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Clinical trial offers first non-invasive ventricular tachycardia treatment

UCLA is one of a handful of centers worldwide pioneering the use of very precise and focused external beam radiation — stereotactic ablative radiotherapy (SABR) — to treat ventricular tachycardia (VT) without surgery.

The clinical study, Stereotactic Ablative Radiotherapy of Refractory Ventricular Tachycardia (or cardiac SABR), is a collaboration among UCLA's departments of radiation oncology and radiology, and the UCLA Cardiac Arrhythmia Center.

New use for an established technology

While radiation is a novel therapy for treating heart conditions, there is a large body of experience from the field of radiation oncology in delivering SABR to extremely small targets with very high accuracy. Within the brain, for example, targets that are millimeters in diameter are treated with measured doses of radiation with sub-millimeter accuracy.

The use of SABR to treat VT could present a treatment alternative for cardiac patients too sick for invasive treatments or for whom conventional therapies, including cardiac catheter ablation, have been unsuccessful.

New irregular heartbeat therapy offers patients hope

"Stereotactic ablative radiotherapy for patients with abnormal heart rhythms is a very new concept," says Jason Bradfield, MD, director of the Specialized Program for Ventricular Tachycardia at UCLA, and co-principal investigator of the cardiac SABR study. "In addition to providing the first completely non-invasive therapy for cardiac arrhythmias, procedure time could be decreased from four-to-eight hours down to less than 30 minutes, without anesthesia or intravascular catheters."

"The most exciting aspect of cardiac SABR is that it provides hope where there were no previous options, including for those who are considered to be high risk or where standard treatments have failed," says Robert K. Chin, MD, PhD, assistant professor of radiation oncology and co-principal investigator of the cardiac SABR study at UCLA. "The next step forward will be to offer the therapy to moderate-risk patients as a less invasive alternative to traditional ventricular tachycardia treatments. We believe SABR has the potential to transform cardiac arrhythmia care in the U.S."

VT is caused when scarring from a heart attack or some forms of cardiomyopathy causes slow conduction of electrical signals within the heart. The scarred tissue is inhomogeneous, meaning it has fibers of muscle tissue that can still conduct electrical impulses through the scar, but very slowly. The goal of any ablative therapy — radiofrequency ablation, cryo-ablation or external beam radiation — is to target these zones of slow conduction.

SABR is an outpatient procedure that does not require an incision or anesthesia. The targeted area is ablated without invasive instrumentation and can be done relatively quickly compared to other procedures. Treatment time can potentially be reduced from several hours to just 30 minutes. In addition, the treatment requires little to no recovery time. Following successful cardiac SABR, patients can return to normal activities almost immediately.

While current preclinical and clinical experience suggests early effectiveness and safety, additional clinical data from properly designed clinical trials are needed. UCLA, with one of the nation's largest experiences of epicardial therapies, is well positioned to study cardiac SABR as part of a clinical study.

Major features of the cardiac SABR study

Cardiac SABR is an Institutional Review Board-approved dose-escalation clinical study being conducted by UCLA in two parts. Part 1 is designed to determine the highest safely tolerated dose of radiation to the heart; part 2 is designed to determine the effectiveness of this dose in controlling the abnormal rhythm.

Participants in the cardiac SABR study will receive external beam radiation to ablate those areas of heart tissue causing the irregular heartbeat. Radiation exposure to healthy tissue in close proximity is minimized.

Researchers hope that a single 30-minute session of SABR will control VT with a low radiation dose. Patients not currently admitted to the hospital should be able to return home immediately after cardiac SABR treatment.

Participants will be asked to return to both their cardiac electrophysiologist and UCLA Radiation Oncology on a regular basis for routine check-up visits for up to five years.

Participation in the cardiac SABR study

The cardiac SABR team follows a protocol based on careful screening of patient eligibility. Cardiac SABR clinical study eligibility criteria include:

- Life-threatening abnormal heart rhythms unsuccessfully treated by other therapies, or patients considered too high risk for invasive therapies
- No diagnosed myocardial infarction (heart attack) within one month prior to enrollment
- No history of prior radiotherapy to the chest

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