Patient Safety Tip of the Week

December 11, 2018 Another NMBA Accident

Mistaken administration of NMBA's (neuromuscular blocking agents) is rare but, unfortunately, the consequences are usually catastrophic. Actually, maybe not so rare. The Pennsylvania Patient Safety Authority reported 154 event reports over a 5-year period that mentioned medication errors involving the use of NMBAs (PPSA 2009). The most common medication error event types associated with this class of medications were wrong-drug errors (37%) followed by wrong-dose/overdosage errors (16.2%). Most importantly, 47.4% of the intended medications were not NMBAs. Moreover, the risk of patient harm was 13 times greater for NMBA's when compared to all medication errors reported to the Authority.

We've reported on cases of errors related to NMBA administration several times over the years (see full list at the end of today's column). But, another unfortunate incident with an NMBA was recently reported (NewChannel5 2018), (Kelman 2018a), (Kelman 2018b), (Ellison 2018). The case came to the attention of the media when CMS issued a termination letter to the hospital (CMS apparently later accepted the hospital's plan of correction and rescinded the proposed termination). We've had to piece together details from multiple media reports and CMS's inspection report (CMS 2018) that led to its action. These do provide enough information about the incident for multiple lessons to be learned.

A 75 y.o. woman with an intracranial hematoma (media reports say subdural hematoma but the CMS inspection report says it was an intraparenchymal hematoma) was admitted to a hospital's Neuro ICU. Two days later she was alert and oriented and stable and was now in the Neuro Stepdown Unit and waiting for a bed on the regular floor. On that day she was sent to the radiology department for a total body PET scan. The patient told staff about claustrophobia and a physician ordered Versed 2 mg intravenously for sedation for the procedure. PET scan staff requested a nurse from the Neuro ICU administer the Versed because their own nurses would not be able to perform monitoring of the patient.

That nurse from the Neuro ICU was already going to the ER to administer a swallowing study. The nurse looked in the patient's profile on the ADC (Automated Dispensing Cabinet) for the Versed but could not find it. (The ADC was in the Neuro Intensive Care Unit, not in radiology.) Therefore, the nurse used the override function on the ADC to search for it. The nurse recalled talking to an orientee about the swallowing study while entering the first two letters "VE" into the ADC. The first medication on the list was chosen. The nurse did not recognize that the medication chosen was vecuronium, not Versed. The nurse looked at the back of the vial to see how to reconstitute the medication but did not recheck the name of the medication on the vial. The nurse grabbed a sticker

from the patient's medication file, a handful of flushes, alcohol swabs, and a blunt-tip needle. The nurse put the medication vial in a baggie and wrote on the baggie "PET scan, Versed 1-2 mg" and went to Radiology to administer the medication. The nurse found the patient waiting in the PET scan area, reconstituted the medication, and administered the medication intravenously to the patient, then left the PET scan area. In the CMS interview the nurse could not remember the exact dose administered but thought it was 1 milliliter. The nurse put the leftover medication in the baggie and gave it to another nurse. The nurse did not monitor the patient after administering the medication.

The order for Versed had been entered at 2:47 PM. It was verified by a pharmacist at 2:49 PM. It was never dispensed from the ADC. Vecuronium, however, was dispensed from the ADC at 2:59 PM, via the override function. There was never an order for vecuronium and no verification from a pharmacist.

The nurse did not document the administration of the medication. Apparently the nurse had been told that the "new system" would capture it in the MAR.

Some time after the administration of the vecuronium the patient was found unresponsive. CPR was administered and resuscitation efforts included intubation and restoration of a heart beat. The patient was not actually in the PET scan when she suffered the arrest. The patient was first in an "injection room" where she received injection of the radioactive tracer and then the injection of what was thought to be Versed. The patient was then moved to a "patient room" where they are expected to wait for up to an hour for the radioactive tracer to circulate. It was in this room where the patient was found by a transport attendant to be "unresponsive". Radiology technicians were able to visualize the patient in that room (via camera) and noted she had her eyes closed but resolution was not good enough for them to detect whether she was breathing or not. It was estimated that 30 minutes had elapsed from the time the patient was put in that "patient room" and the time she was found unresponsive.

Nurses in the Neuro ICU heard the code call to Radiology and wondered whether it might be for their patient who was having a PET scan. It was their patient, and she was brought back to the Neuro ICU after the resuscitation. There a second nurse showed the baggie to the first nurse and asked "Is this the med you gave the patient?". When the nurse answered "yes", the second nurse said "This isn't Versed. It's vecuronium."

