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Managing MRI risks

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AHA
january 2006
volume 15 number 1
www.matmanmag.com

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MANAGING LIABILITY EXPOSURE AND SAFETY

Taking risky business out of the MRI suite

Health care is being transformed by an array of applications for MRI technology. New opportunities abound for both diagnostic and interventional MRI, aided by the rapid-pace growth in sophisticated equipment. What might have required a painful and risk-prone intervention is being replaced with MRI tools that afford real-time diagnostic and interventional procedures.

With rapid change comes a new set of challenges. As more powerful MRIs come on line, safety concerns increase. There are also financial burdens. An MRI purchased or leased today may be obsolete tomorrow. Facilities cannot afford to keep pace with the need to either purchase or renegotiate leases for such expensive equipment. One should not minimize the inherent costs of training and retraining personnel to maintain competencies with each generation of equipment.

A different set of risk issues come into focus with the shift from diagnostic to interventional use of MRI. Facilities designed to serve imaging purposes may be ill-equipped to handle the added burden of interventional MRIs.

Yet another challenge involves the likelihood of federal rules to fill a void in terms of regulatory requirements and oversight.

Such a burden will place increased responsibility on those professionals responsible for materials management and infection control. Driving the impetus for regulatory requirements are horror stories reported in professional journals and leading newspapers.

Contemporary health care is focused on patient safety and quality outcomes. But how can one achieve these laudable results in the midst of rapid technological change? A practical solution can be found in health care risk management.

What is risk management? What does it mean for materials management and infection control? How does it relate to patient safety?

Answers can be found in a basic understanding of health care risk management. Applied to real-time concerns regarding MRI technology, and using the benefits of tools such as root cause analysis (RCA),

QUICK TAKE>>>

Regardless of whether an MRI suite is being created or is already in existence, risk management should always be taken into consideration. There are many factors that play into worker and patient safety such as infection control precautions and ensuring that staff is knowledgeable and properly trained to work the equipment. Though most suites are run with the utmost professionalism, tremendous teamwork from various departments within an organization is needed to ensure MRI suites are safe for both employees and patients.

Photo by Jeffrey Yardis

Fay A. Rozovsky, president, The Rozovsky Group Inc., Bloomfield, Conn., in the MRI suites at St. Francis Hospital and Medical Center, Hartford, Conn.

much can be done to help reach the goals of MRI patient safety and quality outcomes.

Risk factor

Risk management is not unique to health care. It is a disciplined approach used throughout the world and in a host of settings. It provides a systematic method for identifying and managing both actual and potential sources of financial loss.

Examples of actual loss exposures include theft of personal property left in a changing room, a patient fracturing a wrist by falling off an examination table, a hearing impairment from exposure to high-pitch sounds in an enclosed MRI, or a ferrous rod in a patient's body that is moved and displaced by an MRI magnet.

A potential loss might involve a patient who claims to have contracted a serious infection as a result of an interventional MRI procedure. It is a potential compensable event until the facts are known and it is determined that there is a causal relationship between the interventional MRI procedure and the infection. As applied to MRIs, risk management uses a host of identifiers to pinpoint actual and potential exposures. Pre-diagnostic and pre-interventional history-taking, regular calibration checks of MRI equipment, patient complaints and missed appointments are a few examples of risk identifiers.

Photo by David Phipps

Robert J. Latino, executive vice president, Reliability Center Inc., Hopewell, Va.

Once actual and potential risks are identified, the next step is to set priorities for managing risk exposure. In risk management there are several ways in which to address loss exposure. For example, taking an MRI offline that is malfunctioning eliminates the risk of harm to patients and staff. Requiring demonstrated competencies of staff prior to use of new MRI equipment reflects a strong approach to risk prevention. But take into consideration that in health care, some risks cannot be eliminated or prevented. Rather, these risks can be reduced in terms of frequency or severity.

Cause and effect

In the event of a fire, a well maintained sprinkler system will release water in a timely manner to contain the fire in an adjacent storage area. A sprinkler system may soak some equipment, but it will prevent the blaze from spreading to the adjacent MRI suite.

Unlike risk reduction, risk minimization means the event has occurred, and the goal is to contain it.

