

Electrical pulse treatment pokes holes in hard-to-treat tumors

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A new, minimally invasive treatment that tears microscopic holes in tumors without harming healthy tissue is a promising treatment for challenging cancers, suggests a preliminary study being presented at the Society of Interventional Radiology's 38th Annual Scientific Meeting in New Orleans.

"Irreversible electroporation (or IRE) is a new way to attack cancer, using microsecond [electrical pulses](#) to kill cancer at the cellular level without damaging healthy tissue nearby. It may be especially beneficial in treating liver, lung, pancreatic and other cancers that are close to blood vessels, nerves and other sensitive structures," said Constantinos T. Sofocleous, M.D., Ph.D., FSIR, lead author and interventional radiologist at Memorial Sloan-Kettering Cancer Center in New York, N.Y. "IRE appears to be especially beneficial in people with cancer that has spread beyond the primary tumor who do not have good treatment options," he added. "IRE uses strong electric fields to create [tiny holes](#) in the cell membrane, killing the cancer by disrupting the balance between the molecules inside and outside the cell—without resulting in other cell damage. This makes IRE potentially ideal for treating tumors close to sensitive structures," said Sofocleous.

Whereas other treatments—such as surgery, or heating and freezing (also known as thermal ablation)—can damage healthy tissue near the tumor, IRE precisely perforates the [cancer cells](#), posing fewer risks to major blood vessels, nerves, [bile ducts](#) and other vital structures, he said.

IRE has been shown to be safe in the treatment of cancers that have metastasized, or spread, to the liver, lung, bladder and the pelvic region. In this study, 25 participants with a total of 40 metastases to the liver from lung, pancreas, [thyroid gland](#), prostate, uterus and uterine lining, ovaries and rectum primaries, were treated with IRE. The average size of the tumors was about two centimeters. IRE was used due to the location of the lesions, near critical structures that would be affected by thermal ablation. Researchers completed all 30 treatment sessions with no major complications, showing IRE to be safe enough for further investigation and expansion of its use to large clinical trials.

IRE is on the frontier of interventional radiology treatments that are nonsurgical and involve minimal risk and downtime for cancer patients. Interventional radiologist treatments involve making incisions the size of a pencil tip and use medical imaging to guide tiny instruments to the targeted tumors.

"Using the least-invasive treatments available, interventional radiologists are able to destroy entire tumors with a needle and image guidance," said Sofocleous. "We often treat patients who have no other conventional [treatment](#) options or have such poor health that even minimally invasive surgery is too dangerous. Researchers are working to increase the effectiveness of IRE and eventually will test it against other treatments for these tumors, including radiofrequency ablation, microwave ablation and cryoablation," he noted.

More information: Abstract 29: "Safety of Irreversible Electroporation (IRE) Treatment for Metastatic Disease in Humans," M. Silk, T. Wimmer, G. Getrajdman, C.T. Sofocleous, J. Durack, S.B. Solomon, Memorial Sloan- Kettering Cancer Center, New York, N.Y., SIR 38th Annual Scientific Meeting, April 13-18. This abstract can be found at www.SIRmeeting.org

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