Oral Syringes: A Crucial and Economical Risk-Reduction Strategy That Has Not Been Fully Utilized

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Problem: ISMP has repeatedly stressed the importance of never using parenteral syringes to prepare or administer small volumes of oral/enteral products; instead, an oral syringe should always be used. Sound familiar? Over the years, this important advice has appeared in more than 60 issues of our newsletters and in countless educational presentations. Yet, we continue to visit organizations where this simple but critical safety measure is not followed.

Using parenteral syringes (one with a Luer lock that can be attached to a needleless IV system) to administer oral/enteral liquids presents a serious danger of misadministration. After filling a parenteral syringe with an oral/enteral medication, it takes a momentary mental lapse to connect it to an intravenous line and inject it.[1] To prevent this, oral syringes have specially engineered hubs that cannot be easily or securely connected to standard IV lines and cannot accommodate a needle attachment. While some healthcare practitioners may believe this type of error would never happen to them, most events occur when knowledgeable staff, intending to administer the product orally/enterally, inadvertently administer it via the wrong route or access port, or when staff mistake the contents of a syringe—often unlabeled—as a parenteral product. Unfortunately, such errors continue to occur far too often.

The most recent errors reported in the last few months involved a newborn infant and an adult medical patient. The former error claimed the life of a baby born to a woman who was the first person in Spain to die of swine flu. The premature infant was delivered via Cesarean section 1 day before his 20-year-old mother died. A week later, the infant died after an intermittent feeding prepared in a parenteral syringe was administered intravenously instead of via a nasogastric tube. In the latter case, a new graduate nurse prepared yogurt in a parenteral syringe and then accidentally administered it to an adult patient intravenously through a PICC line. The nurse then flushed the line with water. The yogurt was intended to be given via an enteral tube to help treat diarrhea. The distal ends of the enteral and PICC lines, all unlabeled, looked very similar. The outcome was not reported.

In previous newsletters, we wrote about similar errors that fortunately were not all fatal. A few examples follow.

- *A pharmacy dispensed ni**MOD**ipine capsules to nursing units, unaware that these were being used for patients who couldn't swallow. In one instance, a nurse softened the gelatin capsule in hot water and subsequently withdrew the medication into a parenteral syringe. In the chaos of the day, the dose was administered intravenously instead of via the feeding tube. The nurse immediately noticed the error and tried unsuccessfully to withdraw the drug from the IV tubing. Unfortunately, the patient decompensated almost immediately and subsequently expired. A boxed warning has now been added to the ni**MOD**ipine labeling to caution about this type of medication administration error with this product.*
- ***VERSED** (midazolam) syrup (15 mg) and **TYLENOL** (acetaminophen) liquid (650 mg) were withdrawn into a parenteral syringe and administered intravenously to an 11-year-old child being prepared for surgery. A nurse and fourth-year student nurse had prepared the doses, but the nurse was called away momentarily. While she was gone, the student nurse administered the drugs intravenously, believing the child was NPO before surgery. The child remained unconscious for 50 minutes and required several days of antibiotics, but he recovered fully.*

Some may believe they have sufficiently reduced the risk of administering an oral liquid medication intravenously by having pharmacy dispense doses in either an oral syringe or a commercially available unit-dose cup. Some nurses have withdrawn a portion or all of the liquid from a unit-dose cup into a parenteral syringe in order to administer the dose. As the following errors show, all patient care units and procedure areas should be supplied with oral syringes—even if the need for using them is infrequent—and all nurses need to understand the safety features of oral syringes and the importance of using them.

- *A physician wrote an order for **TUSSIONEX** (hydrocodone and chlorpheniramine) suspension but did not specify the oral route of administration. A unit dose of Tussionex suspension was dispensed in an oral syringe, but the pharmacy label covered the manufacturer's warning on the syringe, "For oral use only." A nurse who was not familiar with oral syringes transferred the drug into a parenteral syringe, diluted it with saline, and administered it intravenously. The error was quickly recognized; the intravenous catheter was removed, and no harm occurred. Not every nurse is familiar with oral syringes and some may mistake a liquid medication in an oral syringe as a parenteral product.*

- *An uncooperative patient was sedated for an MRI with 500 mg of chloral hydrate syrup. The patient would not drink from the pharmacy-dispensed unit-dose cup, so a nurse withdrew the medication into a parenteral syringe and administered it orally. A physician accompanied the patient to the radiology department. Once there, the patient required additional sedation, so the physician called the nurse to send another dose of chloral hydrate to radiology. Again, the nurse withdrew the dose into a parenteral syringe. She felt uncomfortable sending it to radiology in a parenteral syringe, but oral syringes were not available. So, she left the syringe uncapped (and without a needle), and included the tear-off label from the unit-dose cup for reference. The physician never noticed the label and began to administer the medication intravenously.When the patient started yelling, further drug administration was halted. Luckily, the patient received very little of the medication and was not injured.*

According to a 2009 analysis of paid liability claims from 1997-2007[2], CNA Insurance Companies and the Nurses Service Organization—the largest insurer of US professional nurses—found that claims alleging wrong medication route, similar to those described above, had the highest average paid indemnity—$214,240 per case—of all medication error claims. One claim involved a nurse who floated to the neurology floor, where she was instructed to give a 19-year-old man recovering from a frontal craniotomy a dose of **DILANTIN** (phenytoin) oral elixir through the patient's feeding tube. The nurse mistakenly gave the drug through the patient's triple lumen catheter. The patient coded within seconds, resulting in a severe non-recoverable anoxic brain injury.

