



## How fast is too fast for IV push medications?

IV errors can have devastating results. In fact, almost all high-alert drugs that are known to cause harm when used in error are administered via the IV route. (Please visit [www.ismp.org/MSAarticles/highalert.htm](http://www.ismp.org/MSAarticles/highalert.htm) for a complete list of high-alert drugs.) One potentially harmful aspect that may go unnoticed, though, is administering an IV medication too quickly. In one tragic example, an emergency department physician prescribed labetalol 20 mg IV push for a patient in hypertensive crisis. A nurse retrieved the drug from the medication cabinet and rapidly administered it to the patient while he was en route to radiology. Sadly, the patient arrested immediately and could not be resuscitated.

The nurse was unaware that labetalol should be administered *very slowly*, over 2 minutes, the recommended rate for initial treatment of a hypertensive crisis. According to a study conducted in the United Kingdom, this nurse is not alone – too rapid administration of IV medications occurs frequently (Taxis K, Barber N. Ethnographic study of incidence and severity of intravenous drug errors. *BMJ* 2003;326:684). The

researchers identified errors in half of all IV drugs administered. Of these errors, about 75% involved IV push medications, most of which (95%) were given *faster* than recommended.

Not all cases of too rapid IV injections are serious. For example, rapid infusion of ampicillin would probably have negligible adverse effects. However, the researchers found that more than half of the too rapid IV injections were potentially harmful to patients. For instance, rapid administration of vancomycin could lead to severe hypotension and flushing of the face and upper body (sometimes called Red Neck or Red Man Syndrome). Fatal arrhythmias can occur with rapid injection of potassium chloride solution, often stemming from an order to administer a “bolus” dose. Too-rapid injection of midazolam (**VERSED**) can result in oversedation because the drug’s effects on the patient cannot be safely monitored during rapid administration.

To prevent errors associated with IV push medications, see the suggestions listed in **Check it out!**

**According to a study, too rapid administration of IV medications occurs frequently.**

### check it out! ✓✓✓✓

To prevent errors associated with IV push medications:

- ✓ **Improve access to information.** Work with pharmacy to prepare IV push guidelines, which include a safe timeframe for injection. Be sure the guidelines are posted in medication use areas, provided on a hospital intranet, printed in a pocket guide, and/or viewable on a handheld device. Update the information regularly. (IV push guidelines are available in a wall chart from Facts and Comparisons. Visit [www.factsandcomparisons.com/ProdPage.asp?ID=128#wc](http://www.factsandcomparisons.com/ProdPage.asp?ID=128#wc) or call 800-223-0554 for ordering information.)
- ✓ **Communicate clearly.** Avoid using terms such as “IV push,” “IVP,” or “bolus” with drugs that require administration over 1 minute or longer. Clarify any order written in this manner and ask for more descriptive terms such as “IV over 5 minutes.”
- ✓ **Use reminders.** Ask pharmacy to add a special alert to product labels specifying the safe timeframe for IV push administration if the medication must be administered slowly. Also program alerts to appear on computer-generated medication administration records and automated dispensing cabinet screens, as applicable.
- ✓ **Reduce the concentration.** Avoid administering IV medications too rapidly by using the lowest available concentration. For example, use the 1 mg/mL, not the 5 mg/mL strength of Versed so staff can titrate the dose slowly during administration.
- ✓ **Consider alternatives.** Use a syringe pump to administer medications that carry a high risk of adverse effects if given too quickly. Otherwise, have pharmacy dilute the medication and administer it as a piggyback, if possible.

### safetywire



**Stop the insulin.** A diabetic patient was receiving continuous enteral feedings along with subcutaneous NPH insulin, 24 units BID, to control elevated glucose levels. When the patient needed a CT scan, the feeding was held, but no one thought to discontinue the insulin. By the time the patient’s blood glucose was checked again, it measured only 26 mg/dL. Dextrose 50% was administered and the enteral feeding was restarted. Fortunately the patient recovered with no ill effects. If feedings are stopped on diabetic patients, insulin orders need to be adjusted or discontinued. These directions need to be listed prominently on medication administration records and any other documents and flow sheets related to the enteral feedings.

