

# Heart Cure With Magnetic Appeal



(Above) Dr. Bruce Lindsay. Dr. Bruce Lindsay (left) directs fluoroscopy calibration with a torso "phantom" to refine X-ray image quality.

Washington University heart specialists at Barnes-Jewish Hospital are preparing to introduce new technology that may revolutionize the treatment for the nearly 2 million Americans who suffer from an irregular heart rhythm called atrial fibrillation.

During atrial fibrillation there is a misfire of electrical currents, explains **Bruce D. Lindsay, M.D.**, Washington University School of Medicine Director of Clinical Cardiac Electrophysiology at Barnes-Jewish Hospital. Somewhere within the heart muscle, a circuit has gone haywire, causing the heart to beat erratically.

Some people with atrial fibrillation have no symptoms, while others suffer uncomfortable fluttering in the chest, exhaustion, and shortness of breath. The pulsing often signifies an underlying heart condition, like coronary artery disease or high blood pressure. The danger for those who suffer from atrial fibrillation is the threat of clots within the heart chambers. If these clots break free, they can lodge in the brain and cause a stroke.

For many people, medication controls the abnormal rhythm. For some

patients with intractable symptoms, a heart operation called the "Maze" procedure can eliminate the problem. But when drugs fail and before doctors resort to surgery, a decade-old procedure known as cardiac ablation used to treat many other types of abnormal heart rhythms has turned out to have the potential to cure atrial fibrillation in certain patients.

In cardiac ablation, thin catheters are threaded into the heart. When they reach the problem area, they are used to cauterize and destroy the electrical circuit that is misfiring.

The trick for a cardiac electrophysiologist is finding exactly where the misfire is happening. To locate it, Dr. Lindsay threads three to five catheters into the heart to "read" and record as many as 20 electrical signals from within the heart. One of those catheters can conduct radio frequency energy that can cauterize the tissue responsible for atrial fibrillation.

The inherent difficulty of guiding catheters into the heart, notes Dr. Lindsay, is that "the heart's moving and nothing's in a straight line." Steering a catheter with meticulous precision is a

challenge. "A stiffer catheter is easier to guide, but then it doesn't bend as well around the anatomical twists and turns," Dr. Lindsay says.

That's why Dr. Lindsay and his colleague, **Mitchell N. Faddis, M.D., Ph.D.**, are poised to introduce new technology that may revolutionize the treatment of cardiac ablation. Working with a company called Stereotaxis, they have helped develop a more flexible catheter that maneuvers its way through the heart under magnetic guidance. A computer maps the course and a changing magnetic field steers the catheters to the troubled site.

The technology was developed for use (and is now being tested) in neurosurgery where catheters must navigate the brain without hitting critical structures. But for the first time, this technology is becoming available for use on a heart in constant motion. "This is a new frontier," Dr. Lindsay says.

For patients, the procedure will appear much the same as it has in the past. It will require light sedation, and may take from 30 minutes to several hours. But the bed the patient will be lying on will be positioned within the

same kind of magnetic field as an MRI. "A coil surrounds the patient," Dr. Lindsay explains, "but it's not enclosing and won't cause claustrophobia."

The cardiologist holds a control that looks like a video game joystick while observing the catheter wires on a monitor. A computer predicts the course of the catheter and also reveals its placement in the heart. The magnetic field causes the supple catheter to loop around bends.

"With better guidance and better control, the procedure becomes more precise and easier to do," Dr. Lindsay says. He predicts that the new approach will also reduce the one-in-1,000 chance that a catheter will puncture a vessel during the procedure.

Most excitingly, the magnet-guided catheter may prove useful in treating the most difficult irregular heartbeats, those with hard-to-locate circuits that spiral around the heart. He and Dr. Faddis have described the technology at two scientific conferences and are preparing a manuscript to submit to medical journals.

Pending FDA approval, Dr. Lindsay and his team will begin trials on patients in the fall. He says, "This technology may prove to be one of the most striking innovations in the last 10 years."

For an appointment or more information about Washington University Heart Specialists at Barnes-Jewish Hospital, contact us at (314) 747-1000 or toll-free (866) 747-1001, [www.barnesjewish.org](http://www.barnesjewish.org) or [www.WUPhysicians.wustl.edu](http://www.WUPhysicians.wustl.edu). ■