Some exposures can be treated through risk transfer. For example, a materials management director may work with the chief financial officer to purchase business disruption insurance for a new MRI center. He may point out that the lease repair terms permit a supplier up to 72 hours to obtain and install replacement parts. Concerned that such serious equipment problems could lead to significant lost revenue, the insurance coverage would help the institution make up for the financial loss. These risk management methods can be used individually or in combination, but a key component is effective communication. If the infection control officer of an ambulatory unit sees a disturbing trend in the MRI unit, it should be communicated to someone who can address the risk exposure because proper infection control in an MRI suite can help reduce both the frequency and severity of infection.

By the same token, if a materials management director is concerned about the terms in a lease agreement, those concerns should be relayed to the facility because timely communication is essential in health care risk management.

Those engaged in the purchase, lease, or use of MRI equipment should be empowered to challenge, question and raise concerns. Their input is critical as they may also possess practical, cost-effective solutions that support patient safety. In essence, they are deputy risk managers and patient safety practitioners whose goal is to prevent and control liability exposure while enhancing quality and safe care.

Risk management, like patient safety, is a team-based approach. It also is a systems methodology that looks far beyond the clinical issues and embraces the financial and business aspects of MRI diagnostic and interventional programs. As such, risk management looks to supply chain issues, vendor relations, planned maintenance, contracting, and staff competencies. Using RCA, one of the key tools in contemporary quality and risk management, one can see how clinical MRI concerns are aligned with the business aspects of care.

Clean suite

MRI facilities present a unique housekeeping challenge. People have been injured doing nothing more than cleaning the MRI suite. The magnetic field generated by these machines is powerful, and the MRI suite is regularly the scene of accidents involving undertrained or careless housekeeping staffs with vacuums, floor polishers or mop buckets. While these accidents have not resulted in death, there have been many injuries to cleaning personnel and damage to expensive MRI equipment.

As a result, many hospitals banished the housekeeping staff from MRI suites and installed access control systems. Those who require special permission to access an MRI suite often include those in charge of patient care, risk management and infection control. Although MRI units are often run with tremendous professionalism, many lack the same degree of oversight that is present in other areas of a health care facility.

A consequence of these conditions is that an MRI department may suffer from poor hygiene. Coupling a poor cleaning regimen with the absence of the most rudimentary infection control measures makes even the hand-washing sink a serious risk exposure. It becomes a particular concern as MRI suites transition from strictly non-invasive diagnostic units to suites used for MRI-guided interventional procedures.

Room for challenge

The demand is increasing in terms of the number and variety of image-guided interventional procedures. For example, the recent Digital Mammography Imaging Screening Trial study on breast cancer screening identified significant advantages to MRI breast screening for certain women. Breast MRI, both imaging and biopsy, is a rapidly growing application.

