



Danger of giving topical thrombin intravascularly

Topical thrombin has been available since the 1940s to help stop oozing blood and minor bleeding from capillaries and small venules. Today, topical bovine thrombin (**THROMBIN-JMI**) is available in the US (King Pharmaceuticals) as a powder for reconstitution (see photo of vial). The manufacturer provides a parenteral syringe to help prepare and withdraw the product. The drug should be applied only to the surface of bleeding tissue. Because of its clotting action, thrombin should never be injected into the body. If injected systemically, extensive intravascular clotting and death may result. Given the similarities between the packaging of topical thrombin and parenteral products, namely a vial and syringe, the drug has been mistaken as a parenteral medication and administered intravascularly. Several events are described below.



A physician reconstituted topical thrombin and instilled it into the track of a centrally placed catheter, which had been oozing blood since removal of the catheter. Within minutes, the patient arrested and died.

Immediately after a nurse administered topical thrombin intravenously, the patient drew his left arm up to his chest, could not respond to voice commands, and subsequently experienced a seizure. Supportive therapy was begun and, within 30 minutes, he was back to his baseline status, talking and sipping water. The patient had no memory of the event or any residual effects.

During cardiac surgery, a labeled thrombin syringe was placed in the warming pitcher along with heparinized saline syringes of similar volume. The topical thrombin was accidentally given intravenously instead of heparin. The patient survived but required additional monitoring and an extended hospital stay.

To reduce the risk of administering topical thrombin intravascularly, please see the suggestions in the **check it out!** column to the right.

A patient hospitalized for an unspecified operation was accidentally given thrombin 5,000 units intravenously. Soon afterward, the patient developed cardiopulmonary arrest, and resuscitation efforts were unsuccessful.

Ambiguous drug doses on discharge forms

Hospitals may need to change the way medication lists are prepared for patients and other providers upon discharge from the hospital. Using a computer-generated list or copying each drug order from the medication administration record (MAR) might lead to dose confusion if strengths available after dis-

charge are different than those used in the hospital.

To minimize costs and manage space limitations, hospital pharmacies may stock a minimum variety of dosage strengths for a drug, particularly in automated dispensing

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check it out! ✓✓✓✓

Follow these suggestions to reduce the risk of accidental intravascular injection of topical thrombin.

- ✓ **Have pharmacy prepare, label, and dispense the drug** whenever possible, including doses used in the operating room (OR).
- ✓ **Never leave a thrombin vial or syringe** at the patient's bedside because it may be confused as a parenteral product.
- ✓ **Apply auxiliary warning labels to the product.** FDA requires the manufacturer to place a prominent warning on the carton and vial labels, "For topical use only—do not inject" (see photo to the left). The same warning should be affixed to any syringe of topical thrombin.
- ✓ **Communicate the presence of topical thrombin** when placing it on the sterile field, and try to delay placing it on the sterile field until all parenteral products have been administered.
- ✓ **Differentiate parenteral and topical products.** In various types of surgery, solutions of topical thrombin may be used with an absorbable gelatin sponge for hemostasis. It may also be helpful to use a dry form of topical thrombin on oozing surfaces.
- ✓ **Consider using spray kits,** which are available for topical thrombin. With a spray kit, a syringe is used to reconstitute the product, then a pump with a sprayer and protective cap is snapped onto the vial. With a syringe spray kit, thrombin is drawn into a syringe and a spray tip is attached. The spray mechanisms help differentiate the product from parenteral products. Reconstituted thrombin should never be left in an unlabeled syringe as an intermediate step before applying the spray mechanism.

Dose on discharge continued from page 1
cabinets. Thus, nurses often administer the prescribed dose using multiple tablets or half tablets. For example, a hospital may stock 100 mg tablets of **SEROQUEL** (quetiapine fumarate) but not the 200 mg, 300 mg, and 400 mg tablets. If a physician prescribes a 200 mg dose, the nurse would be directed to give the patient 2 tablets of the 100 mg strength. MARs frequently list the number of tablets to give along with the dose, as in the following example: "Seroquel 100 mg, 2 tablets twice daily." Although not recommended, the MAR may just list "2 tablets = 200 mg." Patients and healthcare providers in outpatient settings may find this confusing, making the MAR a less-than-ideal document from which to prepare a discharge medication summary.

