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Improved Cardiac Late Gadolinium Enhancement MRI for Patients with Cardiac Devices

Tech ID: 23169 / UC Case 2013-310-0

SUMMARY

UCLA scientists have developed a technology for improving late gadolinium enhancement (LGE) magnetic resonance imaging (MRI) for assessing myocardial viability of patients with cardiac devices such as cardiac pacemakers and implantable cardioverter defibrillators (ICDs).

BACKGROUND

Late gadolinium enhancement (LGE) MRI is the clinical gold standard for in vivo myocardial tissue characterization and is useful for assessing tissue viability in patients with ischemic heart disease, myocarditis, cardiomyopathies, as well as other heart conditions. LGE MRI is also playing an increasing role in guiding catheter ablation treatments for arrhythmia.

Cardiac pacemakers and implantable cardioverter defibrillators (ICDs), which are often implanted into patients with such heart conditions, impair the utility of LGE MRI by producing disruptive imaging artifacts. These artifacts manifest as bright contrast signals, image distortions, or signal voids. Combined, these artifacts drastically limit a physician's ability to determine if scar tissue is present. Given that over 500,000 patients are implanted with ICDs or pacemakers every year in the U.S., the inability to have diagnostic LGE MRI imaging for these patients represents a significant hazard and unmet need. Thus, novel methods or approaches are needed to clarify LGE MRI images for these at-risk patient populations.

INNOVATION

Dr. Peng Hu in the Department of Radiological Sciences at UCLA's David Geffen School of Medicine has developed an approach to eliminate the image quality distortions associated with pacemakers and ICDs in LGE MRI. The technique has been tested in healthy volunteers and a number of patients having an implanted ICD.

APPLICATIONS

LGE MRI imaging of patients with pacemakers or ICDs

ADVANTAGES

Eradicates imaging distortions associated with pacemakers or ICDs allowing diagnostic

imaging

STATE OF DEVELOPMENT

The researchers are actively developing the tool to improve image quality and are

planning tests on a large cohort of patients

PATENT STATUS

Country	Type	Number	Dated	Case
Germany	Issued Patent	2914172	02/18/2026	2013-310

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Late gadolinium enhancement, LGE, magnetic resonance imaging, MRI, pacemaker, cardiac, implantable cardioverter defibrillators, ICD, ischemic heart disease, myocarditis, cardiomyopathy, sarcoidosis, arrhythmia, arrhythmogenic right ventricular dysplasia,, amyloidosis, myocardial disease, ventricular tachycardia, imaging, scar tissue

CATEGORIZED AS

- ▶ **Imaging**
 - ▶ Medical
- ▶ **Medical**
 - ▶ Diagnostics
 - ▶ Disease: Cardiovascular and Circulatory System
 - ▶ Imaging

RELATED CASES

2013-310-0

United Kingdom	Issued Patent	2914172	02/18/2026	2013-310
United States Of America	Issued Patent	11,709,216	07/25/2023	2013-310
United States Of America	Issued Patent	10,649,053	05/12/2020	2013-310

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [An Improved Phase-Contrast MRI Technique](#)
- ▶ [High Spatial and Temporal Resolution Dynamic Contrast-Enhanced Magnetic Resonance Imaging](#)
- ▶ [An Accelerated Phase-Contrast MRI Technique](#)
- ▶ [A Novel MR Angiography Technique](#)

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