Accepted for presentation at AHA Scientific Sessions 2012
Monday, November 5th 4:45 PM

Determining the Risks of Magnetic Resonance Imaging at 1.5 Tesla for Patients with Pacemakers and Implantable Cardioverter Defibrillators (The MagnaSafe Registry)

Author Block: Robert J Russo, Heather S Costa, Debra Doud, SCRIPPS CLINIC, La Jolla, CA; Seth Uretsky, Steven D. Wolff, Advanced Cardiovascular Imaging, New York, NY; Edward T Martin, Oklahoma Heart Inst, Tulsa, OK; Steven Higgins, Gail Tominaga, Scripps Memorial Hosp, La Jolla, CA; Christian Machado, Providence Heart Inst, Southfield, MI; Todd Florin, Aventura Hosp and Medical Ctr, Aventura, FL; Daniel C Bloomgarden, Aurora Health Care, Milwaukee, WI; Ulrika Birgersdotter-Green, Univ of California San Diego, La Jolla, CA; George Ponce, Spectrum Clinical Res Inst, Inc., Moreno Valley, CA; Raymond Schaerf, Providence Saint Joseph, Burbank, CA; Rachel Lampert, Yale Univ, New Haven, CT; Donald Chilson, Kootenai Heart Clinics, Spokane, WA; Dipan J Shah, The Methodist Hosp, Houston, TX; Aysha Arshad, The Valley Hosp, Ridgewood, NJ; Alison Tonkin, Intermountain Medical Ctr, Murray, UT; Jeffrey Anderson, Intermountain Medical Ctr, Salt Lake City, UT

Abstract:

Objective: The MagnaSafe Registry is a multicenter study designed to determine the risk of MRI at 1.5T in 1500 patients with pacemakers (PM) and implantable cardioverter-defibrillators (ICD) who undergo clinically-indicated non-thoracic imaging.

Methods: Device interrogation was performed pre- and post-MRI using a standardized protocol. Pacemaker non-dependent patients had pacing functions deactivated; dependent patients had the device programmed to an asynchronous pacing mode. Tachyarrhythmia therapies were disabled in non-pacemaker-dependent ICD patients; dependent ICD patients were excluded. Primary endpoints were device failure, generator/lead replacement, induced arrhythmia, loss of capture or electrical reset. Secondary endpoints were clinically-relevant device parameter changes.

Results: Between April 2009 and May 2012, 600 non-thoracic MRI studies were performed (447 pacemakers, 153 ICD, 1161 leads) at 12 sites. Pacemaker dependence was noted in 20% of cases; and MRI scan duration was 42 ± 20 min. No deaths, device failures, generator/lead replacements, losses of capture, or ventricular arrhythmias occurred. Four episodes of self-terminating atrial fibrillation (within 48 hours) were noted, and three cases of partial electrical reset. A decrease in battery voltage ≥0.04V occurred in 1% of PMs and 10% of ICDs; pacing lead impedance change ≥50Ω in 4% of PMs and 4% of ICDs; and high-voltage impedance change ≥3Ω in 18% of ICDs. A decrease of ≥ 50% in P-wave amplitude occurred in 1 PM and 1 ICD. A decrease of ≥25% in R-wave amplitude occurred in 4% of PMs and 3% of ICDs. No decreases in R-wave amplitudes ≥50% were recorded. A pacing threshold increase ≥0.5V at 0.4 ms occurred in 1% of PM and 2% of ICD leads. Overall, one or more clinically-relevant device parameter changes occurred in 13% of PM and 31% of ICD cases. In 136 cases (23%), a previous MRI had been performed. The frequency of one or more device parameter change events was 15% in those with, and 18% in those without a previous MRI exam.

Conclusions: Preliminary results for the first 600 cases enrolled in the MagnaSafe Registry demonstrate no deaths, device failures, generator/lead replacements, ventricular arrhythmias, or losses of capture during non-thoracic MRI at 1.5T.