## What's packaged in a brown plastic tub?

Since 2000, the packages of **METHERGINE** (methylergonovine maleate) and **BRETHINE** (terbutaline sulfate) injection have looked so much alike that nurses have often confused one for the other. Both products are packaged as 1 mL ampuls within an amber plastic tub covered by a foil label that has the product name in tiny print (see photo). Both ampuls also have similar colored "rings" around the ampul necks that can be seen through the amber plastic tub, which further adds to their similarity.

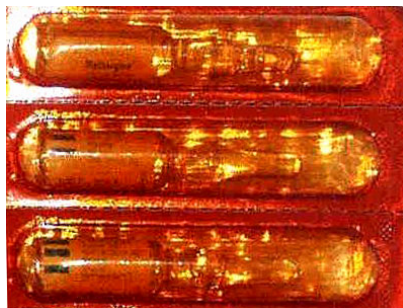
Contributing to the problem, both of the products are frequently used in labor and delivery settings, but for very different reasons. Brethine is used to treat preterm labor, and Methergine is used primarily after the delivery of the placenta to treat uterine atony, subinvolution, or hemorrhage. Because Methergine produces sustained uterine contractions, it is absolutely contraindicated in pregnancy and would be especially dangerous to a patient in preterm labor.

Interchanging these two drugs could result in serious adverse outcomes for the mother and baby. Sadly, in one reported case, a preterm labor

patient who was supposed to receive Brethine was given four doses of Methergine in error, which was felt to contribute to fetal demise. In a very recent case, a 35-year old woman experiencing significant preterm uterine contractions also received the wrong medication. Her physician diagnosed fetal distress and asked a nurse to administer Brethine IV push. Instead, the nurse mistakenly gave the patient Methergine. The mother experi-



Dangerous packaging of Brethine (top) and Methergine (bottom)



enced strong contractions requiring an emergency C-Section. Fortunately, the patient and newborn were discharged 2 days later, unharmed.

ISMP will continue to encourage the companies to change the packaging. For now, keep your colleagues informed of the potential for dangerous mix-ups and, most importantly, **store the products separately on your unit**. Methergine ampuls are best refrigerated, as they may be kept at room temperature only for a period of 60 to 90 days. This will help to separate the products. However, errors are still possible, so work with the pharmacy department to ensure that label reminders are applied to the ampuls to prevent mix-ups.

## No sweet-talking now... How do you communicate glucose results?

After performing bedside glucose testing, a nursing assistant told a nurse that the patient's blood sugar was 217 mg/dL. Unfortunately, the nurse thought she was talking about a different patient and administered a sliding scale dose of insulin to a patient whose blood sugar was just 116 mg/dL. The error was soon recognized and the patient was fed and monitored.

While nurses know that they should write a telephone/verbal order directly onto the patient's record and read the order back to the prescriber, a similar verification process might not occur when orally receiving other information about the patient. The Joint Commission requires "read back" when taking telephone/verbal orders as well as **critical** test results. Each organization must define what is meant by **critical** test results, but a glucose level obtained using a bedside glucometer may not be included. Errors when communicating this information can result in patient harm. To cite another example, a nurse saw a piece of paper that listed several patients with a number next to each name. All of the numbers were above 200. Believing the numbers were blood sugars, she gave each patient insulin using a sliding scale protocol. Afterwards, she realized that the numbers were patient room numbers!

Convene a group of clinicians and ancillary staff (lab technicians, nursing assistants, unit secretaries) to determine the safest way to receive, document, and communicate blood sugars and other lab data. In some hospitals, nursing assistants record the patient's blood sugar directly onto diabetic flow sheets or medication administration records. In others, the nurse responsible for administering insulin performs the glucose monitoring or accepts a verbal report of a lab-drawn blood glucose level. Send a message to [ismpinfo@ismp.org](mailto:ismpinfo@ismp.org) to tell us how you are handling this problem.

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To report medication errors to ISMP, please call 1-800-FAIL-SAF(E).