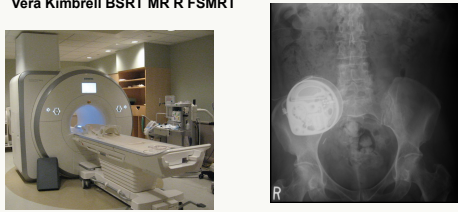




MRSO-TECHNOLOGIST PERSPECTIVE

Vera Kimbrell BSRT MR R FSMRT



Brigham and Women's Hospital
Presenter Disclosure Slide

Vera Kimbrell
Nothing to disclose

The extra challenges in today's healthcare environment

- ▣ More implanted devices in our patient population
- ▣ Greater sophistication of those devices
- ▣ Faster and more complicated pulse sequences and scanner capabilities
- ▣ Less time to make decisions and attend to parameter controls in conditional devices
 - ▣ Concerns for more efficiency
 - ▣ Patient comfort and ability to tolerate the exam
 - ▣ Multi-tasking with other job duties

**HOW IS IT THAT WE KEEP EVERYONE SAFE?
WHOSE RESPONSIBILITY IS THAT?**

The answer is *complicated*

MRI and metal in our subjects/patients

- ▣ Both clinical and research patients come to the MR exam with varying levels of complexity.
 - ▣ Surgical Interventions
 - ▣ Clothing
 - ▣ Ancillary equipment
- ▣ Those subjects who have internal or external devices may be affected by the magnetic field or radio frequency and can be an issue in the MR environment-
 - ▣ EM field interactions=Big Safety concerns
- ▣ Much to the displeasure of everyone, there is no black and white answer to the question
 - ▣ IS THIS (XXXXXXXX) SAFE FOR MRI?
- ▣ It can be dangerous to have a MR exam without careful attention to conditions and scan parameters

The job at hand

- ▣ Screen patients for MR safety-
 - ▣ Verbally, Visually, and in Writing (or digital documentation)
 - ▣ Ferrous Metal Detection (FMD)
- ▣ Investigate any surgery or procedures they might have had in their whole life
 - ▣ Medical Records
 - ▣ Family/caregiver information
 - ▣ Documentation-
 - ▣ Implant Cards
 - ▣ MD reports

Investigate Results of the Screening process

- ▣ Determine if any of their answers constitute a safety concern.
 - ▣ Research on-line
 - ▣ Call the vendor
 - ▣ Other diagnostic testing
- ▣ If there is a concern, what are the risks? What is the benefit of the exam?
 - ▣ Complicated decision to proceed (or not) with the exam-
 - ▣ Input from MRSE and MD before the exam
- ▣ How do we meet the conditions of the device and perform a quality test?
 - ▣ Pre/before the scan
 - ▣ During the exam
 - ▣ Post/After the scan

MR Safety Decision Tree

- ▣ MR Conditional Labeling:
 - ▣ MR Safe
 - ▣ MR **Conditional**
 - ▣ MR Unsafe
- ▣ Safe-Scan
- ▣ Conditional-Maybe scan
- ▣ Unsafe-Potentially scan???

MR Exam preparation

- ▣ What are the conditions?
 - ▣ Patient prep before exam
 - ▣ Intervention by another service
 - ▣ Patient/device interaction (turn off/on)
 - ▣ Potential wait time before and after exam
 - ▣ Scanning safety
 - ▣ Scanner limitations
 - ▣ Exclusion zones
 - ▣ RF, gradient, or scan time limits
 - ▣ Post exam follow up
 - ▣ Patient may need device interrogated or switched into working mode after the exam

Risk versus benefit

- ▣ Should always be done as a team
 - ▣ MRSO-Determines the vendor recommendations, patient condition, scanner capabilities
 - ▣ MR expert-Lays out all the risks and potential safety concerns
 - ▣ MRMD- weighs those risks and the benefit to the patient of the exam and makes the ultimate decision about performing the exam

**MR SAFETY IS NOT ONE PERSON OR ONE ROLE
IT IS A TEAM OF PEOPLE WHO WORK TOGETHER
TO ENSURE PATIENT SAFETY**

IT'S A TEAM EFFORT



The Safety Committee

- ▣ Consists of at least:
 - ▣ MRSO-Usually a technologist
 - ▣ MRSE-Usually a physicist
 - ▣ MRMD-Usually a radiologist
- ▣ Takes responsibility for MR safety administratively and directs day-to-day operations
- ▣ Writes, maintains and oversees MR safety policy and QA processes
- ▣ Deals with incidents, regulatory inspections and hospital policy

MRSO-MR Safety Officer

MR Safety Officer

- ▣ Why do we need this role
- ▣ Who should/does fill this role
- ▣ How is the role defined and what is the operational responsibilities

Definition

- ▣ Magnetic Resonance Safety Officer
- ▣ The person in charge of day to day MR safety workflow
- ▣ Works as part of a team that includes a physicist and a radiologist
- ▣ Makes the first pass decision
- ▣ Oversees and helps to write/implement policy
- ▣ Educates staff and other hospital personnel
 - ▣ Level 1
 - ▣ Level 2
 - ▣ Other ancillary basic or advanced training

Responsibilities

- ▣ Resource for technologist questions
- ▣ Helps with researching implants, conditions and patient history
- ▣ Designs, implements and manages safety workflow with input from the safety committee
- ▣ Trains, teaches, maintains knowledge of industry changes, updates and issues

Developing a Safety Program

- ▣ **Policies, procedures and processes**
 - ▣ Review and update policies at least annually
 - ▣ Good clear concise procedures-Complicated workflows are hard to implement
 - ▣ Make sure everyone knows the process and at least is aware they should be following it!
- ▣ Staffing-MRSO is seldom a position, but usually an additional role for a technologist who is already busy
 - ▣ For effective safety practice this position needs protected time
- ▣ Research, volunteers, new equipment, Zone 4 labeling, etc.

ACR Required Policies

- ▣ MR Safety related
 - ▣ Screening and changing patients
 - ▣ Ferrous metal detection*
 - ▣ Level 1 & 2 training
 - ▣ Safety Officer and MD
 - ▣ Zones, Restricted access
 - ▣ Hearing Protection
 - ▣ Unforeseen/unknown metal
 - ▣ Quench
 - ▣ Pregnant patients
 - ▣ Heating and preventing RF burns

Coloring outside the lines

- ▣ When your Risk/benefit equation tips to the Benefit side for complicated exams/implants
 - ▣ Clearly define the risks and understand how to best mitigate them
 - ▣ All the information we can garner about the implant, patient condition, pre/post scan preparation
 - ▣ Design the best scan parameters to obtain the exam needed
 - ▣ Ensure all emergency procedures are in place

Issues for further development

- ▣ Role definition
 - ▣ Although much work has been done there is still many different job descriptions in the world
 - ▣ Making the argument to management and the MR community in general that this is a much needed position (***NEEDS DEDICATED TIME***)
 - ▣ Better tools for tracking of implanted devices
- ▣ Training and education
 - ▣ There is education but not a clear pathway or universally agreed upon material
 - ▣ Referring clinician, patient and hospital staff knowledge and understanding for MR safety and its impact on patient care

References

- ▣ ACR white paper on MR safety 2013
 - ▣ <https://www.acr.org/Clinical-Resources/Radiology-Safety/MR-Safety>
- ▣ FDA
 - ▣ <https://www.fda.gov/radiation-emitting-products/mri-magnetic-resonance-imaging/information-industry>
- ▣ ISMRM white paper on MR safety roles
 - ▣ ismrm.org/smrt/safety