated, and Dr. Bradford J. Wood, Senior Staff Clinician and Clinical Investigator, Department of Radiology, NIH Clinical Center, has treated almost 60 kidney tumors with this technique.

During RFA, a tiny needle is inserted into the tumor and radiofrequency energy applied through the needle tip to the tumor. As the tip heats, it "cooks" a 1- to 3-inch tennis-ball size area in 10-30 minutes, killing the tumor cells. Larger tumors can be treated by overlapping treatments. The dead cells are not removed, but become scar tissue and eventually shrink.

"RFA appears to be a very effective option, especially for people with hereditary kidney tumors," Wood said. "Partial surgical removal in organs such as kidneys often sacrifices more of the organ than we'd like. The long-term data is sparse, but is beginning to be reported. The short- and mid-term results are quite promising; however, no randomized, prospective, controlled trials have been reported." He added that though more long-term outcomes are needed to prove effectiveness, "it appears to be an effective tool for local-regional therapy in many cases." Even so, said Wood, RFA is not a "magic bullet."

"It clearly can be a cure in some cases," he said, "however, it may also prolong survival or reduce pain in certain patients. For some patients, it may provide an alternative for those unwilling or unable to undergo more risky surgery. It can also occasionally convert an inoperable tumor into a candidate for surgery."

Radiofrequency energy is electromagnetic and non-ionizing in nature, similar to microwave energy. "We have used RFA throughout the human body, including the liver, kidney, adrenal, breasts, ribs, lungs, diaphragm, muscle, prostate, and pelvis," Wood said. "In this study of small kidney tumors, we found a high incidence of tumor eradication following treatment using x-ray criteria. It is a safe, well-tolerated, effective, and local method of tumor destruction and pain control in certain patients. RFA can be performed on an outpatient basis under sedation. It is more rapid than surgery - we even had one patient who went kayaking the day after he underwent the procedure." Wood added that RFA heating also improves local drug delivery to a tumor, and can be combined with heat-activated particles, for targeted drug, or gene therapy.