



MR Safety and The Kanal Method

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EXECUTIVE SUMMARY

- The Kanal Method is a scientific method of focusing and standardizing efforts in MR safety as it applies to each specific patient. Its value, along with the American Board of Magnetic Resonance Safety (ABMRS) and the Magnetic Resonance Safety Officer (MRSO), Magnetic Resonance Medical Director (MRMD), Magnetic Resonance Safety Expert (MRSE)™ board certifications, is demonstrated and in practice.
- People learn the Kanal Method in the MRSO/ MRMD/ MRSE courses. Such certification helps to ensure a standard knowledge base and competency among those overseeing departmental, organizational, and/or enterprise MR safety.
- As with all patient care activities, the team approach is necessary for best practices and for more positive patient outcomes. With this methodology, technologists, physicists, and physicians can improve best practices for their patients.

For years within the global MRI industry, it was understood that something more needed to be done to advance MR safety practices. The need manifested itself daily in patient delays, denials, and/or rescheduled patients. Hours were spent researching implants and devices. Adverse MRI safety events continued to rise. Exams were cancelled due to confusion about the ability to meet the many MR conditions, including those involving spatial magnetic gradients.

There was an awareness of why change was needed to improve MR safety practices. Unhappy patients, disengaged technologists, frustrated radiologists, and annoyed administrators were evidence that change was needed. Unhappy patients equated to abysmal patient satisfaction scores. Disengaged, frustrated, and annoyed staff and faculty linked to appalling employee engagement scores. These key performance indicators guide payments and reimbursements and should have been influencing, to a greater degree, how and where organizational dollars were spent to improve safety operations. With a few exceptions, the front line MRI technologist and the radiologist/MR medical director (the most experienced persons in MR safety at almost all MR sites) were missing from many conversations on what MRI safety practices were

needed and how to allocate MR safety dollars—if any funds were made available at all. And still, adverse MRI safety events kept rising.

Many attempts to fix MR safety failings were cobbled together—our own “bubble gum and duct tape” MR safety solutions that were, in turn, superglued onto historical operational processes. Was this better than having no MRI safety processes? Probably. However, those practices seemed to have the operational feel of driving a car when one of the wheels was about to fall off. MRI departments were perpetually waiting for a sentinel MR safety event and hoping one didn’t occur on their watch. That was then.

The Kanal Method: Background

Now, there’s an alternative to the homebrew tactic that epitomized the way many learned and practiced MR safety. The Kanal Method, developed and taught by Dr. Emanuel Kanal, is a scientific method of focusing and standardizing efforts in MR safety. There is a new way of thinking, a different process for approaching MR safety in a way that is specifically patient centered, not device or implant centered. There is an algorithmic methodology for evaluating each potential risk to the patient, and it is very much

patient dependent. There is a process for dissecting the potential risks that do—or do not—apply to a given implant or device or clinical/research situation for that specific patient. This is a decision matrix that provides the MR technologist and the radiologist a tool to assess each potential risk independently of each other, and then arrive at a scientifically sound and even quantifiable assessment as to what the potential risks might be for safely scanning that individual patient. It defines and applies specific risk assessments to precisely which risks do—and do not—apply to the patient/implant/MR study in question, and dissects out the specific issues relating to static magnetic fields, static magnetic field gradients, radiofrequency transmitted power, temporal imaging gradient magnetic fields, gadolinium based contrast agents, etc and applies each to the presented clinical situation.

This is an actual method for determining how MRI personnel may safely image a specific patient with a given implanted medical device, on the particular MRI scanner in that facility, based on the acuity of the specific patient, allowing for a well informed risk versus benefits assessment. Like all algorithms, however, this one does nothing if it only exists hidden away in a policy and procedure manual. To be meaningful, it must be put into the hands of capable practitioners. So who are these magi, those who can wield these algorithms for improved patient safety and departmental efficiency? They are probably people already within the organization who simply need the opportunity to learn, have administrative support, and be trusted with the freedom to implement the process.

With this methodology, technologists, radiologists, and physicists can provide efficient, effective, and timelier patient services. They can do so with fewer delays, reduced implant and device research time, and they can minimize exam cancellations. All of which are key components to improved patient and provider satisfaction. All are factors which directly impact volumes and drive

positive revenues. Metrics have been obtained from sites that calculated hours spent researching medically implanted devices to determine if patients could safely undergo MRI exams.

One such site, with 10 clinical magnets, performing annual total MRI volumes of 44,600 pre-Kanal Method training, spent 70 hours per week researching medically implanted devices. That same site was denying services to patients who had coronary stents, unsure their MR systems could meet the vendor stated spatial magnetic gradient conditions. Other patients were delayed for days or weeks while the conditions to safely image the patient implant were meticulously researched and confirmed, even if those criteria did not apply for the particular prescribed MR exam. This site had top box patient satisfaction scores for MRI of 32.4%, based on Press Ganey results. This means only roughly 32% of patients thought the performance of this MRI department was “excellent,” “exceptional,” or “very good.” Equally dismal employee satisfaction and employee engagement results made for uncomfortable leadership meetings, staff meetings, and physician meetings. MRI leadership believed there had to be a better way and sought out learning how to improve the metrics of the department. They found the Kanal Method.

