MRI Scans to Be Made Safe for Pacemakers

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WASHINGTON (AP) -- More than 2 million Americans depend on pacemakers or defibrillators to keep their hearts beating right, but those lifesaving implants come with a price: They're not allowed in MRI machines, leaving these patients out of luck if they later need scans to detect cancer, stroke or myriad other ailments. That's poised to change.

Doctors at a handful of hospitals are beginning to give MRIs to certain patients despite those implants -- in careful experiments of ways to shield the heart devices from potentially deadly meltdowns or misfires. And the first human study of a pacemaker specially designed to withstand MRIs is expected to begin by year's end.

The attempts come none too soon. Use of the heart implants is growing rapidly, and already hundreds of thousands of recipients every year are estimated to be turned away from MRIs that their doctors wanted to help diagnose or manage other diseases.

"It's a critical issue," says Owen Faris, a heart device specialist at the Food and Drug Administration, which has long urged manufacturers to create MRI-compatible implants.

The irony is that for most people, an MRI is super-safe. The scanner itself is a powerful magnet. Most modern implants are made with materials that aren’t too magnetic, meaning an MRI won’t move them around once they've healed in the body.

But MRIs are off-limits for a handful of implants -- mostly pacemakers, heart-shocking defibrillators, and some brain devices -- because the scans can heat them, burning surrounding tissue. Also, MRIs emit radiofrequency waves that can confuse electronic implants, leading them to either quit working or fire when they shouldn't.

Baltimore's Johns Hopkins University Hospital, a leader in the fledgling MRI trend, is getting two or three requests a day to scan pacemaker or defibrillator recipients, after scientists there reported safety steps that have allowed MRIs for more than 100 of the risky patients so far.

"Even with all these precautions, we can't guarantee that nothing adverse would happen," warns Dr. Saman Nazarian, a Hopkins cardiac electrophysiologist who monitors patients' hearts while they're inside the scanner, ready to intervene at signs of trouble.
"Our hope ... is the devices that will come out in the future will be built from the ground up to be safe."

Scientists are trying three approaches:

-- Medtronic Inc. is awaiting FDA permission to begin the first patient tests of a pacemaker designed to be compatible with MRI scans. Medtronic added filters to prevent the pacemaker's heart-penetrating wires from picking up MRI signals, so that they shouldn't heat or misfire, explains Vice President Warren Watson.

-- Recall how dentists cover patients' bodies with a lead apron before X-raying teeth? University of Pittsburgh researchers are preparing to test a similar shield approach, covering pacemaker recipients' chests with material that blocks MRI energy while scanning other body parts. Called an "MRI isolation blanket," it's made by a company that provides radar blockers to the military.

In laboratory tests using mannequins, the blanket kept MRIs from dangerously heating pacemaker wires, says Dr. Emanuel Kanal, the university's MRI chief and head of the American College of Radiology's MRI safety committee.

-- Then there's Hopkins' method. Lead researcher Dr. Henry Halperin first exposed pacemakers and defibrillators to extra-high-dose MRIs, to winnow out 24 modern brands that withstood strong magnetic fields without getting too hot.

Animal testing identified more safety concerns. If a pacemaker wire, called a lead, goes bad, doctors sometimes just unhook it from the device's battery and let it lie quietly in the heart. It turns out that unattached leads get far hotter than attached ones; so do even attached leads if they're placed on the outside of the heart instead of inside.

So Nazarian turns away patients with those two lead problems. For other candidates, he temporarily reprograms their pacemakers or defibrillators to reduce electronic interference, and runs the MRI scanner at half-strength.

So far, no one's been harmed, the team reported in last month's journal Circulation. The MRIs have uncovered cancers and strokes, helped doctors plan artery-opening treatments -- and in one patient spotted a brain disorder that other tests had missed, allowing surgery to end the woman's seizures.

For now, pacemaker patients should be wary if a doctor orders an MRI, Kanal warns. Very few medical centers have on hand the specialized equipment and specially trained electrophysiologists and radiologists needed to monitor their safety during the scan.

"It can be done, but it's not at all the state of the art."

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