Focus Paper: A Need for MRI Safety

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Nurses have been voted the most trusted profession for the last 23 years, according to the Gallup poll of 2023 (Firth, 2024). This is no surprise, as nurses are advocates, educators, and caregivers to patients and families. Furthermore, nurses are at the forefront of healthcare institutions, providing direct patient care through evidence-based practices, often being the most knowledgeable about each patient's care. As advocates, nurses educate and fight for the health and safety of the public, identifying problems and finding solutions through research and quality improvement projects. Nurses adapt to the continuous evolution of healthcare, creating new solutions and pathways to drive their care (Freeman, 2024).

As nurses, we must continue to be the liaison between patients and their healthcare team. Patients and families trust nurses to deliver high-quality, safe, evidence-based care. Nurses help patients and families make educated decisions and guide them toward health and wellness. Patients and families rely on nurses to uphold the ethics of their profession, refusing to provide care that will have adverse outcomes or effects (ANA Center for Ethics and Human Rights, 2016). As healthcare continues to change, nurses play a pivotal role in embracing the change and adapting procedures and care based on the needs of society. There is always room for improvement in healthcare; as nurses, we can make a difference by continuing to look at these areas of improvement and collaborate with other stakeholders to find ways to improve healthcare quality.

I currently function as a clinical supervisor in the sedation unit of a large pediatric teaching hospital. The sedation unit provides care for patients receiving sedation or general anesthesia for all radiology modalities in the hospital. As the supervisor, I oversee the unit's daily operations, ensuring we are staffed appropriately at all sites and in all modalities. I collaborate

with the leaders of the other teams we work with daily (general anesthesia providers, sedation providers, and radiology). In addition, I partner with our clinical nurse expert on education needed for staff and aid in disseminating the education. I am also the lead facilitator for our unit's annual sedation simulations. As the facilitator, I work with our sedation providers to create scenarios based on adverse events and provide educational experiences for our staff to learn from. My position allows me to continuously look at the function of our unit and how we can improve patient quality and safety outcomes.

Our unit is comprised mainly of senior staff, as we only hire nurses with ICU or ER experience. This seasoned staff has specialized knowledge and skills to provide the safest, most efficient care for patients needing sedation or anesthesia. We are a close-knit unit focused on teamwork and efficiency. We consistently have packed schedules and continuously pivot and adapt as changes occur with the schedule and patients daily. We are confident in our colleagues and know we have support whenever a patient emergency occurs.

We are the only nurses in the institution who can provide these services for radiology. MRI has specific safety protocols and regulations that require specialized training and knowledge. This makes our unit the experts in the area; while being experts allows us to provide education to the rest of the institution, it prevents us from receiving staffing help when short-staffed. We cannot accept any float nurses as they are not able to receive the proper training and orientation in our area in a short amount of time. The institution seems to not fully understand the severe impact that short staffing can have on our unit and the safety of the patients and staff in the area.

Problem Identification and SWOT Analysis

To conduct a SWOT analysis of my workplace, I met with my closest colleague in the management of my department and my direct supervisor. Because of his expertise in analysis of the data we collect daily, I also included the director of data services. To round out the group, I invited a staff nurse.

Strengths

I identified three areas of strength: specialized knowledge, active partnership with child life specialists, and the development of a behavior health committee. As previously stated, our unit requires specific training and expertise to function in our unit. This allows our team to be specialized and truly the experts in our field. We understand the risks of MRI, CT, nuclear medicine, interventional radiology, and PET scanners. We have studied the multiple sedation medications and know how to maintain a patient's airway when sedated. Furthermore, our unit's utilization of child life services has allowed many patients to complete their studies without the need for sedation or general anesthesia. We also utilize child life to create plans to provide our young patients with the safest, least traumatizing experience.

Finally, this year, we have seen an increase in behavioral health patients needing sedation services to complete procedures such as lab draws, EKGs, etc. We have created a Behavioral Health Committee that works toward finding best practices for our neurodivergent patient population. This team consists of staff members from different disciplines, such as child life, security, behavioral health, nursing, providers, etc.

Weaknesses

During my SWOT analysis, I discovered many weaknesses within our unit. These include MRI safety, staffing fluctuations, a high number of cancellations on the day of service, siloed

communication between MRI, GA, Sedation, underutilization of child life services, infrequent timely documentation, parental presence in induction/procedures, poor communication with oncology, and delayed schedules. Staffing fluctuations are common in healthcare, and we are familiar with these issues. We often have ebbs and flows of staffing, which can significantly affect our daily operations as we function in a high-paced environment with a lot of patient turnover daily.

Siloed communication between the sedation, general anesthesia, and MRI teams has caused communication errors, fractured staff relations, and increases the potential for patient safety events. While we have a great relationship with our Child Life colleagues, there is still a great need to improve the utilization of their services. We continue to see high numbers of day-of-service (DOS) cancellations due to patient illness, late arrivals, and not having fasted appropriately. A lot of these DOS cancellations have to do with lapses in communication.

Due to human factors, we also see an inconsistency in timely documentation. Not all sedation cases go smoothly, often requiring the nurse to be completely hands-on from the time she receives a patient until the time she is discharged. Since the nature of our unit is fast-paced, nurses typically receive another patient as soon as they discharge one, often having to delay documentation. Delayed schedules are a consistent struggle in our unit. Many factors influence this delay, including late patient arrivals (both inpatient and outpatient), sedation or anesthesia emergencies, difficult IV access, and scans taking longer than expected. One little misstep can throw off an entire schedule by at least an hour.

