Wrong-Drug Errors with Paralyzing Agents

The Pennsylvania Patient Safety Authority recently published a safety advisory concerning neuromuscular blocking agents (NMBAs). For a copy of the advisory, visit the Patient Safety Authority website at www.patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2009/Dec6(4)/documents/109.pdf. More than one-third of the incidents reported concerned "wrong drug" errors. Since NMBAs paralyze the patient, inadvertent administration to someone who is not on ventilator support can be catastrophic. Notably, while only 0.93 percent of all reported "wrong drug" errors resulted in patient harm, the incidence of harm when NMBAs were involved was 22.8 percent. Patients were 26 times more likely to be harmed when NMBAs were involved than with other drugs.

Common contributing factors were unsafe storage, similar product labeling and packaging, look-alike drug names and unlabeled syringes. The Patienty Safety Authority's recommendations for risk-reduction strategies are (listed in order from highest leverage to lowest):

Limit access. When possible, dispense NMBAs from the pharmacy as prescribed for patients. Allow floor stock of these agents only in the OR, ED and critical-care units where patients can be properly ventilated and monitored.

Segregate storage. When NMBAs must be available as floor stock, have pharmacy assemble the vials in a distinct, sealed box with warnings affixed as noted below.

CHPSO Database System Deployment Schedule

CHPSO is working with Quantros to deploy a database system that is at the heart of a patient safety organization's (PSO) functions — semi-automated aggregation of incident reports from each hospital's own incident reporting system. Quantros continues to work on the system, customizing it for hospitals' specific needs.

Several web seminars have already been conducted to introduce certain aspects of the system. Slides and audio recordings from the completed web seminars are available on the CHPSO website at www.chpso.org/webinar/index.asp. More web seminars will be scheduled in January and February to introduce hospitals to the live system.

Because 130 hospitals already have contracts, rollout will be over several months so CHPSO can give each hospital individualized assistance.

Hospitals within a health system should check with their system's quality office. In some of the health systems, the process is being coordinated at the system level.

CHPSO is also working with Quantros on a template hospital policy for PSO reporting.

Sequester the boxes in both refrigerated and nonrefrigerated locations.

Warning labels. Affix fluorescent red labels that note: "Warning: Paralyzing Agent—Causes Respiratory Arrest" on each vial, syringe, bag and storage box of NMBAs.

Safeguard storage in the pharmacy. Sequester and affix warning labels to vials of NMBAs stocked in the pharmacy. Be sure they do not obscure the vial label in any way.

Standardize prescribing. Include the need for ventilation support during and after administration, as well as a protocol that stipulates automatic discontinuation of these agents after extubation and removal from a ventilator. Never accept orders to continue medications upon patient transfer.

Computer reminders. Build alerts in the pharmacy computer to verify the patient's location when NMBAs are entered. If the patient is not in a critical-care unit, ED, OR or invasive procedure area, question the order and verify ventilatory assistance before dispensing the drug. If possible, establish computerized cross-checking of the patient's location when entering NMBAs. Cautionary messages should also appear on ADC screens when applicable. Consider a pop-up box that asks, "Is the patient being ventilated?"

Redundancies. Consider an independent double check of these medications before dispensing and administering. Ensure the medication is checked against the original order.

Supervision during initial administration. Require bedside attendance of a licensed practitioner who has experience with intubation and airway management during initial administration of an NMBA.

Prompt removal of discontinued products. Place vials, bags and syringes of NMBAs in a sequestered bin for immediate pharmacy pickup after the patient has been extubated or the drug has been discontinued.

Increase awareness. Educate staff about the risk of serious errors with these high-alert drugs. Provide staff with a list of both generic and brand names for all NMBAs available at the facility.

Communication of orders. Always refer to NMBAs as "paralyzing agents" rather than muscle relaxants. Orders should not be written "prn for agitation" but more specifically as part of an intubation procedure or to maintain a specific level of paralysis while the patient is on a ventilator only.

Medication Packaging

Challenge: Designed Environment

You may not think of the medication suppliers as designers, but their packaging decisions affect your patient-safety efforts. As detailed in the Pennsylvania Patient Safety Authority advisory on paralyzing agents, one of the Authority's recommendations addresses the packaging issue.

