

## Patient Safety Tip of the Week

### November 5, 2019 A Near-Fatal MRI Incident

The last column we did before our recent vacation was on MRI safety (see our October 15, 2019 Patient Safety Tip of the Week “[Lots More on MRI Safety](#)”). Ironically, a week later there was a near-fatal MRI accident in Sweden ([Fornell 2019](#) , [Fischer 2019](#), [Forrest 2019](#), [Ward 2019](#)). Though details are still limited, there is sufficient information for dissemination of some of the lessons learned.

A patient was in the MRI machine in a mobile MRI unit based in a truck/trailer outside the Swedish hospital. A radiology nurse approached the patient while the magnetic field was active. The nurse got pinned against the MRI unit by some sort of “weight vest” containing ferrous material (this was described as a sort of vest worn during exercise). The strap of the vest was wrapped around his neck as the vest was being pulled into the magnet. The patient being scanned recognized something was wrong when he heard screams and saw a hand inside the MRI tunnel. He managed to crawl out the back of the machine and tried to help the nurse. In addition, two hospital security guards responded. They and the patient tried to release the strap from the nurse’s neck but were unsuccessful. The nurse was already unconscious. One guard then used a knife to cut the strap and they pulled the nurse out of the mobile unit.

The guard’s baton and shackles apparently got stuck to the scanner, though the media articles don’t mention what happened to the knife. The patient who had been getting the MRI scan was unhurt. The two security guards apparently suffered minor injuries. The nurse was taken by ambulance to the hospital and admitted to an ICU. He later recovered and was ultimately discharged from the hospital.

It is unclear if the nurse was wearing the “weight vest” or if it came from elsewhere. The media reports and statements from the MRI company and local health officials did not comment on the nature of the vest. The fact that the strap was around the nurse’s neck suggests he was wearing it. This was apparently a very experienced nurse who was employed by the MRI company. In several of our recent columns we’ve talked about how ferromagnetic materials are often present in places you’d least expect them. In our October 15, 2019 Patient Safety Tip of the Week “[Lots More on MRI Safety](#)” we mentioned that the recent ACR guideline update ([Greenberg 2019](#)) notes that clothing and other related products may have incorporated ferromagnetic and/or conductive materials (eg, antimicrobial silver and copper) that are not reliably disclosed in labeling. Examples given include sportswear (including underwear), brassieres, orthotic-related items (eg, stump covers or stump shrinkers), and blankets, but there are likely others as

well. Perhaps the nurse in the current incident was unaware that the weight vest contained ferromagnetic material and the mobile unit likely lacked metal detector gates. The AuntMinnie.com article ([Ward 2019](#)) mentions that the mobile MRI units in Sweden typically do not have metal detector gates.

One important facet is that this was a mobile MRI unit, housed in a truck/trailer parked outside the hospital. Way back in our October 25, 2011 Patient Safety Tip of the Week “[Renewed Focus on MRI Safety](#)” we noted 2 scenarios where training of hospital staff for MRI safety is likely deficient. One is when an MRI unit within a hospital is owned and operated by a separate entity (such as a physician group). The other is when the MRI unit is a mobile one housed in a truck or trailer and operated by an outside entity. The radiology nurse who was injured was employed by the company owning and operating the portable MRI unit. The security guards who responded, however, were apparently hospital employees. In our many columns on MRI safety we’ve emphasized the importance of staff training on MRI safety. But when hospitals utilize mobile MRI scanners (that are typically owned and operated by someone other than the hospital), they often do not provide adequate training for those nurses or other staff that might accompany patients to the mobile MRI unit. We strongly recommend you review all aspects of safety if your staff does go on transports to such mobile MRI units. We’ve also emphasized the need for training your local fire and police personnel who might respond to an incident in an MRI unit.

Regarding the security guards who responded, they likely had no training on MRI safety and they noted that there was apparently no signage warning them about metallic items. The AuntMinnie.com article ([Ward 2019](#)) states “Following the accident at Luleå, 90-minute training sessions for the security guards at the Karolinska group were scheduled to be held on October 31 and next week. The guards will receive information about MRI, and they will enter the MRI suite to learn about the strength of the magnetic field, how to behave in the safety zone, and what to do and what not to do.”

Perhaps the most important new lesson is **the danger of working alone near an MRI unit** ([Ward 2019](#)). The rapid action of the security guards and the patient obviously saved the nurse’s life. It is a wonder that no one else suffered serious injury in this incident.

Investigations are being undertaken by both the MRI company and the local police. Hopefully, further details will be released upon completion of those investigations because valuable lessons are likely to be learned to prevent similar accidents in other venues. But, this incident suggests you consider performing a **FMEA** (Failure Mode and Effects Analysis) in your organization or facility to see what vulnerabilities you may have if a similar set of circumstances occurred.

There are, of course, many other aspects to MRI safety than simply considering the impact of projectiles or other items being pulled into the magnetic field. In addition to the recent ACR guideline update on MRI safety ([Greenberg 2019](#)), the FDA recently published a draft guidance “Testing and Labeling Medical Devices for Safety in the Magnetic Resonance (MR) Environment” ([FDA 2019](#)). Importantly, the safety and

performance of medical devices should be assessed for all of the magnetic field strengths to which that device may potentially be exposed (see our October 15, 2019 Patient Safety Tip of the Week “[Lots More on MRI Safety](#)” for comments on the introduction of 7T MRI). Devices should be tested for both magnetically induced displacement force, magnetically induced torque, gradient induced vibration of the medical device, as well as for the potential device heating and thermal injury. In addition, they should be tested for malfunction of medical devices or inadvertent device stimulation. And, lastly, they should be assessed for producing imaging artifacts.

**Some of our prior columns on patient safety issues related to MRI:**

- February 19, 2008 “[MRI Safety](#)”
- March 17, 2009 “[More on MRI Safety](#)”
- October 2008 “[Preventing Infection in MRI](#)”
- March 2009 “[Risk of Burns during MRI Scans from Transdermal Drug Patches](#)”
- January 25, 2011 “[Procedural Sedation in Children](#)”
- February 1, 2011 “[MRI Safety Audit](#)”
- October 25, 2011 “[Renewed Focus on MRI Safety](#)”
- August 2012 “[Newest MRI Hazard: Ingested Magnets](#)”
- October 22, 2013 “[How Safe Is Your Radiology Suite?](#)”
- October 21, 2014 “[The Fire Department and Your Hospital](#)”
- August 25, 2015 “[Checklist for Intrahospital Transport](#)”
- August 2016 “[Guideline Update for Pediatric Sedation](#)”
- October 2016 “[MRI Safety: There’s an App for That!](#)”
- January 17, 2017 “[Pediatric MRI Safety](#)”
- August 8, 2017 “[Sedation for Pediatric MRI Rising](#)”
- March 2018 “[MRI Death a Reminder of Dangers](#)”
- March 2018 “[Cardiac Devices Safe During MRI But Spinners!?](#)”
- November 2018 “[OMG! Not My iPhone!](#)”
- April 2, 2019 “[Unexpected Events During MRI](#)”
- September 2019 “[New MRI Hazard: Magnetic Eyelashes](#)”
- October 15, 2019 “[Lots More on MRI Safety](#)”

**References:**

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