One hospital recently reported that a patient discharged to a long-term care facility received Seroquel 400 mg twice daily instead of 200 mg twice

daily. The nurse misunderstood the hospital's summary sheet, compiled from the MAR, which listed the dose as "Seroquel 2 tablets = 200 mg bid." The nurse thought this entry meant that the patient should receive 2 tablets of the 200 mg strength twice a day. Another patient received **RISPERDAL** (risperidone) 0.25 mg twice daily because the medication entry was listed as "0.5 tablet = 0.5 mg twice daily." In this case, the nurse thought the patient was supposed to receive half of a 0.5 mg strength tablet, but in the hospital, the patient was receiving half (0.5) of a 1 mg tablet.

To minimize problems when listing medication doses on discharge forms, do not include the tablet strength or liquid concentrations used in the hospital. Instead, include only the drug name, dose, route of administration, purpose, and frequency that each medication should be given.

A problem with Byetta

A nurse administered the entire contents of a **BYETTA** (exenatide) pen to a patient, which resulted in a 60-fold overdose. Byetta is an injectable medication used to improve glucose control in adults with type 2 diabetes. The nurse saw the prescribed dose of 5 mcg on the Byetta pen label. However, there were no directions on the pen itself after the outer carton was discarded, and the nurse had missed the concentration and total volume listed in fine print on the pen label. She had never used Byetta and was unsure how to activate the pen, so she withdrew the full contents (1.2 mL) from the cartridge and administered it to the patient.



Byetta is supplied as a multi-dose syringe either as 5 mcg per dose (60 doses), 1.2 mL prefilled pen or as a 10 mcg per dose (60 doses), 2.4 mL prefilled pen (see photo). According to the drug's prescribing information, patients who experienced 10-fold overdoses have developed severe nausea and vomiting, rapidly declining blood glucose concentrations, and hypoglycemia which required glucose administration. When this patient exhibited these symptoms, appropriate treatment was initiated, and the patient recovered.

The wide variety of pen injector designs and activating mechanisms make it difficult for nurses to learn how to use them properly and maintain competence. Nurses should receive adequate education, which includes

safetywire



Prefilled syringes of vitamin K.

Phytonadione (vitamin K1) injection is available in 1 mg/0.5 mL and 10 mg/mL ampuls, which look similar enough for the wrong strength to be dispensed or administered. Recently, two infants received the adult strength in error after the 10 mg/mL ampuls were stocked in the nursery's automated dispensing cabinet. Fortunately, the infants were not harmed. In another hospital, the same error happened even though the pharmacy had already separated the products and put warnings stating "not for pediatric use" on bins of the 10 mg/mL strength. Amphastar makes a prefilled neonatal phytonadione syringe (1 mg/0.5 mL), which is available with safety needles. Dispensing the prefilled syringes for neonates and the ampuls (10 mg/mL) for adults reduces the risk of errors. Use of prefilled syringes also saves time and eliminates the need for filter needles, which should be used when withdrawing medication from a glass ampul.

hands-on and repeat-back demonstrations using a sample pen device, before they are expected to administer a drug using the device. Clinical and diabetes educators may be excellent resources for developing pen device-related educational materials that can be quickly referenced when needed.

An additional note about Byetta: In October 2007, FDA alerted health professionals about cases of pancreatitis that appear to be linked to Byetta (www.fda.gov/medwatch/safety/2007/safety07.htm#Byetta). Health professionals should watch for signs of acute pancreatitis and instruct patients taking Byetta to seek prompt medical care if they experience unexplained, persistent, severe abdominal pain, with or without vomiting.

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