ISMP Medication Error Report Analysis

Preventing 10-fold Dosage Errors

Controlled Substances at Bedside or Procedural Area

Genvoya-Stribild Mix-up

Should Transdermal Fentanyl Be Stocked in the ED?

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These medication errors have occurred in health care facilities at least once. They will happen again—perhaps where you work. Through education and alertness of personnel and procedural safeguards, they can be avoided. You should consider publishing accounts of errors in your newsletters and/or presenting them at your inservice training programs.

Your assistance is required to continue this feature. The reports described here were received through the Institute for Safe Medication Practices (ISMP) Medication Errors Reporting Program. Any reports published by ISMP will be anonymous. Comments are also invited; the writers' names will be published if desired. ISMP may be contacted at the address shown below.

Errors, close calls, or hazardous conditions may be reported directly to ISMP through the ISMP Web site (www.ismp.org), by calling 800-FAIL-SAFE, or via e-mail at ismpinfo@ismp.org. ISMP guarantees the confidentiality and security of the information received and respects reporters' wishes as to the level of detail included in publications.

PREVENTING 10-FOLD DOSAGE ERRORS

Mix-ups between available drug strengths that differ by a factor of 10 have been reported in the past. For example, 10-fold dosage errors have occurred with ABILIFY (ARIPiprazole), which is available in both a 2 mg and 20 mg tablet; predniSONE, available in a 5 mg tablet and 50 mg tablet; and warfarin, available in a 1 mg and 10 mg tablet. We wish that the US Food and Drug Administration (FDA) and pharmaceutical companies would avoid these situations because they contribute to medication errors.

The latest reported error occurred with BELBUCA (buprenorphine), which is indicated for the management of pain severe enough to require daily, around-the-clock, long-term opioid treatment and for which alternative treatment options are inadequate.

The drug is available as a buccal film in 75, 150, 300, 450, 600, 750, and 900 mcg strengths. We heard from a consumer recently regarding an incident in which her pharmacy dispensed 750 mcg instead of 75 mcg, which is the recommended starting dose. It is unknown whether the prescription was handwritten or typed and whether there was a trailing zero involved (75.0 mcg). The patient took 5 doses of the erroneous 750 mcg strength. She experienced pain relief but was unable to stay awake and experienced dizziness, lightheadedness, and vomiting. She contacted her doctor to tell him that she was unable to tolerate the medication and learned that he had prescribed 75 mcg, not 750 mcg.

The risk of 10-fold overdoses is increased by health professionals and computer systems that dangerously use trailing zeros (eg, 1.0 mg, which can

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be misread as 10 mg) or by people who do not use leading zeros (eg, .5 mg instead of 0.5 mg, the former of which can be misread as 5 mg). All too often, blame is cast upon prescribers and pharmacists for prescribing or dispensing errors when many of these would not occur if companies took a safer approach of testing and marketing medications with strengths that are above or below an exact 10-fold difference. We saw this done when fentaNYL transdermal was marketed in a 12.5 mcg/hour dosage form. The manufacturer, Janssen, labeled it DURAGESIC-12 in an attempt to prevent mix-ups between Duragesic 12.5 mcg/hour and Duragesic 125 mcg/hour (requiring 100 mcg/hour and 25 mcg/hour patches), which may be an acceptable dose for opioid tolerant patients with chronic pain. Manufacturers and the drug approval divisions at FDA should take note of this as they contemplate drug approvals, especially for high-alert medications.

CONTROLLED SUBSTANCES AT BEDSIDE OR PROCEDURAL AREA

Our ongoing interaction with health care providers across the US suggests that a risk identified by ISMP during the analysis of a 2006 event¹ may be an ongoing problem that could cause patient harm—bringing a controlled substance (or any other medication or solution) into the patient's room, bedside, or procedural area before it is ordered or needed. This introduces the risk that the controlled substance might be mistaken as a different oral solid drug or solution that is packaged similarly. Practitioners who inadvertently administer the incorrect medication may not even know that the controlled substance has been brought to the immediate area. Administering a controlled substance in error has led to significant patient harm.

In the 2010 journal article about the 2006 event, we reported that this practice played a major role in a mix-up between bags of epidural fentaNYL with bupivacaine and intravenous (IV) penicillin, which ultimately led to the death of a young mother in labor.¹ Several factors led to the decision to bring the epidural medication into the room before it was ordered or needed, but the primary factor was the nurse's desire to have everything ready for anesthesia staff. The nurse brought the fentaNYL and bupivacaine bag into the room so that it would be available for anesthesia staff to initiate an early epidural. Before the event, anesthesia staff had expressed dissatisfaction if the drug or patient was not ready for an epidural upon their arrival on the unit. This dissatisfaction had placed considerable pressure on nurses to ensure that the patient and drug supplies were ready before anesthesia staff

arrived. As a result, guidelines and a checklist to promote patient readiness had been established, which included retrieving the epidural medication for anesthesia personnel before their arrival on the unit. Yet, nurses found it difficult to anticipate the arrival time of anesthesia staff—obstetricians notified anesthesia staff to request the epidural analgesia and did not always communicate this with the nursing staff. Thus, before receiving a signed order and often long before it was actually needed, nurses routinely brought the epidural analgesia into patients' rooms. This was obtained via override from an automated dispensing cabinet (ADC) before an order was verified by pharmacy. Tragically, in this case, the nurse accidentally picked up the bag of epidural fentaNYL and bupivacaine and administered it IV instead of the intended penicillin, which was in a similarly sized plastic bag. The young mother reacted to the intravenous bupivacaine, which is arrhythmogenic, and quickly developed seizures, respiratory distress, and cardiovascular collapse. A healthy infant was delivered by emergency cesarean section, but the mother could not be saved.

