Hosp Pharm 2013;48(10):803–806

www.hospital-pharmacy.com
doi: 10.1310/hpj4810-803

ISMP Medication Error Report Analysis

Leucovorin-Levoleucovorin Mix-Up

Two Error-Reduction Principles, One Change

Syringe Pull-Back Method of Verifying IV Admixtures Is Unreliable

Fleet Enema Saline Is Not Just Saline

ISMP Processes Health IT Error Reports

Michael R. Cohen, RPh, MS, ScD,[*] and Judy L. Smetzer, RN, BSN[†]

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.

LEUCOVORIN-LEVOLEUCOVORIN MIX-UP

A hospital recently experienced 2 errors involving a mix-up between leucovorin and levoleucovorin (*Fusilev*). An order was written for levoleucovorin, but a pharmacy technician incorrectly pulled leucovorin from stock and prepared that instead. The drug was correctly labeled leucovorin, but the error was not caught by pharmacy or nursing and the drug was administered to the patient.

Due to name similarity, there is significant potential for dosing errors when leucovorin and levoleucovorin are interchanged. This is an important error, because the dose of levoleucovorin is one-half the dose of racemic leucovorin injection (leucovorin). In this case, 400 mg/m^2 leucovorin would be similar to 200 mg/m^2 levoleucovorin.

Since the error, the hospital pharmacy has separated the 2 drugs in their automated dispensing cabinets (ADCs) and instituted tall man lettering for the ADC software listings. However, the drug information database used by the hospital for its computer order entry processing does not allow tall man lettering.

ISMP will mention this to drug information vendors and will be adding levoleucovorin to its list of drugs with tall man letters. Pop-up messages should

*President, Institute for Safe Medication Practices, 200 Lakeside Drive, Suite 200, Horsham, PA 19044; phone: 215-947-7797; fax: 215-914-1492; e-mail: mcohen@ismp.org; Web site: www.ismp.org. [†]Vice President, Institute for Safe Medication Practices, Horsham, Pennsylvania.

also be considered, as they may be useful to educate, alert, and remind staff of a possible mix-up.

TWO ERROR-REDUCTION PRINCIPLES, ONE CHANGE

In the early 1990s, 3 patients died in a New Jersey hemodialysis unit when nurses accidentally retrieved 50 mL vials of lidocaine 2% instead of mannitol, which had been ordered to treat muscle cramps. The similarity in the appearance of the 50 mL vials contributed to the events, which took place within minutes of each other.

Just recently, we heard of a similar situation; this time, the error involved retrieving a 50 mL vial of lidocaine from an ADC matrix drawer instead of what was thought to be a 50 mL vial of 50% dextrose. Vials of 50% dextrose were no longer stored in the ADC due to the current drug shortage.

There are 3 basic principles to reduce harm from medication errors with high-alert drugs: (1) reduce or eliminate the possibility of errors, (2) make errors visible, and (3) minimize the consequences of errors. In this recent case, stocking lidocaine in 50 mL vials violates 2 of these principles – making errors visible and minimizing their consequences.

Limiting the availability of vials of lidocaine to 10 or 20 mL makes it look different than other drugs in 50 mL containers, such as sodium bicarbonate, 50% dextrose, and mannitol. It also reduces the risk of harm in the event of a mix-up with another vial of the same size, if the whole vial is administered. Large vials invite multiple reentries with either a needle used for the same patient or a needle used for different patients, which violates safe injection practice principles. Therefore, a reduction in the container volume can reduce the possibility of solution contamination and help differentiate lidocaine from other 50 mL vials.

SYRINGE PULL-BACK METHOD OF VERIFYING IV ADMIXTURES IS UNRELIABLE

Some hospital intravenous (IV) admixture services use the syringe pull-back method as a check system. After injecting the medication into the container, the syringe plunger is pulled back to display the amount of medication or diluent that was added to the infusion container. This is accompanied by the actual drug or diluent container that was supposed to be added to the infusion container. In ISMP's recently published compounding safety guidelines, this proxy method of verification of IV admixtures was strongly discouraged; this method should never be used in the preparation of chemotherapy, complex or pediatric/neonatal solutions, or compounded sterile products (CSPs) with high-alert medications. An error report we received earlier this year serves to illustrate one of the problems with this check system.

