April 2015 ■ Volume 14 Issue 4

ISMP

Community/Ambulatory Care

ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

Life-threatening errors with flecainide suspension in children

Flecainide is an oral class 1c antiarrhythmic drug that may be used to treat atrial fibrillation or supraventricular tachycardia, particularly when conventional treatment agents fail. Since it is available commercially only as 50 mg, 100 mg, and 150 mg tablets, it must be compounded into a suspension when needed for infants and small children. Unfortunately, errors during preparation and dosing of the suspension have occasionally led to serious overdoses that resulted in cardiac emergencies and required immediate therapeutic intervention. Overdoses can lead to seizures and cardiotoxicity, including ventricular tachycardia and fibrillation due to sodium channel blockade.[1] Treatment includes sodium bicarbonate boluses or sodium chloride boluses and extracorporeal circulatory support.

We first learned of a flecainide suspension-related error from a report submitted to ISMP in 2007. A 4-month-old infant had been receiving 8 mg twice daily as an 8 mg/mL suspension (1 mL per dose). When the dose was later increased to 10 mg, a suspension purported to be 10 mg/mL was compounded. However, the baby's mother complained that the suspension was too thick to withdraw from the bottle. The pharmacist asked the mother to return the suspension and elected to compound a 7 mg/mL suspension, instructing the parent to give 1.4 mL per dose. Due to a math error, this replacement suspension was actually compounded with 6 g (6,000 mg) of flecainide instead of 600 mg. Therefore, each dose represented 100 mg, not 10 mg. It is unclear whether the previous 10 mg/mL suspension may also have been prepared incorrectly.

Additional errors with compounded flecainide suspension have appeared in the literature.[1-5] A 2-year-old child received a 5-fold overdose when unlabeled oral syringes of nadolol (**CORGARD**) and flecainide were used. Instead of withdrawing 5 mL of nadolol suspension (concentration not specified) and 1 mL of flecainide suspension (20 mg/mL), the nurse administered the opposite and the child received 5 mL of flecainide (100 mg).[2] In another case, a pharmacy dispensed a 5 mg/mL suspension for a 4-week-old child who was supposed to receive 3 mg/0.6 mL TID. Pharmacy staff erroneously transcribed the dosing instructions to take "3 mL" instead of 3 mg (0.6 mL), resulting in an overdose that led to wide complex tachycardia.[3] In a third case, an 18-day-old infant received 4 doses of flecainide 8 mg (0.8 mL of a 10 mg/mL suspension) instead of 4 mg (0.8 mL of a 5 mg/mL), also resulting in wide complex tachycardia and cardiac arrest from which the child recovered.[4] A fourth case involved a 9-month-old infant whose parents were told to increase the dose of flecainide to 4 mL, assuming the concentration was 5 mg/mL as in the original prescription.[1] But the parents refilled the prescription at another pharmacy, receiving the drug in a 20 mg/mL concentration. The patient received 80 mg/4 mL, a 4-fold overdose, resulting in wide complex tachycardia and QRS prolongation. Finally, an event published just this past December described an error in which the aunt of a 7-month-old child un-

continued on page 2—Flecainide >

SAFETY briefs

Confused drug names: clomiPHENE and clomiPRAMINE. Recently, a consumer reported that his wife received the wrong medication from a community pharmacy. The physician's office telephoned a prescription to the pharmacy for the fertility drug clomi**PHENE** 50 mg, take 3 tablets by mouth daily. However, the pharmacy dispensed clomi**PRAMINE** 50 mg, a tricyclic antidepressant used to treat obsessive-compulsive disorder, with directions to take 3 capsules (150 mg) by mouth daily. After taking the first dose, the patient reported feeling sick and very sleepy. Later, she developed a headache, dizziness, and nausea. It is not known if any computerized alerts were generated for the high dose of clomi**PRAMINE**—the starting dose for clomi**PRAMINE** is 25 mg daily with a gradual titration over 2 weeks to 100 mg daily in divided doses.

ISMP has received 4 other reports involving this look- and sound-alike name pair dating back to 2002. The fact that both products are available in 50 mg dosage strengths only increases the risk of confusion. To help differentiate these drug names, the US Food and Drug Administration (FDA) applied tall man lettering to the pair as part of the FDA Name Differentiation Project (www.ismp.org/sc?id=520).