Today, nurses are still bringing controlled substances into procedural areas or to the bedside before needed or ordered, for basically the same reason—to be prepared for when the physician and/or anesthesia arrives to carry out the procedure or administer sedation or analgesia. Preparedness is important, but the risk of mixing up an intended medication with the unnecessarily available controlled substance is not a risk worth taking. Syringes, vials, and bags containing controlled substances can look very similar to other medications that are needed for administration before the procedure. There may also be drug diversion concerns associated with unsecured controlled substances left unattended at the bedside or in the procedural area.

Any controlled substance needed for a procedure should be ordered and verified by pharmacy, if possible, and then brought to the bedside immediately before use. This way, the controlled substance will not be accessible until needed and can't be confused with other medications that are ordered for the patient. A time-out process before a procedure should include verification of the controlled substance as it is handed off to the physician who will be administering it, without setting the drug down. Another option is to require anesthesia staff or other physicians to obtain any medication they plan to administer to the patient before or during the procedure, once they arrive on the unit, or to bring the medications with them in a secure anesthesia bag. If the medications are in an ADC, furnish anesthesia staff and other key providers

with individual access codes. If possible, segregate the medications used for this purpose from other drugs in the ADC. Barcode scanning is also highly recommended prior to drug administration.

REFERENCE

1. Smetzer J, Baker C, Byrne FD, Cohen MR. Shaping systems for better behavioral choices: Lessons learned from a fatal medication error. *Jt Comm J Qual Patient Saf.* 2010;36(4):152-163.

GENVOYA-STRIBILD MIX-UP

We continue to receive reports about mix-ups between GENVOYA (elvitegravir, cobicistat, emtricitabine, and *tenofovir alafenamide*) and STRIBILD (elvitegravir, cobicistat, emtricitabine, and *tenofovir disoproxil fumarate*). Both medications (manufactured by Gilead) contain 4 drugs in one tablet and are given once daily to treat human immunodeficiency virus-type 1 (HIV-1) infection. In addition to these similarities, the tablets appear nearly identical (**Figure 1**), making it difficult for even the patient to recognize a dispensing error.

These drugs are not interchangeable. The difference between them lies with the ester derivative of tenofovir. Genvoya, which contains *tenofovir alafenamide*, has less than one-tenth of the amount of tenofovir found in Stribild, which contains *tenofovir disoproxil fumarate*, decreasing the risk of renal and bone toxicity. Unfortunately, official product labeling, and therefore computer presentations of the generic names, list the different forms of tenofovir as the last ingredient of the 4. Thus, it is easy to miss the difference between these drugs when viewing only the generic names. Also, some computer systems may also

truncate the drug names, which could lead to errors. In one of the error reports from August, a computer system listed Genvoya using abbreviated generic drug names, Elviteg-Cobic-Emtricit-TenofAF, and not the brand name. When the pharmacy received an order for Genvoya, Stribild was mistakenly dispensed.

To prevent such mix-ups, we highly recommend that these drugs be referred to in computer listings by their brand names—Genvoya or Stribild. Also, in discussing the latest case with the FDA, we mentioned that the pharmacist who reported the mix-up recommended, in addition to addressing tablet appearance issues, expressing the entire ester form of tenofovir in all bolded uppercase letters. We also believe the generic names should be reordered, with the tenofovir esters appearing first, making the different esters easier to identify.

SHOULD TRANSDERMAL FENTANYL BE STOCKED IN THE ED?

FentaNYL transdermal patch 50 mcg/h was prescribed for an 89-year-old man in the emergency department (ED) with intractable back pain. The order for fentaNYL was continued when the patient was admitted to an inpatient unit. Unfortunately, the patient was opioid-naïve, had never used this drug previously, and did not meet product labeling requirements to be prescribed this drug. It should also be mentioned that transdermal fentaNYL is not indicated for the treatment of acute or intermittent pain and is only indicated for opioid-tolerant patients. The pharmacist contacted the admitting physician, who ordered a different analgesic. Had the patient not been admitted, he most likely would have been discharged with the patch in place, risking an opioid overdose.

It should also be mentioned that the initial order in the ED for the fentaNYL patch had been automatically verified by the computer system, thus bypassing pharmacy review. Auto-verify systems, which are commonly used in EDs, can present hazards to patients since they do not require pharmacy review. This is an opportunity for system administrators to build stops or decision trees into fentaNYL patch orders requiring prescribers to verify that the patient meets prescribing criteria (opioid-tolerant patient, for chronic pain). Moreover, transdermal fentaNYL should not be stocked in the ED. Serious consideration should also be given to requiring pharmacists to verify that the patient is opioid-tolerant (eg, checking state opioid registries) and that the dose is appropriate prior to dispensing it to the ED. ■

Figure 1. Genvoya and Stribild tablets are a slightly different shade of olive green, are the same shape, and are nearly the same size.