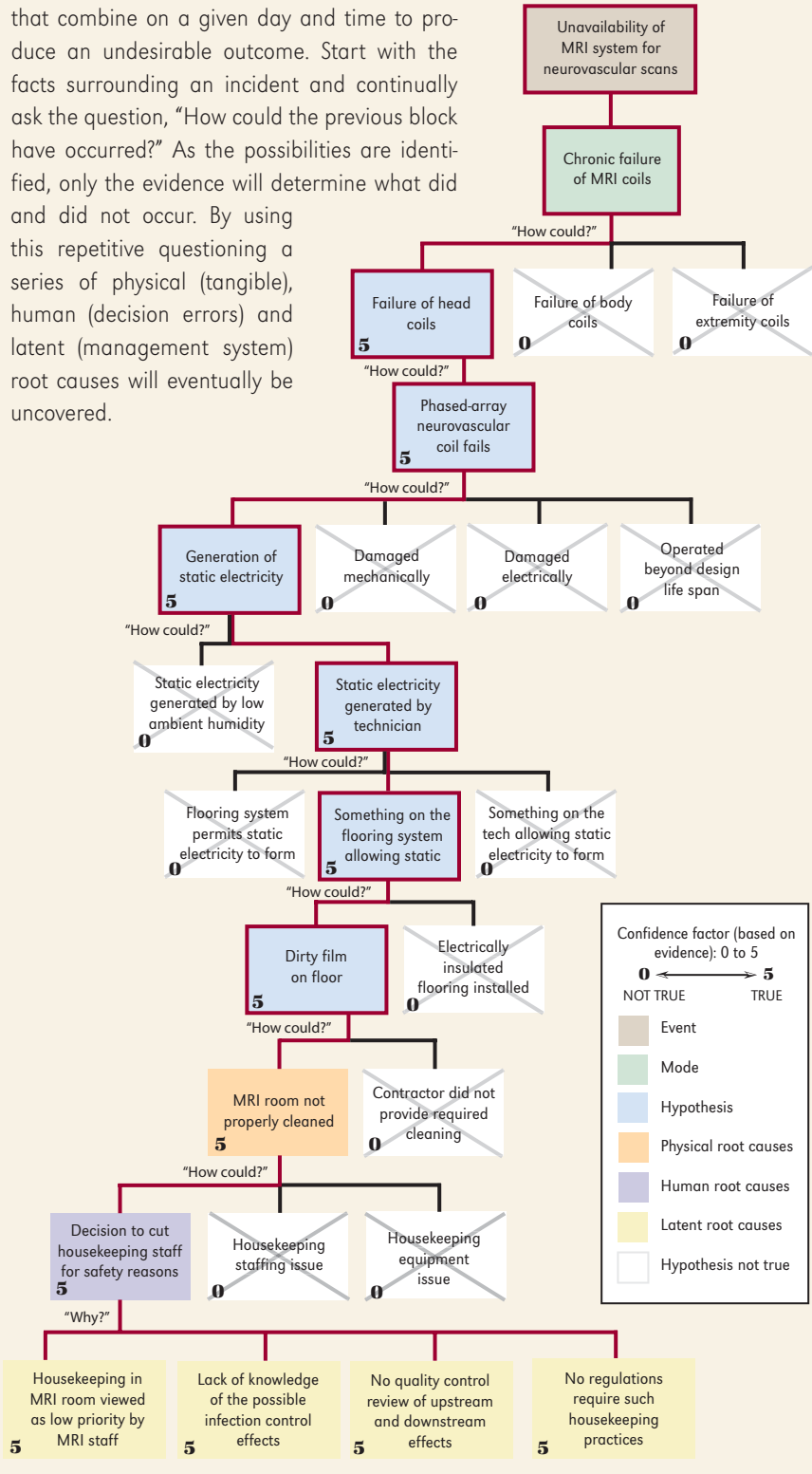
Unfortunately, it is often conducted in facilities that were never designed to sup-

Tobias B. Gilk, associate architect, Junk Architects, Kansas City, Mo.

Photo by Dave Kaup

Getting to the root of the matter

This PROACT logic tree is a graphic depiction of tightly coupled cause-and-effect relationships that combine on a given day and time to produce an undesirable outcome. Start with the facts surrounding an incident and continually ask the question, "How could the previous block have occurred?" As the possibilities are identified, only the evidence will determine what did and did not occur. By using this repetitive questioning a series of physical (tangible), human (decision errors) and latent (management system) root causes will eventually be uncovered.



Source: PROACT Suite Software, Reliability Center Inc., 2005

port interventional procedures.

For example, one regional hospital has three MRI suites, all of which were designed and built strictly for diagnostic purposes. A decision was made to use these suites for breast imaging and biopsies without any updates or adaptations to the suite, and without the knowledge of the hospital's infection control staff. The same facility encountered a remarkable static electricity problem in the MRI suite, which was the direct result of a thin film of dirt on the floor.

Discovering the cleanliness problem because the static shocks were damaging the MRI equipment was, in an odd way, a lucky break. Instead of a patient being injured by a resistant staph infection acquired in the dirty MRI suite, the facility averted potential disaster.

Subsequently, the hospital developed a new cleaning protocol for the MRI suite. It is still uncertain whether the hospital's infection control officer is aware of the interventional procedures under way.

Other facilities may face similar challenges. In contemporary health care, the focus has intensified on designing an accountable culture of safety and relying on constructive changes to modify decision-making behavior—RCA, used in health care quality and risk management, is designed for this purpose.

