Concentrated Insulin Confusion

Extreme caution should be used when administering U-500 insulin. This concentrated form is used for patients with marked insulin resistance who would otherwise need large volumes of U-100 insulin.

Recently, a vial of U-500 insulin was left in a nursing unit refrigerator after the patient for whom it was prescribed went home. The pharmacy originally dispensed the insulin with a patient label, but the label was affixed to the vial's cardboard carton, which was discarded at some point. While looking for regular insulin in the refrigerator, a nurse saw the familiar brand name, Humulin R (regular insulin) but did not notice the U-500 concentration. A statement printed in red on the label of Humulin R vials (Eli Lilly) warns “high potency” and “not for ordinary use.” However, the font size is small and the warning was overlooked; the large, bolded “R,” common to both concentrations, was highly visible.

The nurse drew the prescribed dose into a U-100 insulin syringe and administered it. Fortunately, another nurse saw the vial that was used, read the warnings out loud, and noticed that the U-500 insulin was given in error—a five-fold overdose. The physician was called and the patient was immediately treated with no adverse outcome.

The Institute for Safe Medication Practices (ISMP) has noted other potential problems with U-500 insulin in the past. Because a U-500 syringe is not available, Lilly recommends using a U-100 insulin syringe or a tuberculin syringe to measure the dose. However, patients who use a U-100 syringe for U-500 insulin can incorrectly communicate their doses to others. They could state that their dose is “40 units,” if they read “40 units” on the U-100 scale, when their dose is actually 200 units. Consistent use of a tuberculin syringe with U-500 insulin is recommended, with doses expressed in both units and volume (e.g., 200 units, 0.4 ml).

Staff and patients need to be educated about these potential problems. As with all insulin products, an independent double check should be incorporated before administering this drug in health care settings. The concentrated product should never be used intravenously, because of the serious nature of an inadvertent overdose. The hospital where this particular error occurred has decided that U-500 vials will never leave the pharmacy; they will prepare and dispense labeled syringes of the drug for each dose ordered.

Succinylcholine Vial Mix-up

A potentially serious situation occurred as the result of the labeling and packaging of succinylcholine. A technician ordered a supply of 10 ml vials of Quelicin (succinylcholine) directly from the manufacturer, Abbott Laboratories. The pharmacy expected to receive the usual concentration of 20 mg/ml, but instead received 10 ml vials of 100 mg/ml, a strength used less frequently in hospitals. Side by side, the 10 ml vials are slightly different in size, but the labels look very similar (see photo at www.ismp.org). If the more concentrated strength had been dispensed to anesthesia unnoticed, serious patient harm could have resulted.

The hospital is unsure whether the technician ordered the drug by volume only (10 ml vials) or whether the manufacturer simply sent the only strength available. When non-pharmacists are ordering products, they should be sure to specify the drug’s strength and vial size. Equally important is to verify the medications when shipments arrive, before stocking them.

National Fentanyl Shortage

The recent national shortage of fentanyl products has created unsafe conditions for many patients who might require analgesia and sedation. As a result of the shortage, many hospitals have made a temporary switch to Sufentanil. Two serious errors have recently been reported.

In one case, an anesthesiologist accidentally administered sufentanil 50 mcg instead of fentanyl 50 mcg. Sufentanil has a dosing and pharmacokinetic profile that varies considerably from fentanyl. The patient subsequently developed respiratory arrest and required intubation. In another case, a pharmacist made a patient controlled analgesia (PCA) with sufentanil instead of fentanyl, using the same concentration. The patient became increasingly unresponsive and required treatment with naloxone. The patients recovered in both cases.