ISMP Medication Error Report Analysis

Unusual Use for a Baby Bottle Nipple

Confusion Between Naropin for Epidural Infusion and Ofirmev IV

Pemetrexed Vials Contain Overfill

Misleading Kcentra Label Leads to Dosage Errors

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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.

UNUSUAL USE FOR A BABY BOTTLE NIPPLE

Although not a US Food and Drug Administration (FDA)–approved use, topical anesthetic creams are sometimes used in conjunction with male circumcision. A nurse was preparing a newborn infant for circumcision using *LMX 4* (lidocaine 4%) cream to numb the procedural area. To be effective, the cream must be applied in a moderately thick layer (eg, 1/8 in. thick) to the affected area and remain in place for 30 minutes. To accomplish this, the nurse placed the *LMX 4* cream inside a soft nipple, which had been removed from the hard plastic ring used to secure it to a feeding bottle, and then placed the soft nipple with the cream in it over the tip of the infant's penis.

This process had worked well in this institution to keep the anesthetic in place once the infant's diaper was secured over the nipple.

When the infant was ready for the procedure, a nurse brought the child into the procedure room, removed his diaper, removed the nipple from the infant's penis, and set it aside. One physician was in the room and witnessed the nipple being removed from the infant's penis. When a second physician arrived, the nurse left the room to gather a more appropriately sized circumcision set. While she was gone, the second physician, who had not witnessed the removal of the nipple from the infant's penis, used the nipple as a pacifier for the infant.

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Upon return, the nurse noticed that the infant was sucking on the nipple that had been filled with *LMX 4* cream and removed it immediately. No *LMX 4* cream was visible on the infant's lips, and the infant was still able to suck. A poison control center was called, and the infant was closely monitored but showed no signs of lidocaine toxicity or methemoglobinemia. This could also have led to other problems. If lidocaine 4% entered the baby's mouth, it might have caused oropharyngeal anesthesia, which could interfere with swallowing.

If you use a soft nipple in this manner, discard the nipple immediately after removing it. Also, although unlikely, a flexible nipple pacifier that is accidentally drawn into the baby's mouth could lead to asphyxiation.

CONFUSION BETWEEN NAROPIN FOR EPIDURAL INFUSION AND OFIRMEV IV

Glass 100 mL and 200 mL infusion bottles of 0.2% or 0.5% *Naropin* (ropivacaine) injection can be mistaken as intravenous (IV) piggyback containers. However, *Naropin* is intended for epidural infusion when a prolonged block is needed. Unintended IV injection of ropivacaine may result in cardiac arrhythmia or arrest.

We have received 3 reports in which a *Naropin* glass vial was confused with *Ofirmev* (acetaminophen injection), which is also in a glass bottle but is intended for IV administration (**Figure 1**).

Figure 1. Look-alike glass bottles of acetaminophen and ropivacaine injection.

Doses of either drug can be administered without further dilution. In one case, the *Naropin* bottle was attached to IV piggyback tubing and administered instead of *Ofirmev*. The patient began to experience shortness of breath, dizziness, visual changes, and anxiety after receiving 20 mL of the drug. The symptoms lasted for 5 minutes after the medication was stopped. Both *Ofirmev* and *Naropin* were stocked in the same automated dispensing cabinet (ADC). Two “near misses” between *Ofirmev* and *Naropin* have also been reported in a critical care unit of a community hospital. In addition to these incidents, we have learned of another case in which *Naropin* was given IV, although what it may have been confused with and the patient's outcome were not mentioned in the report.

On examination, the labels for each product clearly indicate the bottle content; therefore, an error can be avoided if the labels are properly read. Still, in some areas of the hospital, these may be the only 2 products in glass infusion containers with a similar shape. The risk of confusion is highest in areas where the bottles are stored near one another, such as in the same ADC drawer, especially if the drugs can easily be accessed via an override. If possible, limit storage in ADCs to only one of the drugs and store the products in locked, lidded compartments. Some ADCs may allow “issue confirmation,” where you scan the product's barcode to ensure it is placed in the correct location in the ADC, and “removal confirmation,” where you again scan the barcode to ensure the correct product has been removed from the ADC. New label technologies that use barcode scanning may also be helpful in confirming that the correct product has been selected.