The chart to the left shows how RCA would be used in the case example. The type of RCA used is called a Proact Logic Tree. The logic tree identifies the events and modes surrounding any undesirable outcome.

Events are usually the negative consequences that trigger the need for an RCA. The modes are usually the manifestations of what triggered the negative consequence to occur. In the case example, the negative consequence that led to the root cause analysis was the chronic unavailability of the MRI system for neurovascular scans. The mode in this case was that the MRI coils kept failing, so the MRI system was constantly unavailable. In building the

logic tree, an exploratory questioning process is used posing the simple question: How could the preceding block have occurred? By asking the question "How could ...," the analyst is seeking all the possibilities in the fewest amount of blocks.

In this case, the only coils that failed were the head coils, body coils and extremity coils. Evidence collected will determine if one or more of the possibilities are true.

Planning for a suite deal

Complete a strategic risk management plan or opportunity analysis that identifies major issues in designing, developing and implementing innovative MRI services. Consider the following:

- MRI suite design for today and the future
- Infection control
- Environment of care safety
- Communication requirements with patients and their family members
- Ease of access for planned maintenance or to repair equipment
- Projected diagnostic needs
- Anticipated interventional services
- Staffing requirements for diagnostic and intervention services
- Contracting for purchase, lease to purchase and leasing of equipment
- Market share now and in the future
- Transfer plans for patients who experience adverse events in either a diagnostic or interventional MRI
- Compliance with anticipated private sector and federal regulatory safety requirements

Confidence factors are provided in each hypothesis block. A zero indicates that with the evidence provided there is a 100 percent confidence that the hypothesis is not true.

Therefore an X is placed over the possibility. Conversely, a five indicates that there is 100 percent confidence that with the evidence provided the hypothesis is true. Between zero and five are gradations to compensate for lack of confidence in either direction due to inconclusive evidence.

This questioning process continues until the RCA identifies the physical roots, human roots and latent roots. Latent roots are the organizational systems that are put in place to help people make better decisions, such as policies, procedures and practices.

Flawed systems and poor information trigger bad decisions. Such decision errors are equivalent to the human roots. As a result of making a poor decision, a physical consequence is triggered, hence the term physical roots."

In the case study, four latent roots were identified:

1. Housekeeping in the MRI room was not viewed as a priority by MRI/radiation staff.

2. There was a lack of understanding by the staff of the possible infection control effects of this decision.

3. There was no quality control review of the upstream and downstream effects of removing housekeeping from the MRI room.

4. There were no regulations that required housekeeping practices in the MRI suite.

As a result of these organizational systems, a decision was made to remove housekeeping from the MRI room for safety reasons.

The consequence was that the MRI room was not cleaned properly, resulting in a layer of dirty film forming on the floor; and the error chain continued until the static electricity harmed the head coils and required frequent, costly replacements.

The RCA helps to pinpoint chronic system problems that trigger undesirable risk exposure. In a culture of safety, it reveals decision-making behaviors that need to change, especially in a fast-paced environment such as the MRI suite. Evidence gathered during the RCA helps to substantiate the business case for collaborative efforts in designing and transforming diagnostic and interventional MRI suites.

For future reference

Preventive risk management emphasizes solid communication and education. MRI units offer good examples of the need for such preventive methodologies.

As MRI units move from diagnostic to interventional suites, from traditional devices to more high-powered components, the need is great for a comprehensive look at everything from leasing, purchasing and training to infection control and patient safety. Good analytical tools, such as RCA, offer evidence-based data to guide a more collaborative decision-making model.

With such information, strong risk management methodologies can be put in place to address actual and potential patient-safety dangers that are apt to emerge with future generations of MRIs.

It is a challenge that can be overcome by people working together including materials management practitioners, care providers, infection control practitioners and risk management professionals.

In the end, costs can be controlled and patients provided quality, safe diagnostic and interventional MRI services. MMHC

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Article reprinted with permission from **Materials Management in Health Care** January 2006 Volume 15 No. 1
Published by Health Forum Inc., Printed in U.S.A.