Can Lumbosacral Magnetic Resonance Imaging be Performed Safely in Patients with a Sacral Neuromodulation Device? An In Vivo Prospective Study

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Abstract

Purpose:
We sought to determine the safety of sacral neuromodulation in patients during lumbosacral 1.5 Tesla magnetic resonance imaging.

Materials and Methods:
We prospectively recruited patients with a sacral neuromodulation implant who required lumbosacral 1.5 Tesla magnetic resonance imaging. Before imaging the patients completed validated urinary symptom questionnaires and a survey regarding the usual sacral neuromodulation sensation. The implantable pulse generator was interrogated, and impedances, battery life and stimulus amplitude sensory thresholds were assessed before and after magnetic resonance imaging. Devices were switched off before the patient entered the scanner. Patients were monitored during the study and magnetic resonance imaging related adverse events questionnaires were completed after imaging. Validated questionnaires were repeated 1 month after magnetic resonance imaging to assess for changes in sacral neuromodulation therapeutic efficacy.

Results:
A total of 11 patients were enrolled in the study. Lower back pain, which was noted by 6 of the 11 patients (55%), was the most common indication for imaging. Immediately after magnetic resonance imaging only 1 patient reported mild discomfort during imaging at the site of the implantable pulse generator. This discomfort was present only during the scan and not afterward. Two patients reported warmth at the implantable pulse generator site during the scan, which was also present only during scanning. Patients did not report any other adverse events. There were no major changes in impedance or battery life after magnetic resonance imaging. Stimulus amplitude sensory thresholds and stimulation localization were unchanged. Validated questionnaires 1 month after imaging did not show worsening scores compared to scores before imaging.

Conclusions:
No significant adverse events occurred in patients implanted with a Medtronic InterStim™ II device who underwent a 1.5 Tesla lumbosacral magnetic resonance imaging scan. Therapeutic efficacy of sacral neuromodulation was unchanged 1 month after imaging.