The patient was subsequently put on comfort care after discussion with family about the neurological sequelae and died the following day.

As sad as this case is, there are numerous lessons learned that we hope can help other hospitals avoid similar incidents. As with almost every incident that results in serious patient harm, there was a cascade of errors, contributing factors, and root causes that played roles in the unfortunate outcome. You will likely find that several of vulnerabilities identified could be present in your own organizations.

Bypassing medication safety safeguards
In most places in a hospital a medication is ordered via CPOE. This ties into pharmacy computer systems, an EMAR (electronic medication administration record), and ultimately a bedside medication verification (barcoding) system. One problem we often see in hospitals is that the bedside medication verification (barcoding) system may not be available in the Radiology suite. In this particular case, the barcode implementation in Radiology was "pending".

Overrides are problematic.
Overrides are really intended for truly STAT or emergent situations. They often are used in response to verbal orders. Since they bypass pharmacist review and barcode verification safety nets, their use in non-emergent situations increases the likelihood of errors. But overrides, of course, are built into all ADC's (Automated Dispensing Cabinets). Hospitals do monitor the frequency of overrides as part of their quality improvement programs. That data is used to identify inappropriate overrides or to identify the need for better access to certain drugs. However, that is a retrospective process. What is needed is something to better ensure the correct drug is being removed from the ADC during an override. Requiring an independent **double check** would make sense. But double checks have their own problems. The statistic we often give is that an inspector fails to recognize an error in someone else's work 10% of the time. That is why truly independent double checks (where each person independently reviews the order or other issue) are necessary when doing things such as administration of a high-alert drug. (See our October 16, 2012 Patient Safety Tip of the Week "What is the Evidence on Double Checks?"). However, the literature suggests a medication error reduction of about 30% when using a double check system. ISMP Canada (ISMP Canada 2005) describes the independent double check process and calculates that independent double checks would reduce the error rate of a process having an error rate of 5% all the way down to 1 in 400.

In this case, since the medication was removed from an ADC in the Neuro ICU, there should have been ample accessibility to other nurses who could have been involved in a double check. Had this been an ADC in the Radiology suite, one answer we often get is "but we only have one nurse in the suite". Well, the person doing the double check does not need to be a nurse. It can be another qualified healthcare professional, like the radiologist or the other physician who ordered the drug.

In our December 9, 2014 Patient Safety Tip of the Week "More Trouble with NMBA's" we mentioned a **"mental" double check** in a similar case. The nurse could have thought in the current case "I don't recall ever having to reconstitute Versed before…"

Most ADC's have the capability of presenting messages when certain drugs are selected. In this case, there apparently was a warning in a red box visible for an override stating that it should be for STAT orders (but apparently no warning that this medication should only be for patients who are intubated and mechanically ventilated or in the process of

being intubated). We suspect it might have been possible to **program the ADC to force the nurse to verify the patient was intubated/ventilated or about to be intubated**. A message that the override is only for STAT orders is much too vague (the nurse obviously assumed there was an urgent need for the medication).

The Joint Commission now includes assessment of the override process as a performance element in its medication management standard (Traynor 2018).

In 2015 the Penssylvania Patient Safety Authority published an advisory about overrides of healthcare technologies (Grisinger 2015). **Over 75% of the overrides involved ADC's**. The most common type of event involving overrides of ADCs were unauthorized medications (e.g., obtaining a medication for a patient with no prescribed order for the patient), followed by wrong-drug events and wrong dosage form events (e.g., selecting a sustained-release product instead of the immediate-release form, selecting an oral formulation instead of the injection) (Figure 4). A majority of the unauthorized medication events specifically stated there were no orders for the medication, and over 30% of the unauthorized medication events involved a high-alert medication. Many of the cases involved withdrawal of a medication from the ADC before pharmacist verification or when the pharmacy was closed.

One of the things we'd look at during an RCA on this case would be whether overrides were used commonly by multiple staff in this unit (that is, had routine overrides become part of the culture of the unit?). We'd also want to know if double checks were required for all ADC overrides. One of the problems we see is that requirements for double checks typically appear in a hospital's "Transfusion" policy and the "High Alert Medication" policy and often the latter just refers to specific medications or drug classes. These often do not state that double checks should be done for all ADC overrides.

Why is vecuronium in the ADC in the first place?

It is essential that NMBA's only be kept in areas where they are truly needed (OR, ICU, ER). They should not be stored in floor stock or ADC's on other units. Keeping NMBA's out of the ADC (or other source of floor stock) in other areas is probably the most important action to prevent nurses from inadvertently grabbing an NMBA and administering it.