Magnesium sulfate 135 mg was ordered to be infused IV over 4 hours for a neonate. The infant's magnesium level was 1.7 mg/dL. The pharmacy production label correctly stated that 135 mg of magnesium sulfate 50% (0.27 mL) should be added to 5.13 mL of 0.9% sodium chloride injection, which would provide a total volume of 5.4 mL. Due to a shortage of magnesium sulfate, the pharmacy did not have 2 mL vials, so 50 mL vials were used instead to prepare the dose. At the end of the infusion, the infant was not moving, had no reflexes, and exhibited poor muscle tone. The infant's magnesium level had increased to critical levels. Fortunately, the infant returned to baseline within 48 hours and recovered.

After investigating the incident, the hospital traced the problem to a pharmacy technician most likely mixing 0.27 mL of 0.9% sodium chloride with 5.13 mL of magnesium sulfate 50%, which was available from the 50 mL vial. The pharmacy always used the syringe pull-back method for checking all admixtures; in this case, the method did not identify this serious error. One syringe was drawn back to 0.27 mL and 1 was drawn back to 5.13 mL. The magnesium vial and the 0.9% sodium chloride vial were placed near the syringes. But the placement of the syringes did not make it clear which syringe was associated with which vial. The pharmacist who checked the product reversed the syringes and thought the correct amount had been pulled back in each.

The hospital has now discontinued the pull-back method for all pediatric/neonatal preparations and is currently reviewing all other high-risk preparations to determine whether changes should be made. The hospital also assessed the pharmacy workflow, especially during minimal staffing conditions, to ensure compliance with guidelines.

Additional compounding guidelines were published in the April 2013 issue of *Hospital Pharmacy*: Guidelines for the Safe Preparation of Sterile Compounds: Results of the ISMP Sterile Preparation Compounding Safety Summit of October 2011 (*Hosp Pharm*. 2013;48(4):282–294,301; www.ismp.org/sc?id=207).

FLEET ENEMA SALINE IS NOT JUST SALINE

A hospital pharmacist recently switched storage and distribution of *Fleet* enema products from the institution's central supply department to the pharmacy department. In doing so, a concern was noted

about the product being labeled "Fleet Enema Saline." Although the drug facts section lists the active ingredients as monobasic sodium phosphate monohydrate 19 g and dibasic sodium phosphate 7 g (www.fleetlabs.com/directions/ICS4_5903Z03_OL.pdf), most people would define "saline" as a mixture of salt and water. Simply referring to the product as "saline" does not bring attention to the phosphate content in *Fleet* and similar generic enema products.

The US Food and Drug Administration (FDA) published warnings in 2008 about acute phosphate nephropathy, a type of acute renal failure that is a rare but serious adverse event associated with the use of oral sodium phosphates for bowel cleansing. Since then, the use of oral sodium phosphate products has been discontinued for this purpose (http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2008/ucm116988.htm). There are potential safety issues involving the phosphate content in *Fleet* enemas, especially in elderly patients, who may use more than one enema at a time and risk metabolic disorders and fatalities (www.ncbi.nlm.nih.gov/pubmed/22332159). When a *Fleet* enema is ordered for a hospitalized or nursing home patient, a second dose should not be used in quick succession to the first. Patients should be warned about the need to carefully follow label directions, which state that using more than 1 enema in 24 hours can be harmful.

ISMP PROCESSES HEALTH IT ERROR REPORTS

A national health information technology (health IT) Safety and Surveillance Plan was issued in July 2013 by the Office of the National Coordinator (ONC) for Health Information Technology. As part of the plan, the Agency for Healthcare Research and Quality (AHRQ) will encourage event reporting, including health IT-related events, outside the institution to a federally certified Patient Safety Organization (PSO) such as the Institute for Safe Medication Practices (ISMP). The ISMP National Medication Errors Reporting Program (ISMP MERP) is an important option that can be used for this purpose. In turn, ISMP will interact, when appropriate, with product vendors and government organizations to help address reported issues and educate the health care community about significant situations. The Safety Plan addresses the role of health IT in helping to eliminate medical errors, protect patients, and improve the efficiency of health care. ONC will also work toward making it easier for clinicians to report health IT–related incidents and hazards through the use of certified electronic health record technology, and the Centers for Medicare & Medicaid Services will be training surveyors to identify safe and unsafe practices associated with health IT. More information, including a factsheet and the final report, can be found at www.ismp.org/sc?id=203. ■