

Patient Safety Tip of the Week

July 26, 2022

More Risks in the Radiology Suite

You’ve seen our multiple columns describing the radiology suite as being high-risk for patient safety events. In our October 22, 2013 Patient Safety Tip of the Week “[How Safe Is Your Radiology Suite](#)” and the other columns listed below we’ve discussed the multitude of safety issues seen in radiology suites that have little to do with radiology per se. That’s because sick patients with multiple medical problems and vulnerabilities are being taken to the radiology suite and staying there, sometimes for prolonged periods. The events include things like falls, medication errors, patient mixups, IV connection errors, running out of oxygen, conscious sedation incidents, suicides, and others.

But sometimes factors related to the imaging procedure may also contribute to patient safety events. Sanchez et al. ([Sanchez 2022](#)) recently discussed cases of 2 patients given IV sedation to facilitate MRI scans. In one, a 43-year-old woman with acute neurological symptoms and signs was given lorazepam 2 mg intravenously (IV) as premedication to reduce agitation after a first attempt at doing the MRI was unsuccessful. The MRI was again unsuccessful, despite anxiolysis. After returning to the medical unit, flumazenil 0.2 mg was given due to somnolence, with subsequent improvement in mental status.

In the second case, a 71-year-old man with a possible epidural abscess following a bout of sepsis was sent for an MRI scan. He was unable to tolerate the scan due to back pain, so hydromorphone 0.5 mg IV was administered. Because of continued restlessness, additional doses of lorazepam 1 mg IV and hydromorphone 0.4 mg IV were ordered. After the patient received a 3rd dose of lorazepam 1mg IV, he became obtunded, hypotensive, and developed respiratory depression with oxygen saturation around 60%. The rapid response team was called, and naloxone and flumazenil were administered. The patient was placed on bilevel positive airway pressure (BiPAP) and given a fluid bolus before being transported to the intensive care unit (ICU), where he was emergently intubated. The patient remained intubated for several days due to severe acute respiratory distress syndrome (ARDS), which was attributed to aspiration while in the MRI machine.

Sanchez et al. provide a nice discussion of the risks of minimal-to-moderate sedation for imaging procedures, especially in high-risk patients, when multiple medication doses are required, and when monitoring is limited or inadequate (e.g., inside an MRI machine). They highlight the need for risk assessment prior to administering such drugs and

consideration of patient-specific risk factors for respiratory depression. They stress such risk factors for oversedation as obesity, hepatic, renal, and lung disease; substance use disorder, and obstructive sleep apnea. They recommend looking for higher American Society of Anesthesia (ASA) physical status classification and checking a STOP-BANG score to help identify patients who might have unrecognized obstructive sleep apnea. In addition, they note that lower BMI values are associated with higher plasma concentrations of fentanyl or midazolam, two commonly used medications for diagnostic imaging sedation. They also suggest assessing the patient for potential aspiration risk and considering NPO (nothing by mouth) orders prior to diagnostic imaging procedures with sedation.

They caution against “dose-stacking” of medications (administering medications multiple times and/or from various routes before each dose reaches its peak therapeutic effect).

Monitoring is very important. Because of variability and risk for oversedation, patients must be assessed before and after each dose or medication administration. They note that consistent sedation assessments are important throughout the duration of action of the medication(s) administered. They emphasize “Continuous electronic monitoring is indicated for moderate levels of sedation or higher and should be considered for high-risk patients receiving opioids and/or benzodiazepines.”

They also stress an important point that is often overlooked – sedation might be avoided all together in many patients. They discuss non-pharmacologic techniques that can be used to minimize anxiety, agitation, and claustrophobia prior to such imaging studies. These include positioning issues, use of movie goggles, mirrors, 2-way communications, call buttons, and even fragrance administration.

Nice, practical discussion of a problem we continue to see all too often in patients undergoing imaging studies.