Before we had access to the CMS Inspection Report, we had thought the ADC might have been in the Radiology suite. That would have been totally inappropriate. But the vecuronium in this case was taken from the ADC in the Neuro Intensive Care Unit, not one in radiology. Even on those units where they are needed, NMBA's should be kept segregated from other drugs, such as in lidded containers or rapid sequence intubation kits (ISMP 2016).

ISMP (Institute for Safe Medication Practices) has very important practical recommendations regarding accessibility and storage of NMBA's (ISMP 2016). Regarding limiting access, ISMP recommends:

- Eliminate the storage of neuromuscular blockers in areas of the hospital where they are not needed.
- Allow unit stock only in the OR, ED, and critical care units where patients can be properly ventilated and monitored.
- Consider limiting the number of neuromuscular blockers on formulary, and eliminate storage from pharmacy stock when possible.
- Regularly review these storage areas, both inside and outside of the pharmacy, including agents that require refrigeration, and consider the potential for mix-ups.
- Limiting access to these products is a strong deterrent to inadvertent use.

And regarding storage, ISMP recommends:

- Segregate, sequester, and differentiate all neuromuscular blockers from other medications, wherever they are stored in the organization.
- In areas where they are needed, place neuromuscular blockers in a lidded box or in a rapid sequence intubation (RSI) kit.
- One option is a highly visible red-orange storage container available commercially.
- If neuromuscular blockers must be stored in ADCs, keep them in separate lidded pockets, away from other drugs.
- Also segregate neuromuscular blockers from all other medications in the pharmacy by placing them in separate lidded containers in the refrigerator or another secure, isolated storage area.
- Organize anesthesia carts and trays to avoid the proximity of look-alike vials, syringes, or bags, and display the labels so they are readily visible.

No monitoring?

The patient was inadequately monitored in this case. In fact, there was no monitoring after the administration of what the nurse and radiology staff thought was a sedating agent. Though the nurse did not know vecuronium had been administered and, instead, thought Versed (midazolam) had been administered, there should have been monitoring for the latter. We don't know how many PET scan sedation protocols include provisions for monitoring. Probably the vast majority of PET scans are done on outpatients. But an inpatient with a neurological problem like an intracranial hematoma, and who is going to be alone in a room where they cannot be directly observed, must be monitored. Such patients may be more vulnerable to the respiratory depressant effects of benzodiazepines, other sedative/hypnotic drugs, and opioids. Monitoring should include at least EKG monitoring and pulse oximetry (capnography would be even better but would be technically difficult in this setting). Such monitoring would likely have identified the respiratory arrest at a time when intervention might have been successful in preventing brain injury.

The patient was first in an "injection room" where she received injection of the radioactive tracer and then the injection of what was thought to be Versed. The nurse who administered what he/she thought was Versed left the PET suite shortly after administering it. The patient was then moved to a "patient room" where they are expected

to wait for up to an hour for the radioactive tracer to circulate. Radiology technicians were able to visualize the patient in that room (via camera) and noted she had her eyes closed but resolution was not good enough for them to detect whether she was breathing or not.

Preparation for a PET scan should include a question about possible claustrophobia, which might flag the need for sedation. Actually, mild sedation is often given prior to PET scan even when claustrophobia is not an issue. That is because patients must lie still during the scan. A typical scan might take 20-40 minutes. However, patients are to minimize activity during the hour after injection of radioactive tracer in order to maximize tracer going to areas of interest rather than to areas affected by activity. So sedation may be needed for about an hour and a half in all. And choice of sedating agent is important. There are some agents that are contraindicated because they may interfere with specific types of tracer or tracer localization. Bottom line: **there should be a pre-PET questionnaire** and also **a PET sedation protocol** that would include a section about what monitoring, if any, will be necessary.

LASA (look-alike, sound-alike) error, juxtaposition error, or truncation error?
Maybe we need to add a category "**spell-alike**" since the similarity was just in the first two letters of the drugs that were confused. Rather than being a true LASA error, it really is one of two types of error we've seen over and over in the EMR era: the **juxtaposition error** (also known as the cursor error or pick list error and other names) in which we erroneously click on an item in a drop down list different from the intended one, or the **"truncation" error**, where is a tendency for us to select the first item in a list on a computer screen and fail to scroll down to see if there are other selections that might be correct. In this case, the nurse selected the "first medication on the list".

Ironically, vecuronium has been implicated in "sound-alike" instances of other NMBA accidents in the past. Norcuron (a brandname for vecuronium) has been mistaken for Narcan, and vecuronium for vancomycin. But this new instance of the truncated "VE" leading to mistaking vecuronium for Versed should be added to that list.