PEMETREXED VIALS CONTAIN OVERFILL

A pharmacist informed us about an issue that came to light while staff were preparing an 850 mg dose of the chemotherapy drug *Alimta* (pemetrexed). To compound the dose, one 500 mg vial and four 100 mg vials were reconstituted according to the package insert. Once reconstituted, the solution's final concentration is 25 mg/mL. For a dose of 850 mg, 34 mL of drug would be needed. But a pharmacy technician noticed that she was able to obtain 34 mL of pemetrexed solution without needing to enter the final 100 mg vial of reconstituted drug. It was at first thought that the volume used to reconstitute the vials must have been slightly higher than required per the package insert, but a pharmacist had confirmed the volume prior to reconstituting each vial. Given that pemetrexed comes as a powder, the

pharmacist felt strongly that 50 mg was still needed from the remaining 100 mg vial to make the correct 850 mg dose.

At this point, the manufacturer, Lilly, was contacted, and a clinical representative confirmed that the pemetrexed vials contain a small amount of overfill; the 100 mg vials contain an overage of 8.5%, whereas the 500 mg vials contain an overage of 2%. The representative confirmed that if all of the solution was removed from the 500 mg vial and three 100 mg vials, it could result in 34 mL (850 mg) without requiring part of another 100 mg vial.

Overfill is mentioned in the package insert, but the details are not specified. Had the company not been called, the patient might have received 900 mg or more instead of 850 mg. Although this may not be clinically significant, it is important to be aware of overages, especially when a small difference could be clinically important, such as with a pediatric patient.

MISLEADING KCENTRA LABEL LEADS TO DOSAGE ERRORS

Kcentra is given intravenously for urgent reversal of acquired coagulation factor deficiency induced by vitamin K antagonist therapy (eg, warfarin) in adult patients with an acute major bleeding episode or the need for pressing surgery or an invasive procedure. Even though *Kcentra* contains the vitamin K-dependent coagulation Factors II, VII, IX, and X, and the

antithrombotic Proteins C and S, its dose is based on the product's Factor IX activity.

Although the *Kcentra* carton label seems to indicate in the upper right corner that each vial holds exactly 500 units (**Figure 2**), there is actually a range (400–620 units, or 20–31 units/mL) of Factor IX units per vial (a range of over 50%). There is also a 1,000 unit kit that has a range of 800 to 1,240 units per vial. The product is manufactured from pooled human plasma. Because humans have different amounts of Factor IX in their plasma, there is no way to make the potency exact. Dosing is based on the patient's weight and international normalized ratio (INR).

Recently, when 4,500 units of *Kcentra* were ordered for a patient, pharmacy staff noted the “500 U” on the carton and vial and assumed each vial contained 500 units. Nine vials were prepared and transferred to an empty infusion bag labeled “4,500 units in 180 mL.” This was dispensed and the patient received the full dose. Although there had been some staff education about the product beforehand, its actual potency may not have been emphasized. When pharmacy staff reviewed the product for reordering, they noticed that an empty vial label said there were 596 units in the vial (**Figure 3**). Looking at the other vials that had been used, they saw that 4 vials contained 596 units and the other 5 contained 537 units, resulting in 5,026 units, not 4,500 units. The patient did not have clotting issues or other side effects after receiving the higher dose.

Figure 2. *Kcentra* carton expressed contents as 500 units.

Figure 3. *Kcentra* vial indicates actual number of units.

In another report, a pharmacist at a different hospital made the same error, but another pharmacist noticed the error when checking the product. Our database has 5 additional reports that have led to dosing, billing, and documentation errors. Two more

events reported with *Kcentra* were associated with a failure to measure an INR prior to treatment and close to the time of dosing and a failure to administer vitamin K concurrently with *Kcentra* — both are recommended in the product labeling.

The nominal amount (500 U) on the *Kcentra* label has no disclaimer or special notation stating that the package does not or may not contain this amount. The potency amount for each Factor is also on the flipside of the carton, although it is not as prominent as the “500 U” on the front label panel. We contacted the manufacturer, CSL Behring, to ask them to modify the way the product is labeled so the range is better communicated. We also suggested to the FDA that additional information is needed where “500 U” appears — perhaps specifying “500 Units Range” as a midpoint of dosages in each vial, or use of an asterisk to direct users to the actual potency or a range of units. We also recommended writing out the word “units.” It should be noted that some hospitals are ignoring the actual amount in each vial and are considering that each dose is 500 units – a practice that is not mentioned in product labeling. ■