To prevent these errors, prescribers should include both brand and generic names as well as the purpose of the medications on prescriptions and limit the use of telephone orders. If used, pharmacies should document telephone orders on a pharmacy prescription blank and read back, spelling the drug name(s) and stating

continued on page 2—SAFETY briefs >

> **Flecainide**—continued from page 1

knowingly gave her nephew a 5-fold overdose of flecainide.[5] She pulled the suspension into an oral syringe that had both a teaspoon and mL scale and measured 5 mL (one teaspoon) instead of 1 mL. The child was hospitalized and suffered a cardiac arrest but was successfully resuscitated. Fortunately, all of the children recovered without neurologic sequelae following life-threatening flecainide overdoses.

Unrecognized changes in drug concentration, math errors, labeling errors, and inaccurate dosing instructions led to the confusion in these cases. In one case, the authors indicated that all of their local pharmacies had agreed to compound flecainide in one standard concentration of 20 mg/mL.[1] Along this line, a Michigan state-wide initiative agreed to standardize the flecainide concentration and other compounded liquid medication concentrations for pediatric patients. The initiative, which received a 2014 ISMP **Cheers** Award, provides the preparation directions, final concentration, stability data, storage information, and information for prescribers and families about the standards.[6] Such efforts to standardize concentrations in both inpatient and outpatient pharmacies can help eliminate medication errors like those described above. The American Society of Health-System Pharmacists (ASHP), in cooperation with ISMP, the US Food and Drug Administration (FDA), and other stakeholders, is trying to broaden this initiative nationwide.

To reduce the risk of errors, prescribers should order flecainide in terms of the mg dose. This allows pharmacists to address the suspension concentration (mg/mL) and volume per dose, which should be expressed in mL (metric). For neonates and infants, a lower concentration may be required. If the drug is prescribed by volume (mL), the concentration **MUST** be specified, or the prescriber must be contacted for clarification.

Figure 1. Flow restrictors placed within neck of bottles of liquid medication.

Community pharmacies should provide liquid suspensions with a flow restrictor embedded in the neck of the bottle (**Figure 1**) along with a metric-only oral syringe to measure and administer doses. Be sure to remind the patient or parents to secure the child-resistant cap after each use. Label directions should include the dose in terms of mL (not teaspoonfuls), such as "**Flecainide 0.25 mL by mouth every 8 hours**." The community pharmacy label should also include the concentration next to the drug name, below the instructions for use. To be sure parents give a proper dose, use "teach-back" methods to demonstrate how to measure and administer proper amounts. This also gives pharmacists and parents an opportunity to catch an error.

References

1) Wang GS, Tham E, Maes J, et al. Flecainide toxicity in a pediatric patient due to differences in pharmacy compounding. *Int J Cardiol.* 2012;161(3):178-9.
2) D'Alessandro CD, Rieder MJ, Gloor J, et al. Life-threatening flecainide intoxication in a young child secondary to medication error. *Ann Pharmacother.* 2009;43(9):1522-7.
3) Riley B, Judge B, Veltman M. Flecainide toxicity in a newborn. 2014 Annual Meeting of the North American Congress of Clinical Toxicology (NACCT). *Clin-Toxicol (Phila).* 2014;52(7):802-3.
4) Jang D, Hoffman R, Nelson L. A case of near-fatal flecainide overdose in a neonate successfully treated with sodium bicarbonate. *J Emerg Med.* 2013;44(4):781-3.
5) Kwan D, Vohra R, Dyer JE, et al. An infant with a heartbreaking medication error. *Pediatr Emerg Care.* 2014;30(12):e1-5.
6) Michigan Pediatric Safety Collaboration. Flecainide acetate suspension. Michigan Collaborative Standardization of Compounded Oral Liquids. March 2014. www.ismp.org/sc?id=518

> SAFETY briefs

cont'd from page 1

its indication(s). Differentiate these drug names on computer screens for e-prescribing and in the pharmacy computer system. Explore adding computer alerts to verify the indication for these drugs. Use tall man letters and other strategies (e.g., bold face, color) to differentiate these drug names on storage shelves. Consider storing products with look-alike names in different locations; use shelf stickers to help locate products that have been moved. Investigate implementing mandatory counseling when dispensing medications from a known problematic name pair.

Health Alert! RB (formerly Reckitt Benckiser) has recalled certain lots of its **MUCINEX FAST-MAX** combination liquid cough and cold products. The affected lots, which correctly label the product on the front of the bottle and list all active ingredients, may not have the correct corresponding drug facts label on the back panel. This mislabeling could cause patients to be unaware of side effects and/or risks associated with the ingestion of certain product ingredients which include acetaminophen, dextromethorphan, guai**FEN**esin, phenylephrine, and/or diphenhydr**AMINE**. Patients may also be at risk of taking unintentional overdoses of these ingredients which can result in serious harm.