Problem: brand names vs. generic names
The search function on the ADC in this case defaulted to generic names. Versed is the brand name for midazolam. Had the nurse switched the search mode to brand names, perhaps Versed would have been found under the patient's profile (since a pharmacist had already verified the order). But this also raises another question: should the order have been converted to "midazolam" rather than "Versed" during order entry via CPOE? Especially since the ADC's default to searching for generic names, one would think that CPOE should similarly default to generic names for the sake of consistency. Yes, there are a few (very few) instances where a brand name drug is intended rather than a generic but there are ways to present that option in CPOE.

Was the PET scan indicated? Was there an adequate plan for intrahospital transport?

When we do a root cause analysis (RCA) on any incident that occurs during a procedure, one of the first questions we ask is "was the procedure indicated?". We, of course, don't have access to the medical details of this case so we cannot answer that question. In our August 25, 2015 Patient Safety Tip of the Week "Checklist for Intrahospital Transport" we mentioned studies suggesting that care plans were changed for patients after intrahospital transports in only 24-39% of cases. So one really needs to consider how likely the imaging study (or other procedure the patient may be going for) is really going to change patient management. In that column we noted an excellent review of issues related to intrahospital transport by Day (Day 2010), who describes "**the 5 W's**. The first "W" is "**Why**" or "Why does the patient need to leave the ICU for the procedure?". Important questions to ask here are "Are there bedside alternatives for the procedure? And "Is the patient's condition stable?". If the patient is considered unstable, the next questions are "Is the transport for a lifesaving intervention?" and "Is the transport to a diagnostic test pivotal to decision for emergent plan?".

(We hate to speculate when we don't have the necessary medical information, but we suspect there was likely a legitimate indication for the PET scan here. There was probably something about the intracranial hemorrhage that made physicians suspect the possibility of a hemorrhagic metastasis (certain primary cancers may be associated with hemorrhagic brain metastases). So, they were probably performing a total body PET scan looking for a potential tumor source.)

Preparation for a PET scan should include a question about possible claustrophobia, which might flag the need for sedation. Actually, mild sedation is often given prior to PET scan even when claustrophobia is not needed. That is because patients must lie still during the scan. A typical scan might take 20-40 minutes. However, patients are to minimize activity during the hour after injection of radioactive tracer in order to maximize tracer going to areas of interest rather than to areas affected by activity. So sedation may be needed for about an hour and a half in all. And choice of sedating agent is important. There are some agents that are contraindicated because they may interfere with specific types of tracer or tracer localization. Bottom line: there should be **a pre-PET questionnaire** and also **a PET sedation protocol** that would include a section about what monitoring, if any, will be necessary.

Then, when preparing a "**Ticket to Ride**" intrahospital transport plan (see our numerous coloumns on "Ticket to Ride" and intrahospital transport below), it could have been decided that the patient would need monitoring after administration of a sedating agent and appropriate monitoring equipment would have been sent with the patient to Radiology, with accompaniment of a nurse to monitor the patient.

Communication

The PET scan staff recognized the need for monitoring the patient after sedation. That is why they called the Neuro ICU and requested a nurse come down to administer the

sedation. But it is not clear that the message for the need to monitor the patient was ever conveyed to the nurse who was sent down to administer the intended sedation. “RN #2 had asked RN#1 to go downstairs to Radiology PET scan and administer the medication Versed to Patient #1 because the patient was not able to tolerate the PET scan procedure or they would have to send the patient back and reschedule it.”

A radiology technician asked the patient's nurse (RN#2) if the patient would need to be monitored and he/she said “no” and he/she would send another nurse.

So it is not clear whether RN#1 knew that he/she was expected to monitor the patient in any way other than the brief observation that is done after administration of any medication.

Was there an adequate warning on the vial of vecuronium?

A warning on an NMBA must capture the attention of all involved and convey the message that this medication is to be used only in patients who are intubated or in the process of being intubated. For warnings we usually use bold letters and bright colors. Regarding labeling, ISMP (Institute for Safe Medication Practices) had the following recommendations (ISMP 2016): Place auxiliary labels on all storage bins and final medication containers (e.g., vials, syringes, IV bags) of neuromuscular blockers that state: “**WARNING: PARALYZING AGENT—CAUSES RESPIRATORY ARREST**,” to clearly communicate that respiratory paralysis will occur and ventilation is required.

