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Abstracts 662/Poster C67 (663/Poster C68, 651/Poster C56)
Abstract 662 will also be featured in a video news release and podcast.

Study highlights:

- MP3 player headphones can cause potentially dangerous interactions with pacemakers and implantable defibrillators.
- For safe use, the headphones must be at least 1.2 inches (3 cm) from the implanted devices.
- Unrelated research did not find adverse reactions to pacemakers and defibrillators from iPods®, Bluetooth® headsets, iPhones, electric blankets, hand-held airport metal detectors or pills swallowed to perform video endoscopy.

American Heart Association meeting report

MP3 headphones interfere with implantable defibrillators, pacemakers

NEW ORLEANS, La., Nov. 9 – Headphones for MP3 players placed within an inch of pacemakers and implantable cardioverter defibrillators (ICDs) may interfere with these devices, according to research presented at the American Heart Association’s Scientific Sessions 2008.

Researchers investigated the effects of MP3 player headphones, most of which contain the magnetic substance neodymium, on the operation of implanted cardiac devices (abstract P662).

An MP3 player is a popular digital music player. Earlier this year an FDA report concluded that interactions between MP3 players, such as the popular iPod®, and implanted cardiac devices are unlikely to occur.

“We became interested in knowing whether the headphones which contain magnets — not the MP3 players, themselves — would interact with implanted cardiac devices,” said William H. Maisel, M.D., M.P.H., senior author of the study and director of the Medical Device Safety Institute at Beth Israel Medical Center in Boston, Mass.

Maisel said doctors traditionally use magnets in the clinical setting to test pacemakers, which treat slow heart rhythms. When exposed to magnets, these devices automatically pace, sending low-energy signals to the heart to make it beat. Defibrillators, which treat slow and dangerously fast heart rhythms, send either low- or high-energy signals to the heart. However, ICDs near magnets may temporarily stop looking for abnormal heart rhythms.

Implanted cardiac devices that react in these ways to magnets outside the clinical setting can be potentially dangerous for patients who rely on their lifesaving technologies.

Researchers tested eight different models of MP3 player headphones (including both the clip-on and earbud variety) with iPods® on 60 defibrillator and pacemaker patients.

“We placed the headphones on the patients’ chests, directly over where their devices are located, monitoring them for evidence of an interaction,” Maisel said.

The researchers found a detectable interference with the device by the headphones in 14 patients, (23 percent). Specifically, they observed that 15 percent of the pacemaker patients and 30 percent of the defibrillator patients had a magnet response, Maisel said.

“For patients with pacemakers, exposure to the headphones can force the device to deliver signals to the heart, causing it to beat without regard to the patients’ underlying heart rhythm,” he said. “Exposure of a defibrillator to the headphones can temporarily deactivate the defibrillator.” In most cases, removal of the headphones restores normal device function.

The researchers also tested the magnetic field strengths of each of the headphone models using a gauss meter, which measures the units of magnetic charge produced.

Field strength of 10 gauss at the site of the pacemaker or defibrillator has the potential to interact with the implantable device. The researchers found that some of the headphones had field strengths as high as 200 gauss or more.

“Even at those high levels, we did not observe any interactions when the headphones were at least 3 cm, or about 1.2 inches, from the skin’s surface,” Maisel said.

“Patients should not focus on the brands we tested but instead should simply be instructed to keep their headphones at least 3 cm from their implantable devices.”

Instead, patients should not place headphones in their pocket or drape them over their chest.

“For family members or friends of patients with implantable defibrillators, they should avoid wearing headphones and resting their head right on top of someone’s device,” he said.

In two unrelated studies, researchers did not report adverse heart-related effects on implantable cardiac devices from other devices.

Researchers in Hyannis, Mass., found that cell phones equipped with wireless technology known as Bluetooth® and pills swallowed to view internal organs are unlikely to interfere with pacemakers or ICDs (abstract P651).

Likewise, California researchers determined that electromagnetic interference from personal devices including iPod®, iPod® nano, iPhone, some cell phones (with and without Bluetooth® technology), electric blankets and hand-held airport security metal detectors did not cause adverse effects to patients with pacemakers or ICDs (abstract P663).

Co-authors of the study with Maisel are: lead author Sinjin Lee, M.D.; Benjamin Ransford, B.S.; Kevin Fu, PhD; and Tadayoshi Kohno, Ph.D. Individual author disclosures can be found on the abstract. Maisel’s study was funded by the Medical Device Safety Institute.

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