Finally, the two weaknesses that I think impact our area the most are poor communication with oncology colleagues and MRI safety. We share many patients with oncology, and these patients tend to schedule their appointments all on the same day. We have continued to see an

increase in patients requiring multiple IV sticks or central line access due to a lack of communication between the two units. Perhaps most importantly, MRI safety is a topic that needs to be addressed because of the inherent risk of causing catastrophic errors. In this paper, I will discuss the importance of MRI safety and the need for a quality improvement project in my unit.

Opportunities

The identified opportunities include the need for increased knowledge about sedation and anesthesia services in our patients' families and their awareness of our behavior health services. Indeed, more families have become educated about sedation and anesthesia topics, allowing for open conversations about sedation medication usage. These conversations enable parents to feel more comfortable and trusting of our team. This knowledge also allows for more parents to be open to having their children attempt procedures without sedation or anesthesia by utilizing child life services. Additionally, the knowledge of our behavioral health services has allowed patients who are neurodivergent or in need of behavioral health services to receive the necessary care safely and efficiently. Our program has reached parents from all over the tri-state area, allowing them to travel to our hospital and receive this care.

Threats

Threats include patients and families coming for their appointments while sick, lack of education about our unit by staff in the rest of the hospital, inpatients arriving late, and EPIC limitations. When parents come to their appointments with a sick patient, they are jeopardizing the safety of their child. If the child outwardly shows upper respiratory symptoms, our team will cancel. However, if it is not as obvious, there is a chance that the patient will suffer from adverse events due to the nature of the sedation medications and their viral illness.

The rest of the institution needs to be more knowledgeable about the ins and outs of our unit. This includes how our schedules flow, the importance of MRI safety, the necessity of specific monitoring for inpatients, etc. This lack of education can cause schedule delays, possible patient or staff member injury, and inappropriate team communication. Finally, with all technology, there are limitations to communication and education through EPIC, our electronic medical record.

Quality Improvement Project Identification

The risks associated with MRI procedures are essential topics that must be addressed for the safety of patients and the staff in the environment. MRI magnetic fields are always on and can potentially pull any ferrous-containing metals to the bore at a high rate, potentially harming those in the MRI environment (Hossen et al., 2020). As our unit cares for both inpatients and outpatients, the staff in our unit and the hospital must be educated about the safety of MRI.

Since I came to the sedation unit, at least five significant safety errors have occurred because of non-MRI-safe objects entering Zone 4. These include pens, keys, jewelry, watches, toys, and an IV pole. While no harm has been done to the patient, there was an incident where an anesthesia fellow was pinned to the bore by an IV pole. This incident caused harm to the provider, delayed patient care, caused a decant in the MRI, and required a 24-hour shutdown of the MRI machine.

Many inpatients are transported and monitored by an inpatient team unfamiliar with the MRI environment. While our team does its best to educate in real-time, the full effect of the importance of ferrous-free in the environment is not retained. In addition to this lack of knowledge, there is variability in the people required to be in the MRI environment due to the nature of pediatric care. The general anesthesia teams, sedation teams, and inpatient teams

constitute a large pool of people, and consistent education of all is difficult. This continues to increase the risk of an MRI safety event (Sotardi et al., 2021).

Education and developing a standardized procedure of care for inpatients being transferred to the MRI environment are imperative to decreasing the likelihood of an MRI safety event. I believe that this project aligns with the institution's mission of safety as a priority and the National Patient Safety Goals (Division of Healthcare Quality Evaluation and Improvement, 2024).

Baseline and Benchmark Data

I plan to utilize the data collected from my institution through our *Keeping All Patients Safe* (KAPS) files. These are non-punitive reports that are documented when an error occurs. We can track trends and pull data from any timeframe. I also plan to utilize data from *Apparent Cause Analyses (ACAs)* and *Cognitive Systems Analyses (CSAs)* that have occurred due to previous MRI safety events. Our institution does have MRI safety programs in place, such as MRI Safety Officers (MRSOs) and daily safety huddles, as suggested by some of the literature (Sotardi et al., 2021). However, there is still apparent room for improvement.

Regarding benchmark data, I plan to use the literature that emphasizes the importance of MRI safety knowledge and education. I plan to look at other institutions' policies and procedures regarding MRI safety and see if there are differences in practice at our institution. Healthcare continues to evolve, as does the size of our unit, continuously causing us to look at our current processes and find ways to revamp and improve them for the safety of our patients and staff.

Potential Quality Improvement Project

MRI images are necessary in many patients' care plans as they provide soft tissue images without radiation exposure (Mittendorff et al., 2021). The need for these scans in complex

patients, however, increases the risk of injury if a well-suited MRI safety plan is not in place. Our institution has had frequent MRI safety mishaps within the last few years, resulting in a need for another look at our current MRI safety plan. This review of literature will describe the nature and prevalence of increased MRI safety errors and events. This review of literature will also include current evidence-based strategies that could be implemented to improve MRI safety education for staff outside of the MRI environment, as well as stricter MRI safety plans for the pediatric teaching hospital in which I practice.

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