We don’t think that is enough. The vial in the current case did have a red top and message “WARNING: PARALYZING AGENT”. Yet that was not conspicuous enough to get the attention of the nurse. It seems to us you need to put it in some unique sort of container, perhaps a cardboard or plastic “cage” or something that makes it more difficult to remove as a means of attracting attention to the high-risk nature of the medication. But even that could be risky if it obscures any warning message. You’d have to add the same warning to the outside of the “cage”. The ISMP recommendations for storage outlined in an earlier paragraph do serve as warnings. Also, some ADC’s do have messaging capabilities. They could be programmed to request confirmation that the intended patient is intubated or about to be intubated before an override request is granted.

Also, don’t forget the importance of warning labeling anywhere else the NMBA is used (IV bags, IV lines or ports, syringes, etc.). If in an IV infusion, be very careful not to cover any of the important warning information.

Role of the “new system”

The hospital had rolled out its new IT system for documenting the month prior to the incident and had expanded bar code scanners to the ED, PACU, and Holding Rooms. As above, Radiology was next on the list for bar code implementation. Other than the issue of not knowing how to document the administration of a drug in Radiology, it is not clear

whether there were any aspects of the "new" IT system that might have contributed to confusion in this case.

Multitasking
The nurse involved was clearly multitasking. When asked to go down to the PET suite, the nurse was already on the way to the ER to perform a swallow test on an ER patient. Moreover, the nurse was orienting an "orientee". As noted above, the nurse was explaining the need for and performance of the swallowing test to the orientee while inputting the medication name into the ADC search function. He/she than also had to reconstitute the medication. And he/she was apparently unfamiliar with the location of the PET scan unit and had to ask directions to get there. Then, after administering the medication to the patient in the PET unit, the nurse left to go to the ER for the swallowing study.

RN was the "help-all" nurse, not the patient's primary nurse
The involved nurse on that day was a "help-all" nurse. There apparently was no formal description of the role of the "help-all" nurse but it appears that in this role the nurse is not the primary nurse for any one patient but rather interacts with multiple patients on the unit as needed. It's not clear how much information, if any at all, that nurse would have had about the patient who was now down in the Radiology department. The patient had been described as stable and awaiting transfer to a regular floor, so it is conceivable this nurse may have had no contact or interaction with this patient prior to going to the Radiology suite.

The **time and date**
Most of the important events in this case occurred around **3:00 PM**. That is a traditional "**change of shift**" time for nursing and many other healthcare workers. Note that there is nothing in the CMS inspection report to indicate that change of shift issues contributed in this case. But it's worth reminding our readers that change of shift times are periods of vulnerabilities to errors.

Why is **the date** important? It was December 26, 2017, the day after Christmas. As we've wished our readers "Happy Holidays" in several of our December columns over the years, we've also cautioned them to "be careful out there". We don't have statistics to verify that medical errors and incidents are more frequent around the holidays. But we have had two dear friends suffer serious incidents while inpatients on Christmas Day. Staffing issues, coverage issues, and distractions are more common on holidays and are potential factors contributing to incidents. Again, there is nothing in the CMS inspection report to suggest there were staffing issues. We do know that the PET scan unit was very busy that day. Perhaps there were time pressures on either end (due to lack of ancillary studies the previous day). We'll never know but it is worth our annual reminder to you all to be extra vigilant around the holidays.

Time pressures?
The radiology technician mentioned it was a busy day and the PET unit had a full schedule. They were going to send the patient back if ICU staff could not come down to administer the drug. RN#2 had asked RN#1 to go downstairs to Radiology PET scan and administer the medication Versed to Patient #1 because the patient was not able to tolerate the PET scan procedure or they would have to send the patient back and reschedule it. So there probably was some time pressure. Perhaps this contributed to a sense of "urgency" that made use of an ADC override seem appropriate.

The Radiology suite is a dangerous place!
The case, of course, also illustrates another point we've made in multiple columns: the radiology suite is a dangerous place. We've identified the radiology suite as a high-risk area for untoward incidents in many of our columns listed below, noting that most such incidents have little to do with the radiologic procedure being done. It simply reflects that many vulnerable patients with complex medical problems need to go to radiology, where many of the safety features we use elsewhere may slip through the cracks.

Other issues:
The CMS inspection report discussed several other issues, including lack of documentation of the error/event in the chart, failure to inform the medical examiner of the drug error, lack of attempt to get an autopsy, failure to report the event to the state, and lack of alacrity in moving this sentinel event up through the system overseeing quality and patient safety and performing nursing education.

Things done right
When we perform RCA's or review investigations, we always also try to comment on things that were done correctly.