Some of our prior columns on patient safety issues in the radiology suite:

- October 16, 2007 [“Radiology as a Site at High-Risk for Medication Errors”](#)
- February 19, 2008 [“MRI Safety”](#)
- September 16, 2008 [“More on Radiology as a High Risk Area”](#)
- October 7, 2008 [“Lessons from Falls....from Rehab Medicine”](#)
- October 2008 [“Preventing Infection in MRI”](#)
- March 17, 2009 [“More on MRI Safety”](#)
- March 2009 [“Risk of Burns during MRI Scans from Transdermal Drug Patches”](#)
- August 11, 2009 [“The Radiology Suite...Again!”](#)
- January 2010 [“Falls in the Radiology Suite”](#)
- August 2010 [“Sedation Costs for Pediatric MRI”](#)
- January 25, 2011 [“Procedural Sedation in Children”](#)
- February 1, 2011 [“MRI Safety Audit”](#)
- October 25, 2011 [“Renewed Focus on MRI Safety”](#)

- March 13, 2012 “[Medical Emergency Team Calls to Radiology](#)”
- August 2012 “[Newest MRI Hazard: Ingested Magnets](#)”
- October 22, 2013 “[How Safe Is Your Radiology Suite?](#)”
- February 25, 2014 “[Joint Commission Revised Diagnostic Imaging Requirements](#)”
- July 2014 “[New MRI Risks: for Staff!](#)”
- July 1, 2014 “[Interruptions and Radiologists](#)”
- November 2014 “[More Radiologist Interruptions](#)”
- October 21, 2014 “[The Fire Department and Your Hospital](#)”
- June 23, 2015 “[Again! Mistaking Antiseptic Solution for Radiographic Contrast](#)”
- August 25, 2015 “[Checklist for Intrahospital Transport](#)”
- March 22, 2016 “[Radiology Communication Errors May Surprise You](#)”
- 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](#)”
- November 14, 2017 “[Tracking C. diff to a CT Scanner](#)”
- March 2018 “[MRI Death a Reminder of Dangers](#)”
- March 2018 “[Cardiac Devices Safe During MRI But Spinners!?](#)”
- April 2018 “[Radiologists Get Fatigued, Too](#)”
- May 2018 “[Cost of Interrupting a Radiologist](#)”
- November 2018 “[OMG! Not My iPhone!](#)”
- December 11, 2018 “[Another NMBA Accident](#)”
- April 2, 2019 “[Unexpected Events During MRI](#)”
- September 2019 “[New MRI Hazard: Magnetic Eyelashes](#)”
- October 15, 2019 “[Lots More on MRI Safety](#)”
- November 5, 2019 “[A Near-Fatal MRI Incident](#)”
- November 12, 2019 “[Patient Photographs Again Help Radiologists](#)”
- November 26, 2019 “[Pennsylvania Law on Notifying Patients of Test Results](#)”
- January 7, 2020 “[Even More Concerns About MRI Safety](#)”
- July 14, 2020 “[A Thesis on Intrahospital Transports](#)”
- August 25, 2020 “[The Off-Hours Effect in Radiology](#)”
- October 2020 “[New Warnings on Implants and MRI](#)”
- January 2021 “[New MRI Risk: Face Masks](#)”
- May 25, 2021 “[Yes, Radiologists Have Handoffs, Too](#)”
- June 1, 2021 “[Stronger Magnets, More MRI Safety Concerns](#)”
- November 2021 “[Yet Another Risk During MRI](#)”
- January 2022 “[MRI Safety Issues](#)”
- February 2022 “[Managing Incidental Findings](#)”
- June 2022 “[Where Are You Barcoding?](#)”
- July 12, 2022 “[Radiologists Racked by Interruptions](#)”

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](#)”
- November 5, 2019 “[A Near-Fatal MRI Incident](#)”
- November 2019 “[ECRI Institute’s Top 10 Health Technology Hazards for 2020](#)”
- January 7, 2020 “[Even More Concerns About MRI Safety](#)”
- March 2020 “[Airway Emergencies in the MRI Suite](#)”
- October 2020 “[New Warnings on Implants and MRI](#)”
- January 2021 “[New MRI Risk: Face Masks](#)”
- June 1, 2021 “[Stronger Magnets, More MRI Safety Concerns](#)”
- November 2021 “[Yet Another Risk During MRI](#)”
- January 2022 “[MRI Safety Issues](#)”

References:

Sanchez L, Porras H, Lammers C. Medication Safety Events Related to Diagnostic Imaging. AHRQ PSNet Web M&M July 8, 2022
<https://psnet.ahrq.gov/web-mm/medication-safety-events-related-diagnostic-imaging>



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