Not all wrong drug errors are equal. Certain errors, such as those involving paralyzing agents, represent significant immediate risks to patients. Some other drugs pose similar dangers, such as vasopressors and high-concentration electrolytes (e.g., potassium, sodium). For these drugs, distinctive packaging that visually communicates risk acts as one defense against dangerous drug swaps. Distinctive packaging does not obviate other defenses (e.g., bar coding), but, for the riskiest medications, reliance on a single protection results in a less-resilient process, where a single error can result in patient harm. Distinctive packaging also has its limits: users have different capabilities to distinguish packaging (e.g., roughly 8% of men are color-blind), and there is a limit to the number of distinctions people can manage.

Anesthesiology recognized this issue in the 1980s, and developed a standard set of color codes for classes of dangerous drugs used in the operating room. These

are now international standards, ASTM D4774 and ISO 26825:2008. For example, the standards specify that paralyzing agents be labeled with Pantone color Fluorescent Red 805. The standards also recommend that manufacturers color the container's top, label border and any other colored area on the label, excluding the background as required for maximum contrast, with the color corresponding to the drug's classification. Unfortunately, drug manufacturers do not always follow this recommendation. Compare the pictured vials of vecuronium, both from the same company.

The anesthesia labeling standards have not been extensively tested outside of the operating room, and the hazardous drug classes addressed in those standards are only those used in anesthesiology, but standardized labeling of high-hazard items is consistent with what we know works in decreasing human error. As distinctiveness of the object increases (shape, color, brightness and contrast), recognition speed increases and errors decrease. One recent study of the anesthesia color codes in a simulated ICU environment shows improved efficiency and improved error recognition: Porat, N., Bitan, Y., Shefi, D., Donchin, Y., & Rozenbaum, H. (2009). Use of colour-coded labels for intravenous high-risk medications and lines to improve patient safety. *Quality and Safety in Health Care*, 18(6), 505-509.

Whether it is color-coding or another method (e.g., manually applied stickers as suggested by the Pennsylvania Patient Safety Authority), distinctive packaging, when consistently used, should help reduce the risk of dangerous drug swaps.

Anesthesia Color Code Examples
(antagonists are the same color as the agonist but with white diagonal stripes across the color — vasodilators are Violet with white diagonal stripes)

Drug Class	Pantone Color
Benzodiazepines and Tranquilizers	Orange 151
Paralyzing Agents	Fluorescent Red 805
Opioids	Blue 297
Vasopressors	Violet 256

— Rory Jaffe, MD MBA rjaffe@calhospital.org

Helping Teams of Experts become Expert Teams

In the past two months, I have discussed the two fundamentals that establish the foundation for democratizing innovation. Having successfully inculcated the paradigm of team-based care, the servant leader can begin to model teamwork skills to provide a higher level of care. Front-line physicians and staff must also be empowered to hardwire these skills into the standard of care and provide mutual support, or accountability, to ensure that the skills are used for every patient, every day.

The skills that clinicians should leverage to harness the power of teamwork are quite simple: implementing closed-loop communication, sharing the plan for patient care, explicitly tasking others to check another person's work, respectfully asserting one's views and debriefing, to name just a few. None of this is earth-shattering news, but it's the diligent application of these skills that actually makes the team more effective.

Because it's essential that these skills be used consistently, and because the health care environment is complex and unpredictable, it makes sense to use tools to assist clinicians. The WHO Surgical Safety Checklist is a great example. If you look at the items on the list, they're all common-sense best practices. The power of these tools is borne out by dramatic improvements in patient outcomes realized simply because caregivers didn't rely on memory or assumptions to ensure all items were completed. Also note that the tools are the same as every other tool you implement; they must be created or modified by the actual clinicians who will use them.

The final step in reaping these rewards is also pretty straightforward; we call it mutual support. The construct that not only allows, but actually mandates, team members to remind each other to use the tools also ensures that every patient benefits from their use.

Highly effective teams led by enlightened clinical leaders deliver the level of care your patients deserve — the very best care.