- Both the CMS inspection report and a statement issued by the hospital (Commins 2018) indicate that the error was promptly **disclosed** to the patient's family. But, it is not know from either the CMS report or media reports whether apology and followup also occurred. See our prior columns on disclosure and apology listed below.
- The hospital did sequester the baggie containing the medication vial, syringes, etc. That is one of the items on our Serious Incident Checklist (see our July 24, 2007 Patient Safety Tip of the Week "Serious Incident Response Checklist").
- The hospital did at least consider the well-being of the nurse involved in the incident, referring him/her to an employee counsellor. However, our several columns on "**the second victim**" discuss that simple referral to EAP (employee assistance programs) is not adequate and, in some cases, may even be detrimental. A second victim program needs to be much more comprehensive. Problematic is what to do in the case of a healthcare worker who is terminated, as in this case.

- The hospital subsequently removed vecuronium from the ADC's, though rocuronium was left on the list after the pros and cons were discussed in numerous venues.

Blame and shame?

The CMS inspection report notes that the involved nurse was terminated shortly after the incident. On the day of the incident the nurse ended up in the nurse educator's office (about 4 PM) once the nature of the mistake became evident. He/she gave his/her phones to the Charge Nurse and the orientee was assigned to someone else. The nurse then filled out incident reports and recalled leaving the nurse educator's office around 8 PM. The nurse was described as "distraught" after the incident. When he/she returned to the hospital about a week later, he/she was notified of termination and was sent to an employee resource counsellor "for (his/her) personal well-being".

When interviewed by CMS investigators, the Director of Clinical Risk Management said "In the end, there were so many things the nurse did - the 5 rights, basic nursing care." And the RO (Regulatory Officer) stated, "The number of safety points this nurse went through was numerous."

Was termination of the nurse justified? There is little question that the nurse made some egregious errors (failure to verify and administer the correct medication, failure to monitor the patient, use of the override function on the ADC for a non-urgent medication, failure to document administration of the medication, etc.). But one question we would always ask when personnel actions are contemplated after a serious incident is "**might another nurse have possibly made a similar error given the same set of circumstances?**". There were **plenty of system issues** here that contributed to the incident and put that nurse in a position to make that mistake. We need to do a better job to make sure we never put any of our staff in such jeopardy. That nurse was likely left at the "sharp end" of an **error cascade** that had multiple root causes and contributing factors upstream at the "blunt end".

What were those circumstances?

- There was poor planning. A pre-PET scan questionnaire could have predicted there would be a need for sedation. Then, when preparing a "Ticket to Ride" intrahospital transport plan, it could have been decided that the patient would need monitoring after administration of a sedating agent and appropriate monitoring equipment would have been sent with the patient to Radiology, with accompaniment of a nurse to monitor the patient.
- The decision that the patient did not need monitoring (with EKG, pulse oximetry, etc.) was actually made by someone other than the nurse sent to inject the sedating agent.
- The nurse likely knew little about the patient since he/she was not the primary nurse for that patient.
- The vecuronium was too easily accessible in the ADC.
- Barcoding had not yet been implemented in the Radiology suite.
- The nurse was assigned multiple tasks at the same time.

- System allowed for order for a brand name when ADC search defaulted to generic names (lack of consistency of systems)
- System allowed override for something that was not truly urgent
- The override alert on the ADC just warned overrides are for STAT orders rather than specifically warning that this agent is to be used only in patients who are intubated/ventilated or about to be intubated
- Warning label on the NMBA not salient enough?

So, might another nurse have possibly made a similar error given the set of circumstances? We think the answer is "yes". In fact, that is why we are using this case today to provide valuable lessons learned so your hospital does not have similar vulnerabilities.

Ironically, the one person likely to never again make these errors was terminated. The hospital also lost an opportunity to have someone involved in a horrible incident tell the story and describe how it affected their own life. Most of you have heard some of the ISMP personal stories of nurses or pharmacists involved at the sharp end of serious incidents. There is nothing more compelling in getting people to focus on patient safety than these stories. You come away from such a story and say "Wow. That could happen here." Or "That could have happened to me.".

We hope you'll go back to our December 9, 2014 Patient Safety Tip of the Week "More Trouble with NMBA's" that outlines many lessons learned from another NMBA accident and has recommendations about NMBA safety. You'll also want to look at ISMP's 2016 "Paralyzed by mistakes" article (ISMP 2016) that outlines steps your facility should be taking to improve NMBA safety. The 2009 PPSA report (PPSA 2009) also recommended strategies to address these problems such as limiting access to NMBAs, segregating NMBAs from other medications, sequestering and affixing warning labels to vials of NMBAs stocked in the pharmacy, and requiring independent double checks before dispensing and administering NMBAs.