A press release (www.ismp.org/sc?id=521) from the company provides a list of the affected products and corresponding lot numbers. Check your shelves to make sure these affected products are removed. Post information about the recall at the pharmacy counter as well as on shelves where these products are stocked. Advise patients to safely dispose of any unused product by: 1) mixing liquid medicines with an unpalatable substance such as kitty litter or used coffee grounds; 2) placing the mixture in a container; and 3) disposing of the container in the household trash. For more information about the recall, go to: www.ismp.org/sc?id=519.

continued on page 3—SAFETY briefs >

FIRST brand oral vancomycin needs improved labeling

In our October 2014 issue, we wrote about errors that occurred after a long-term care (LTC) pharmacy elected to send vials of injectable vancomycin powder along with diluent for the LTC staff nurses to reconstitute and administer as an oral solution. This was due to the high cost of **VANCOCIN** brand capsules and occasional problems in obtaining specific vancomycin products. At two facilities, nurses were unfamiliar with the practice of using the injectable form of vancomycin for oral administration and instead administered a number of doses intramuscularly (IM).

Last year, CutisPharma launched unit-of-use compounding kits for vancomycin oral solution under the **FIRST** trademark (**Figure 1**). The kits contain a bottle of vancomycin powder along with a bottle of grape flavored diluent. Both 25 mg/mL and 50 mg/mL concentrations, after reconstitution, are available. Prior to use, the contents of each bottle must be properly reconstituted.

Unfortunately, while this product is convenient to use, we have received reports about the product not being clearly labeled. One issue is that the diluent container, which has no vancomycin, and the powder container have "vancomycin 25" or "vancomycin 50" listed at the top of the label. Someone unfamiliar with the product might see the diluent as a bottle of active drug, especially when the containers have been removed from the carton.

Figure 1. Vancomycin powder (L) and diluent (R), each labeled "vancomycin 25." The containers should be better differentiated; the final concentration and volume should be listed.

Administering the diluent alone has happened in the past with other oral antibiotics that require reconstitution with a special diluent. In 1999, ISMP alerted practitioners to a similar situation with **CIPRO** Oral Suspension (ciprofloxacin). The active antibiotic powder container and the diluent container were both labeled "**Cipro Oral Suspension**." This led to the diluent being identified as a ready-to-use product, and it was dispensed without reconstituting the actual antibiotic. At the time, ISMP called upon the US Food and Drug Administration (FDA) and the manufacturer to improve label clarity, and the diluent container labels were then revised to state, "**DILUENT for** Cipro Oral Suspension." Similarly, the new vancomycin product diluent bottle should be prominently labeled, "**DILUENT for** vancomycin 25" or "**DILUENT for** vancomycin 50."

We also received reports in which the powder alone was dispensed without dilution for oral antibiotic products. This can happen with this product because the powder container is marked with an icon that states, "Oral Solution." Another issue with this product is that the bottle of vancomycin powder, which acts as the dispensing container after reconstitution, is not prominently labeled with the expected final concentration or the total volume after reconstitution. This information may not be available unless the bottle happens to be relabeled with that information once reconstituted.

The powder container should state, "Vancomycin 25 **Powder**—Must be Diluted." Until this change is made by the company, pharmacies using this product are advised

continued on page 4—Vancomycin >

> SAFETY briefs cont'd from page 2

HIGH-ALERT

Communicating cancelled e-prescriptions. A pharmacist recently notified us of an error in which a patient received two separate prescriptions for warfarin. The patient was being discharged from the hospital and was to take warfarin 3 mg daily at home. The prescriber initially sent an electronic prescription (e-Rx) to the pharmacy for warfarin 1 mg with instructions to take 3 tablets daily. After sending the e-Rx, the prescriber realized that a warfarin 3 mg tablet was available. So, he electronically discontinued or cancelled the first prescription and sent a new e-Rx for the 3 mg tablet, to be taken daily, to the same pharmacy. The pharmacy never received notification that the first e-Rx was discontinued and they dispensed both prescriptions to the patient. Subsequently, the patient took double the dose (one 3 mg tablet and three 1 mg tablets) daily for several days before presenting to an anticoagulation clinic with an elevated INR. It is not hard to imagine that this patient would have suffered serious harm if the overdose was not identified as soon as it was.

