Model MRI Safety Program

The University Hospitals / Case Western Reserve Experience

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No relevant disclosures
Objectives for Today

To describe:

• History of program and current status

• Real-world challenges (and solutions) when implementing ACR MR safety guidelines
Limitations

Insufficient time to discuss all aspects of comprehensive program

General approach: address all recommendations of:

• ACR Guidance Document on MR Safe Practices

• ACR Manual on Contrast Media
Organization of our MR program:

- Radiology Chairman
  - MR Medical Director
    - UH Radiology (Clinical)
      - MRI Techs & Clinical Staff
  - Radiologists
  - CWRU Radiology (Research)
    - Research Faculty
      - Research Staff, Grad Students, Postdocs
  - MRI Department & Magnets
UH Regional Radiology operations:

32 magnets in 26 facilities
Michael Colombini (2001)

Fatal injury: strike from ferrous O2 tank
2003: Wheelchair and Oxygen tank
2003: Floor Buffer machine
2007: IV Pole
2011: Laundry Hamper
2013: IV Pole
2011-2015: Stepping Up Our Program

Zone 3 & 4 Access Control
Training for “visiting” personnel
Screening cooperation with inpatient units
Master policy & program for the health system
Medical physicist safety audits
ACR Guideline:

*MR Medical Director has ultimate responsibility for content and implementation of MR safety program*

Facility/Institution Structure:

Senior leadership must **provide this individual with authority, resources, and support**

E.g.: Radiology Chair, hospital COO and CMO, management of other sites
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UH Radiology (Clinical)

MRI Techs & Clinical Staff

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Research Faculty

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MRI Department & Magnets
Access Control

Physical security (RFID swipe card access) passing from Zone 2→3
Access Control

Administrative security:
RFID system separate from hospital swipe card system;
Swipe cards issued by MRI manager directly

Individual access to Zone 3 on “need” basis only
“Visiting Staff”

Patients accompanied by: Nursing, anesthesia, sedation, respiratory therapy, medical students and residents

Source of numerous small missile incidents and “near hits”

Chaotic environment in shared control area (5 magnets)
“Visiting Staff” Training

Level 1 MR safety training developed BY and FOR each individual area

Review/approval by MRI department

Departments tasked to train ALL staff, OR designate Level 1 trained personnel to come to MRI
MR Room “Time Out” Procedure

Carried out by MRI techs for ANYONE entering room (Zone 3→4)

Secondary check: everyone should ALREADY be screened

“Fix” for visiting staff who need to bring unsafe items into Zone 3.
MR Room “Time Out” Procedure

Checklist posted at each magnet room entrance door

FMD hand-wand check
Ongoing Challenge: MRI Tech Staffing

ACR recommends minimum of two Level 2 personnel in the “Zone 2 through 4 area” when scanning...

• Are 5 techs / 5 magnets enough?
• For satellites, which non-tech staff can truly be trained to assist? Where do they sit?
Inpatient Screening

• ACR requires screening to be carried out by 2 trained individuals
• For inpatients, nursing and referring physicians have best knowledge of patients’ allergies, medical/surgical history, implants
• Extra concerns for anesthesia
Safety Screening via EMR MRI Order Entry

Order: MRI Brain Function
Requested By: Morgenstern-Clairen, Hadley Scott

Check all Conditions that Apply

Priority
Level 3 - Routine Today

Transport Method
LMP

Current Signs and Symptoms

Radiologist to Determine Optimal Study

Requesting Physician Contact #
7960607

Is Pregnant?
No

Special Instructions

Scheduled Dtm

Other:
Safety Screening via EMR MRI Order Entry

If Pt Requires pre-medication is "Yes" must answer the following questions:
BMI greater than 40? (pre-populates if BMI is on the chart)
BiPAP or CPAP for sleep?
Use high flow O2 40% FIO2 or greater? (pre-populates if documented on the flow sheet)

Instructions:
To resuscitate an adult MRI, contact anesthesia scheduling at 4227/0 between 8:00 AM and 5:00 PM, Monday through Friday. After 5:00 PM, or for urgent cases, call the Mother OR desk at 42268 and ask to schedule an MRI case with anesthesia. Also, contact MRI at 26558.
Safety Screening via EMR MRI Order Entry