Update: See also our Patient Safety Tips of the Week for February 12, 2019 "From Tragedy to Travesty of Justice" and January 1, 2019 "More on Automated Dispensing Cabinet (ADC) Safety"

Some of our prior columns on neuromuscular blocking agents (NMBA's):

June 19, 2007 "Unintended Consequences of Technological Solutions"
July 31, 2007 "Dangers of Neuromuscular Blocking Agents"
November 2007 "FMEA Related to Neuromuscular Blocking Agents"
May 20, 2008 "CPOE Unintended Consequences - Are Wrong Patient Errors More Common?"
January 31, 2012 "Medication Safety in the OR"

February 7, 2012 "Another Neuromuscular Blocking Agent Incident"
October 22, 2013 "How Safe Is Your Radiology Suite?"
December 9, 2014 "More Trouble with NMBA's"

Some of our prior columns on patient safety issues in the radiology suite:

- October 16, 2007 "Radiology as a Site at High-Risk for Medication Errors"
- February 19, 2008 "MRI Safety"
- September 16, 2008 "More on Radiology as a High Risk Area"
- October 7, 2008 "Lessons from Falls....from Rehab Medicine"
- October 2008 "Preventing Infection in MRI"
- March 17, 2009 "More on MRI Safety"
- March 2009 "Risk of Burns during MRI Scans from Transdermal Drug Patches"
- August 11, 2009 "The Radiology Suite…Again!"
- January 2010 "Falls in the Radiology Suite"
- August 2010 "Sedation Costs for Pediatric MRI"
- January 25, 2011 "Procedural Sedation in Children"
- February 1, 2011 "MRI Safety Audit"
- October 25, 2011 "Renewed Focus on MRI Safety"
- March 13, 2012 "Medical Emergency Team Calls to Radiology"
- August 2012 "Newest MRI Hazard: Ingested Magnets"
- October 22, 2013 "How Safe Is Your Radiology Suite?"
- February 25, 2014 "Joint Commission Revised Diagnostic Imaging Requirements"
- July 2014 "New MRI Risks: for Staff!"
- July 1, 2014 "Interruptions and Radiologists"
- November 2014 "More Radiologist Interruptions"
- October 21, 2014 "The Fire Department and Your Hospital"
- June 23, 2015 "Again! Mistaking Antiseptic Solution for Radiographic Contrast"
- August 25, 2015 "Checklist for Intrahospital Transport"
- March 22, 2016 "Radiology Communication Errors May Surprise You"
- August 2016 "Guideline Update for Pediatric Sedation"
- October 2016 "MRI Safety: There's an App for That!"
- January 17, ,2017 "Pediatric MRI Safety"
- August 8, 2017 "Sedation for Pediatric MRI Rising"
- November 14, 2017 "Tracking C. diff to a CT Scanner"
- March 2018 "MRI Death a Reminder of Dangers"
- March 2018 "Cardiac Devices Safe During MRI But Spinners!?"
- April 2018 "Radiologists Get Fatigued, Too"
- May 2018 "Cost of Interrupting a Radiologist"
- November 2018 "OMG! Not My iPhone!"

Some of our prior columns on the "Ticket to Ride" concept:

- April 8, 2008 "Oxygen as a Medication"
- November 18, 2008 "Ticket to Ride: Checklist, Form, or Decision Scorecard?"
- August 11, 2009 "The Radiology Suite…Again!"
- March 13, 2012 "Medical Emergency Team Calls to Radiology"
- August 25, 2015 "Checklist for Intrahospital Transport"
- September 1, 2015 "Smarter Checklists"
- November 2016 "Oxygen Tank Monitoring"
- February 2018 "Oxygen Cylinders Back in the News"
- May 22, 2018 "Hazardous Intrahospital Transport"
- October 30, 2018 "Interhospital Transfers"

Some of our prior columns on Disclosure & Apology:

July 24, 2007 "Serious Incident Response Checklist"
June 16, 2009 "Disclosing Errors That Affect Multiple Patients"
June 22, 2010 "Disclosure and Apology: How to Do It"
September 2010 "Followup to Our Disclosure and Apology Tip of the Week"
November 2010 "IHI: Respectful Management of Serious Clinical Adverse Events"
April 2012 "Error Disclosure by Surgeons"
June 2012 "Oregon Adverse Event Disclosure Guide"
December 17, 2013 "The Second Victim"
July 14, 2015 "NPSF's RCA2 Guidelines"
June 2016 "Disclosure and Apology: The CANDOR Toolkit"
August 9, 2016 "More on the Second Victim"
January 3, 2017 "What's Happening to "I'm Sorry"?"
October 2017 "More Support for Disclosure and Apology"
April 2018 "More Support for Communication and Resolution Programs"