The site demonstrated some astonishing metrics post Kanal Method training. The 70 hours per week researching the safety of medically implanted devices was reduced by applying the Kanal Method decision matrix algorithm, to 24 hours per week (from almost 2 FTE to 0.6), freeing those highly paid lead techs to focus on hands-on patient care and leadership development. The annual volumes increased by 32%, from 44,600 to 58,872 MRI exams the first year following the initial Kanal Method training. This was attributed to fewer denials based on critical thinking skills of the Magnetic Resonance Safety Officer’s (MRSOs) use of the decision matrix taught during the course and less cold table time since fewer patients were being delayed or

denied services. These practices, in conjunction with fewer delays and denials, begin to manifest in higher patient satisfaction scores for the MRI department. In a 9 month period, the top box scores improved 32 percentile points. Remarkably, the employee satisfaction scores improved, as well, moving 2.02 points from an overall 2.65 to 4.67 in that same 9 month period.

As the other front line technologists began to adopt the Kanal Method way of critically thinking through each specific patient case, relationships with radiologists also improved. As the technologists became more confident and knowledgeable in discussing safe scanning conditions, physicians began engaging more with the technologists and this trust relationship developed into a better patient care continuum.

MRMD, MRSO, and MRSE MR Safety Certified™ (MRSC™)

In the past few years, the MR industry has witnessed a major advance in MR safety initiatives: the formation of the American Board of Magnetic Resonance Safety (ABMRS), whose sole purpose is to certify and credential those professionals charged with maintaining safety in the MR environment. These are the Magnetic Resonance Medical Director (MRMD), the MRSO, and the Magnetic Resonance Safety Expert (MRSE), as described in the recently released “Recommended responsibilities for management of magnetic resonance safety.”¹ The responsibilities of each member of the MR safety team are clearly defined in the international consensus document noted above. Each role has a defined set of expectations and realms of responsibility, established either by law, licensure, contract, or agreement/delegation within a specific organization.

MR Medical Director (MRMD)/MR Research Director (MRRD)

The MRMD/MRRD is the person that is ultimately responsible for the safety of the

patient and/or research subject undergoing MR procedures. The MRMD/ MRRD is responsible for the patient even if they are not within the MRI suite at the time of imaging. As such, the MRMD/MRRD should plan to be readily available to the MR technologists whenever MR imaging is occurring. The MRMD/MRRD should assure that at least one MRSO is designated and available/responsible for each MR system (one MRSO can reasonably oversee more than one MR system; sites with multiple scanners in different buildings/ locations should consider more than one MRSO). The MRMD/MRRD should also review and provide input for all MR specific policies and procedures pertaining to the safe operation of MR services and assure all MR safety and QA programs are reviewed periodically.

MR Safety Officer (MRSO)

The Magnetic Resonance Safety Officer (MRSO) credential is designed for those with a senior MR safety role at the point of patient care. The role of MRSO is often carried out by the senior MR technologist, but other suitably trained individuals could also fill this role. Multiple MRSOs could be appointed, provided only one is in charge at a given time. His/her responsibilities would include being readily accessible and available to the MR technologists whenever MR imaging is occurring; developing written safety procedures, operating instructions, and emergency procedures for review and acceptance by the MRMD/ MRRD; assuring the established MR policies and procedures are followed during daily operations; and developing MR safety education and training for medical, technical, nursing, and ancillary staff that may enter the MR environment. The MRSO should also report to the MRMD/ MRRD and imaging leadership any MR safety related issues. Imaging leadership should also consider the counsel of the

MRSO during the capital equipment decision process to assure any MR vendor specific conditions are noted, written into procedure, and implemented.

MR Safety Expert (MRSE)

The Magnetic Resonance Safety Expert (MRSE) credential is designed for those in an expert, technical consulting role who may help determine the safety of complex conditions that may be beyond the ken of an MRMD and/or MRSO. While not exclusive to MR medical physicists, this role is most frequently filled by a medical physicist. This role is expected to serve as a resource for the MRMD/ MRRD and/or MRSO. The MRSE would not normally have medical education and training and, hence, would neither be expected nor required to have any expertise regarding the safety of prescription medications or other non-MR medical procedures. It is understood that there may not be a sufficient number of individuals with the necessary qualifications to provide for the physical presence of an MRSE at each MR facility, and it may also not be necessary to have an MRSE at each site. Thus, the requirement is for ready access to the services and advisory assistance of an MRSE on an as-needed basis. The MRSE roles include, but are not limited to providing high level advice on the engineering and scientific aspects of MR safety as it applies to a specific MR unit, provide safety advice regarding acceptance testing after a new installation or upgrade, and be an advisor for the safe implementation of MR protocols, especially those involving MR imaging of medically implanted devices.