Safe Practice Recommendations

The consistent use of oral syringes for preparation and administration of all small volume oral/enteral liquids is an effective and economical risk-reduction strategy that should be employed in all healthcare settings. **Table 1** summarizes key actions to ensure widespread and consistent use of oral syringes. Patients are subjected to a substantial and unjustifiable risk of harm when oral/enteral products are prepared and administered in parenteral syringes. It's time to make the use of oral syringes a standard of practice in every healthcare organization.

Table 1. Strategies that promote consistent use of oral syringes

Strategy 1. Assess medical equipment connectivity Examine ports on

nasogastric, enteral, and parenteral tubing and catheters to determine which type of connectors they accommodate. Some needleless IV system connection ports unfortunately may accommodate oral syringes (with some manipulation), thereby allowing oral solutions to be injected IV. While some enteral tubes have a port compatible with parenteral syringes, others are available with a port that only accommodates oral syringes. To reduce the risk of wrong route errors, use parenteral tubing with ports that are totally incompatible with oral syringes and enteral devices that only accommodate oral syringes and catheter tip connectors.

Strategy 2. Supply all clinical areas with oral syringes Management should be accountable for supplying all clinical areas with appropriately sized (e.g., 1 mL, 5 mL, 10 mL) oral syringes. If possible, use oral syringes that have a different appearance from parenteral syringes. Judicious use of color and design can help staff distinguish between oral/enteral and parenteral syringes.[3] Warn staff to avoid associating a particular color with the oral/enteral route of administration as no standard exists among different manufacturer's products. Although some facilities use amber oral syringes to differentiate them from parenteral syringes, amber syringes hide the color of liquids and make the volume harder to see. Some facilities use them only when the product is light sensitive.

Strategy 3. Dispense oral liquid medications from the pharmacy when possible in oral syringes Require pharmacy to dispense all oral liquid medications in patient-specific or unit-of-use oral syringes or commercially available dose cups. When appropriate, batch supplies can be prepared and used to stock automated dispensing cabinets. (Even niMODipine liquid can be extracted from capsules, stored in amber oral syringes and placed in light-protected bags, and stocked for up to 31 days.[4]

Strategy 4. Notify pharmacy if liquid medications are required Have nurses or physicians notify pharmacy if patients cannot swallow solid medications so that liquid doses can be provided in oral syringes or dosing cups.

Strategy 5: Reduce tolerance of risk Communicate the potential danger of inadvertent intravenous injection of oral/enteral liquids prepared in parenteral syringes. Include examples of external (and internal) errors that have happened, even if they did not reach the patient, and promote the belief that the error could happen to them. The risks of wrong route errors with oral/enteral liquids should also be identified in medication and enteral feeding policies and procedures.

Strategy 6. Require staff to use oral syringes only when preparing and administering oral/enteral liquids Require staff to prepare and administer all small volume oral/enteral solutions in oral syringes, to avoid placing any non-parenteral products in parenteral syringes. Avoid placing topical products in oral syringes. Include a warning on MARs for liquid medications that states "Use oral syringe only."

Strategy 7. Apply auxiliary labels Label oral syringes dispensed from the pharmacy with an "Oral Only" label on the tip or the plunger so that the label must be removed prior to administration. Don't cover the manufacturer's label warning.

Strategy 8. Label all access lines Place labels (indicating what the port/line is being used for) on all distal ports and tubing of access lines, including peripheral and central intravenous lines and feeding tubes.

Strategy 9. Improve awareness Ensure that all healthcare professionals involved in medication prescribing, dispensing, and administration are thoroughly familiar with the design and purpose of oral syringes and their important safety features, particularly their inability to be connected to intravenous (or other male Luer) ports or parenteral needles. The importance of using oral syringes should be consistently emphasized. A simple poster stating "Only use oral syringes for liquids" in each medication room can help with this.

Strategy 10. Establish training programs[3] All orientation and training programs for staff who administer oral liquid medicines and use enteral feeding systems should include the proper use of oral syringes. Senior staff should supervise new staff to ensure they use oral syringes consistently. Provide additional training for staff when changes are made to tubing, catheters, or oral syringes used at your facility.

References

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