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain, pre-medication, or claustrophobic</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>BMI greater than 40</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>B/PAP or CPAP for sleep</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>High flow O2, 40% FiO2 or greater</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>History of injury by metal object/foreign body (e.g., bullet, BB shrazen)</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>History of metallic object in eyes (silver, shavings, other metallic object)</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Medical attention sought</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Surgical operation or procedure</td>
<td>yes</td>
<td>no</td>
<td></td>
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<tr>
<td>History of kidney disease, asthma, diabetes, high blood pressure, or other allergic respiratory disease</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Received contrast agent or X-ray dye for MRI, CT, Other X-ray or study</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Have you ever had a X-ray dye or magnetic resonance imaging (MRI) contrast agent allergic reaction</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Pregnant or suspected pregnant</td>
<td>yes</td>
<td>no</td>
<td>N/A</td>
</tr>
<tr>
<td>Date of last menstrual period</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Currently breastfeeding</td>
<td>yes</td>
<td>no</td>
<td>N/A</td>
</tr>
<tr>
<td>Post-Menopausal</td>
<td>yes</td>
<td>no</td>
<td>N/A</td>
</tr>
</tbody>
</table>

This pops up for the questions in the box
Safety Screening via EMR MRI Order Entry

- Training for nurses and ordering MD’s developed by each department / unit with review/approval by Radiology
- Training for screening and order entry delivered via electronic LMS module
- EMR roll-out team effort between Radiology, EMR/IT, individual nursing divisions
Patient Screening

• EMR entry flags issues requiring clinical consults with Radiologist, Anesthesia, Cardiology, etc.
• Implants are flagged for Technologist/Radiologist review
• 2nd screening performed by Technologist when patient arrives
Master MR Safety Policy

Approved May 2015

Standardized expectations for MR safety practices for all facilities

Provides “teeth” for Radiology safety efforts

POLICY & PROCEDURE

SA-8 — Magnetic Resonance Imaging (MRI) Safety

Key Points
- Screening tools are used to determine safe access to MRI areas.
- Staff are required to support MRI imaging by maintaining pertinent, content-specific department training programs.
- Specific levels of training are required before entering different MRI zones.
- High field magnets are always on; therefore no metal items are permitted in the magnet room.

Policy & Procedure
1. There are high field MRI imaging systems located within our academic, community and outpatient facilities. Due to the risk involved in these environments, there is a safety program. Staff education and training is conducted based on location, position or job assignment. There is a patient screening process and a staff screening process to enhance the workplace safety within the MRI areas. This policy is based on the American College of Radiology Guideline Document on MRI Safe Practices: 2013
2. It is recommended that individuals who frequent the MRI suite have MRI safety training. The areas include but are not limited to the following:
   2.1. MRI Staff including Radiologists.
   2.2. Neurology.
   2.3. Transporters.
   2.4. Environmental Services.
   2.5. Protective Services.
   2.6. Local Fire Department.
   2.7. Nursing.
   2.8. Anesthesia.
   2.9. Research.
3. Content of training curriculum beyond basic MRI safety level training varies by responsibility and is determined by individual departments.
System MR Safety Roll-Out

Departmental procedures from academic center used as “templates”

Monthly coordination meetings with MR managers and lead techs

Roles of community hospital radiologists clarified, System MR Medical Director designated
Medical Physicist MR Safety Audits

Required by ACR MR accreditation program as part of scanner annual surveys

Added to Program Requirements 28-OCT-2013

ACR-standard forms released 17-APR-2014
Helpful to facilitate system-wide safety program roll-out:

- Small group of experts familiar with all facilities and programs
- Identify problems at individual sites
- Share/spread good practices among sites
Summary

1. MRI safety in a large, complex organization requires cooperation from many departments outside Radiology

2. Incidents and near-hits can raise deeper safety concerns and systematic issues

3. IT tools can help automate key steps in the MRI screening process
Summary

4. Safety training for Level 1 and 2 MR Personnel should be tailored to individuals’ specific roles and duties

5. The fewer people in Zone 3, the better

6. Medical physicists have a key role in MRI safety; must be involved, but can’t do it alone
Questions? Comments? Feedback?

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