This is not the first time we have heard of issues when prescribers try to discontinue or cancel an e-Rx. Most times, pharmacy systems are not implemented in such a way to receive cancellation communications. However, prescribers, including the one involved in the case described above, are not aware of this communication barrier. The safety and efficiency gains provided by the electronic communication of

continued on page 4—SAFETY briefs >

Food For Thought

From **The Joint Commission (TJC) Chapter on Patient Safety Systems**, which becomes official on July 1, 2015: "Among the qualities that healthcare organizations should be working toward in their safety culture is that staff do not view close calls as evidence that the system prevented an error but rather as evidence that the system needs to be further improved to prevent any defects."

> Vancomycin—continued from page 3

to label containers appropriately so the diluent and/or powder are not dispensed and administered as the drug itself without dilution. We also recommend labeling the reconstituted powder containers with the final concentration per mL and total volume, along with the notation, "Reconstitution Completed." We have contacted both FDA and CutisPharma to request improvements to the way the product carton and containers are labeled for this kit, as well as their other oral suspension compounding kits (e.g., lansoprazole, omeprazole).

Special *Announcements*

Updated list of confused drug names

An updated list of confused drug names was recently added to the ISMP website at: www.ismp.org/sc?id=515. You may also purchase a full color wallchart from our online store at: http://onlinestore.ismp.org/shop/item.aspx?itemid=133. As always, our hope is that you will review this list and consider which require special safeguards at your practice site.

ISMP webinars

Join us on **May 27** for ***Expanding Barcode Medication Administration: Making a Difference in the Emergency Department (ED) and Other Outpatient Settings***. Despite widespread adoption of barcode medication administration in hospitals, the safety benefits of this technology have not been as quickly adopted in many associated outpatient clinical locations, such as the ED, oncology clinics, and dialysis locations, where a large number of high-alert medications are administered. Our distinguished faculty will provide an inside look at the implementation of bedside barcode scanning in clinical areas once thought to be "off limits" for this type of technology.

Join us on **June 24** for our ***2015 Update on The Joint Commission Medication-Related Standards***. Learn the most troublesome Medication Management Standards and National Patient Safety Goals along with successful approaches taken by healthcare organizations to accomplish the intent of these Standards. A second presenter will provide personal insight into the Standards, based on a recent Joint Commission survey at a large, nonprofit, teaching hospital. The speaker will share opportunities at both the pharmacy and health-system level.

For details on this and other webinars, please visit: www.ismp.org/sc?id=349.

New ISMP safety CE opportunities

ISMP is now offering two free CE opportunities: ***Improving Medication Safety in the Perioperative Safety Setting*** and ***Addressing a Trifecta of Overlooked IV Medication Risks***. Each program is approved for 1.5 contact hours. For details, go to: www.ismp.org/sc?id=509.

> SAFETY briefs cont'd from page 3

health information and prescriptions continue to be limited by gaps in interoperability. It's about time that pharmacies, prescribers, health information network operators, pharmacy computer system vendors, e-prescribing/electronic health record vendors, and regulators take action to improve the interoperability of these systems. As we move toward that goal, technology vendors and systems that transmit prescriptions must make all prescribers aware of this short fall.

HIGH-ALERT

Look-alike opioid bottles. A pharmacist recently alerted us to a potential hazard. The bottles of oxy**CODONE** 10 mg and oxymorphone 10 mg manufactured by KBK-Tech (**see image**) look very similar to one another. Both products have similar looking names and overlapping dosage strengths. The containers use similar colors and are likely to be stored near one

another on pharmacy shelves. When possible, explore ordering one of the products from a different manufacturer to prevent a mix-up from occurring. We have notified the US Food and Drug Administration (FDA) and the manufacturer of this issue.

If you would like to subscribe to this newsletter, visit: www.ismp.org/sc?id=386

ISMP INSTITUTE FOR SAFE MEDICATION PRACTICES

ISMP Medication *Safety Alert!* Community/Ambulatory Care (ISSN 1550-6290)

Report medication and vaccine errors to ISMP: Call 1-800-FAIL-SAF(E), or visit www.ismp.org/MERP or www.ismp.org/VERP. ISMP guarantees the confidentiality of information received and respects the reporters' wishes regarding the level of detail included in publications.

Editors: Michael Gaunt, PharmD; Michael Cohen, RPh, MS, ScD (hon), DPS (hon); Judy Smetzer, BSN, RN, FISMP; Ann Shastay, MSN, RN, AOCN. ISMP, 200 Lakeside Drive, Suite 200, Horsham, PA 19044. Email: ismpinfo@ismp.org; Tel: 215-947-7797; Fax: 215-914-1492.