With these criteria becoming international industry standards, there are individuals making the decisions to invest in themselves and organizations choosing to invest in their employees, truly putting patient safety first. Globally, several thousand technologists, radiologists,

and physicists have already attended one of the MRMD / MRSO / MRSE safety courses. Still others are clamoring for budgetary dollars from their administrators to attend future sessions. The sessions are intense, focused, practical, and energizing. Attendees from each of the three areas of specialty learn their roles in MR safety, often surprised by just how robust that role can be in the patient care continuum. These people leave the course with a transformed MR safety mindset, a changed perspective on, and confidence in, safe patient care, and a renewed passion for their chosen field.

The Value of ABMRS Certification

People learn the Kanal Method in the MRSO/ MRMD/ MRSE courses. If they wish, they may also sit for the ABMRS board certification exam. Course attendance is not a prerequisite for sitting for the exam. If they demonstrate the knowledge to pass the exam, they then earn the board certification of “MR Safety Certified” from the American Board of Magnetic Resonance Safety. Many attendees of the MRMD/MRSO courses have attempted to earn the appropriate ABMRS MRSO, MRSE, or MRMD MRSC™ certifications. This challenging board certification (overall pass rate in 2015 for roughly 350 examinees was 71%) demonstrates a deeper MR safety understanding, a recognition of a different way of thinking about MRI safety and how this new knowledge can be applied to patient care. Applying this knowledge to clinical and research MR settings can immediately improve how service and care is provided to MR patients/research subjects. They have earned this credential by applying basic science and MR safety knowledge in conjunction with the algorithms defined in the Kanal Method. Such certification helps to ensure a standard knowledge base and competency among those overseeing departmental, organizational, and/or enterprise MR safety.

The combination of formal MR safety certification together with the ability to apply the methodology provides

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the industry with a scientifically based standard by which to assess and quantify patient MR-related risk together with a standard approach to determine by whom that patient care is to be provided. As with all patient care activities, the team approach is necessary for best practices and for more positive patient outcomes.

Results

Technologists, physicists, and physicians can improve best practices for their patients. They can improve patient care, streamline workflow, and increase overall MR safety for their patients and coworkers. By applying the Kanal Method, MR professionals can make a positive fiscal impact for their organizations through increased volumes from providing services to previously denied patients and by improving patient satisfaction scores due to happier patients being seen on time with fewer delays. This, in turn, elevates employee engagement scores because the technologists and radiologists are confidently working together as a team. They can effectively influence patient engagement daily. They make a greater difference because they can, armed with the knowledge to confidently say “yes, we can safely scan this patient” allowing the organization to provide better, safer patient care in a logical, quantifiable, and consistent manner.

This paradigm shift in MR safety thinking elevates how MR technologists, radiologists, and physicists provide services to patients. Earning the MRSO, MRMD or MRSE MRSC™ board certification is crucial in that there is now a bar of MR safety knowledge that is demonstrated by obtaining this credential.

The elite MRI professionals who have earned these credentials have an objective measure of their knowledge. Each can implement safe MR patient care practices with relative assurance. They have the confidence, based on their demonstrated knowledge, to be an active patient care partner to ordering providers, radiologists, and nursing teammates.

The MRSC™ board certified MRSOs, MRMDs and MRSEs are the most valuable tools an organization can have to manage the risks and more successfully promote safe patient care in the unique MR environment. These MR safety-certified professionals can confidently, logically, efficiently, and safely provide access to diagnostic MR imaging services to patients in a timely fashion, with skill and empathy, and can do so with meticulous patient focus.

Conclusion

Patient care must be patient specific. People have physical, emotional, medical, and social needs and those needs are unique to each patient. One of the most valuable lessons learned in applying the Kanal Method is that the clarity of decision making for each specific patient is focused and sharpened even when device labeling and standards are less-than-helpful. This concept is reinforced by reminding technologists and radiologists that, while we may be concerned about a specific implant, we are attempting to safely image and best meet the needs of this one specific person. As the Kanal Method teaches, it is easy to say “no” to performing an MR exam on a patient out of fear or uncertainty, but it takes knowledge, critical analysis skills, and confidence to say “yes.” By learning and implementing this compassionate care model and applying the Kanal Method, technologists and radiologists say “yes” with much greater frequency and confidence and with far better patient—and system—outcomes.

This Kanal Method training is firmly based in science and purposefully puts the needs of the patient first. The ABMRS certification provides others with the confidence in entrusting the safety of their patients to us, knowing that we have demonstrated a unique level of knowledge and set of reasoning skills specific to the unique MR environment, building trust with patients and physician referrers. That is the value of the Kanal Method, the ABMRS and the MRSO, MRMD, MRSE MRSC™ board certifications. 🌱

Bibliography

- ¹“Recommended responsibilities for management of Magnetic Resonance safety.” *OSHwiki*. 23 Oct 2015, 07:05 UTC. Available at: http://oshwiki.eu/index.php?title=Recommended_responsibilities_for_management_of_Magnetic_Resonance_safety&oldid=245505. Accessed March 16, 2016.
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