Other very valuable resources on disclosure and apology:

- IHI's "Respectful Management of Serious Clinical Adverse Events" (Conway 2010)
- The Canadian Disclosure Guidelines (Canadian Patient Safety Institute 2008)
- The Harvard Disclosure Guidelines (Massachusetts Coalition for the Prevention of Medical Errors 2006)
- The ACPE Toolkit (American College of Physician Executives)
- Oregon Patient Safety Commission Oregon Adverse Event Disclosure Guide.

Some of our prior columns on "the second victim":

- December 17, 2013 "The Second Victim"
- July 14, 2015 "NPSF's RCA2 Guidelines"

- June 2016 "Disclosure and Apology: The CANDOR Toolkit"
- August 9, 2016 "More on the Second Victim"
- August 2017 "ROI for a Second Victim Program"
- April 2018 "Joint Commission and the Second Victim"

References:

PPSA (Pennsylvania Patient Safety Authority). Neuromuscular blocking agents: reducing associated wrong-drug errors. PA Patient Saf Advis 2009; 6(4): 109-114 http://patientsafety.pa.gov/ADVISORIES/Pages/200912_109.aspx

NewChannel5. Vandy patient dies after nurse gives lethal dose of wrong drug; threatened Medicare reimbursements. NewsChannel5 (Nashville, TN) 2018; November 29, 2019 https://www.newschannel5.com/news/vandy-patient-dies-after-nurse-gives-lethal-dose-of-wrong-drug-puts-medicare-at-risk

Kelman B, Vanderbilt didn't tell medical examiner about deadly medication error, feds say. Nashville Tennessean 2018; Published Nov. 29, 2018 | Updated Nov. 30, 2018 https://www.tennessean.com/story/money/2018/11/30/vanderbilt-patient-death-medication-error-medical-examiner/2155152002/

Kelman B, At Vanderbilt, a nurse's error killed a patient and threw Medicare into jeopardy. Nashville Tennessean 2018; Published Nov. 29, 2018 https://www.tennessean.com/story/money/2018/11/29/vanderbilt-nurse-killed-patient-drug-death-medicare/2148545002/

Ellison A. CMS threatens to terminate Vanderbilt's Medicare contract after fatal medication error. Becker's Hospital CFO Report 2018; November 29, 2018 https://www.beckershospitalreview.com/finance/cms-threatens-to-terminate-vanderbilt-s-medicare-contract-after-fatal-medication-error.html?origin=qualitye&utm_source=qualitye

CMS (Centers for Medicare and Medicaid Services). Statement of Deficiences. Complaint #TN00045852. CMS 2018; Date of survey 11/08/2018 https://bloximages.newyork1.vip.townnews.com/wsmv.com/content/tncms/assets/v3/editorial/a/7e/a7ea6b5e-f41f-11e8-af7b-570ec9f22209/5c005d6899b8d.pdf.pdf

ISMP Canada. Lowering The Risk Of Medication Errors: Independent Double Checks. ISMP Canada Safety Bulletin 2005; 5(1): 1-2, Janauary 2005
http://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2005-01.pdf

Traynor K. Joint Commission eyes overrides of dispensing cabinets. American Journal of Health-System Pharmacy 2018; 75(9): e172-e173
http://www.ajhp.org/content/75/9/e172.1

Grisinger M. Medication Errors Involving Overrides of Healthcare Technology. Pa Patient Saf Advis 2015; 12(4): 141-148
http://patientsafety.pa.gov/ADVISORIES/Pages/201512_141.aspx

ISMP (Institute for Safe Medication Practices). Paralyzed by mistakes. Reassess the safety of neuromuscular blockers in your facility. ISMP Medication Safety Alert! Acute Care Edition. ISMP 2016; June 16, 2016
https://www.ismp.org/resources/paralyzed-mistakes-reassess-safety-neuromuscular-blockers-your-facility

Day D. Keeping Patients Safe During Intrahospital Transport. Crit Care Nurse 2010; 30: 18-32
http://ccn.aacnjournals.org/content/30/4/18.full

Commins J. Vanderbilt's Medicare Status Threatened After Patient Death. HealthLeaders Media 2018; September 29, 2018
https://www.healthleadersmedia.com/vanderbilts-medicare-status-threatened-after-patient-death-1

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www.patientsafetysolutions.com

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