LETTER TO THE EDITOR

To the Editor:

In his Editorial "Myths, magical thinking, and magnetic resonance imaging (MRI)"[1] Dr. Gimbel describes a case of a "modern pacemaker patient" in which a prolonged asystolic event took place during the onset of MRI scanning and that after aborting the scan a stable rhythm returned. Two questions arise when brooding about this episode.

1. Is it possible that this patient had an implantable cardioverter defibrillator (ICD) whose pacemaker part was inhibited by noise of the gradient field? We made the experience that out of 47 ICDs investigated a majority of 77% were inhibited by noise. This noise caused inhibition is brand-related: all of 14 Medtronic devices, 81% of 16 St. Jude devices, 75% of 12 Guidant devices, and none of five Biotronik devices reacted with "noise inhibition;" the others switched to asynchronous interference mode as it is standard in pure pacemakers. In some ICD models the noise reaction—whether noise inhibition or asynchronous noise mode—is programmable. This must be considered when ICD patients are candidates for MRI.

2. In cases with inhibition in pacemaker dependent ICD patients, MRI examination is not absolutely contraindicated. In such cases electrocardiogram (ECG)-gated MRI scanning during refractory period is an alternative as we have described in our paper, "do we need pacemakers resistant to magnetic resonance imaging"[2]. Why was this possibility not taken into consideration?

Therefore, it is dangerous to believe in titles such as "Yes, Doctor, It Can be Done: MRIs Made Safe for People with Defibrillators and Pacemakers"[3].

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Response:

Many thanks to Dr. Irnich for his comments regarding the editorial "Myths, Magical Thinking, and Magnetic Resonance Imaging (MRI)."[1] Interested readers will find a more detailed description of the asystolic event during the onset of MRI of a "modern pacemaker" (manufactured after the year 2000) in a recently published case report.[2]

Briefly, a pacemaker (Biotronik Cylos VR, Biotronik Inc., Lake Oswego, OR, USA)-dependent patient underwent 3T MRI scanning of the brain while redundantly monitored and programmed VOO at 60 ppm. Upon initiation of MRI scanning, POR (power-on-reset) occurred, a phenomenon frequently described in the MRI-device literature. The POR mode for this device is VVI, and once in the sensing mode, the device inhibited in response to the electromagnetic interference (EMI) leaving the patient without pacing support. The MRI scanning was immediately discontinued with the fortunate return of effective pacing.

As to Dr. Irnich's second comment, the technique of gated scanning should be considered as an alternative in the case of pacemaker-dependent patients. Perhaps this technique could be evaluated more fully in future studies. Given the world's (and this practitioner's) very limited peer-reviewed reported experience in scanning device patients (perhaps 1,000), we should all keep an open mind to novel approaches that allow us to scan device patients safely.

What is striking about Dr. Irnich's comments, however, is that somehow his own limited experience in scanning device patients allows him to conclude that certain effects are "brand related."

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Two points bear emphasis. First, the absence of an effect during the evaluation of a small number of devices under limited circumstances is not proof of safety. Second, device manufacturers are constantly changing and refining the components in their devices and the manufacturing processes they use to build them in small but important ways in response to a variety of competitive and cost pressures. As such, even relatively large databases[3] seeking to establish the safety profile of scanning device patients will *never* satisfactorily answer the question of whether it is safe to scan a particular device patient undergoing a particular scan.

Because they were not designed from the ground up to withstand the intense EMI present during MRI, *all* devices from *all* manufacturers not currently labeled safe for MRI should be regarded as subject to the many unpredictable deleterious effects that have been reported in the literature. Until a broad range of MRI-safe devices (pacemakers and implantable cardioverter defibrillators) are available, like Dr. Irnich, we are left to brood about the potential ill effects that might occur when scanning device patients.

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Erratum

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Transatrial Lead Implantation Using the 4-Fr Lumenless Pacing Lead and Delivery System in Young Adults with Congenital Heart Disease

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The author names were printed incorrectly in the byline. The correct author byline for the article is printed above.