— Steven Montague lifewings@verizon.net, Vice President, LifeWings

Patient Safety Organization Participation: What Every Provider Needs to Know

Quantros publishes whitepaper detailing comprehensive look at issues affecting health care providers around PSOs

Quantros, our partner in providing Patient Safety Organization (PSO) data services, has published a whitepaper addressing the ramifications for health care organizations of the Patient Safety and Quality Improvement Act (PSQIA) of 2005, the legislation that authorized the creation of PSOs.

Developed specifically for health care providers contemplating participation in a PSO, *Patient Safety Organizations: What Every Provider Needs to Know* offers an overview of PSQIA, outlines the benefits and risks of participation, and differentiates between protected and unprotected patient-safety data. It also offers practical advice for designing a Patient Safety Evaluation System that maximizes protection and affords the flexibility to comply with external reporting initiatives.

To read the whitepaper, visit the Quantros website at www.quantros.com/psowhitepaper12032009.html.

Note to Reader

In last month's newsletter we introduced six categories of challenges to improving patient safety: culture, designed environment, resources, customization, complexity, and change. Some articles in this and following issues will focus on aspects of these challenges. The articles will note the challenge in their subheads. For example, this month's article on medication packaging has the subhead: "Challenge: Designed Environment."

Calendar

Following is a list of upcoming events that are still open for enrollment. For more information or to enroll, use the contacts listed below.

January

13: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

14: *BEACON*: Compass Series course day 1 (of 4). Location to be determined.

26: *BEACON*: Quarterly Meeting. South San Francisco.

28: *HASC* (Hospital Association of Southern California): Southern California Patient Safety Colloquium. Pasadena.

February

10: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

11: *HASD&IC* (Hospital Association of San Diego & Imperial Counties): San Diego Patient Safety Council. San Diego.

11: *BEACON*: Compass Series course day 2 (of 4). Location to be determined.

18: *BEACON*: Key Contacts Meeting. Location to be determined.

March

4: *BEACON*: Physician Leadership Meeting. Location to be determined.

5: *BEACON*: CNE Meeting. Location to be determined.

10: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

11: *BEACON*: Compass Series course day 3 (of 4). Location to be determined.

12: *CAPSAC*: California Patient Safety Action Coalition Meeting. Sacramento.

April

7: *HASD&IC*: San Diego Patient Safety Council. San Diego.

14: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

15: *BEACON*: Compass Series course day 3 (of 4). Location to be determined.

27: *BEACON*: Annual Meeting. Santa Clara.

30: *CAPSAC*: Statewide Convening. Sacramento.

May

12: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

13: *BEACON*: Compass Series course day 1 (of 4). Location to be determined.

13: *BEACON.*: Leadership Council. Location to be determined.

June

2: *HASD&IC*: San Diego Patient Safety Council. San Diego.

9: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

10: *BEACON*: Compass Series course day 2 (of 4). Location to be determined.

11: *CAPSAC*: California Patient Safety Action Coalition Meeting Pasadena.

July

8: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

9: *BEACON*: Compass Series course day 3 (of 4). Location to be determined.

27: *BEACON*: Quarterly Meeting. Location to be determined.

August

11: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

12: *HASD&IC*: San Diego Patient Safety Council. San Diego.

12: *BEACON*: Compass Series course day 4 (of 4). Location to be determined.

September

8: *BEACON*: PSQI, Practical Skills for Quality Improvement. Location to be determined.

9: *BEACON*: Compass Series course day 1 (of 4). Location to be determined.

10: *CAPSAC*: California Patient Safety Action Coalition Meeting Napa.

10: *BEACON*: Key Contacts Meeting. Location to be determined.

23: *BEACON*: Physician Leadership Meeting. Location to be determined.

24: *BEACON*: CNE Meeting. Location to be determined.

October

6: *HASD&IC*: San Diego Patient Safety Council. San Diego.

December

1: *HASD&IC*: San Diego Patient Safety Council. San Diego.

3: *CAPSAC*: California Patient Safety Action Coalition Meeting. Torrance.

For further information on these events:

BEACON: Pamela Speich pspeich@hospitalcouncil.net or www.beaconcollaborative.org

CAPSAC: Theresa Manley manley1@pamf.org or www.capsac.org

HASC: Catherine Carson ccarson@hasc.org

HASD&IC: Nancy Pratt nancy.pratt@sharp.com