Morphine and Hydromorphone
An Omnipresent Risk of Mix-ups

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**PROBLEM:** ISMP’s affiliate in Canada (ISMP-Canada) received an error report in which a 69-year-old patient was given 10 mg of intramuscular (IM) hydromorphone instead of 10 mg of morphine. This error might have contributed to the patient’s death.

The patient arrived in the emergency department (ED) with a chest injury sustained while horseback riding. Before the patient was discharged, the ED physician wrote an order for morphine 10 mg IM for pain, but hydromorphone was mistakenly selected from a narcotic drawer. Both hydromorphone and morphine were stocked in 1-mL, 10-mg/mL ampules. According to equianalgesic dose—conversion charts, the patient, who was probably opiate-naïve, received an equivalent dose of about 60 to 70 mg of morphine.

Shortly after the patient was discharged, the nurse discovered the error when a scheduled narcotic count showed a discrepancy between the two drugs. The hospital staff immediately tried to contact the patient and finally located him in a rural hospital ED close to his home. By then, his condition had deteriorated, and he went into cardiac arrest a short time later. Despite rescue efforts, the patient died.

Over the years at ISMP, we’ve received many reports of confusion between hydromorphone and morphine, some of which have resulted in fatalities. In fact, mix-ups between these agents are among the most common and serious errors that can occur involving two high-alert drugs. According to the Pennsylvania Patient Safety Authority (PA PSA), mix-ups between morphine and hydromorphone are the most common name pairs involved in “wrong drug” medication errors. This risk exists in almost every health care facility that provides both pain medications, and we can anticipate that such mix-ups will eventually happen in almost all organizations.

**SAFE PRACTICE RECOMMENDATION:** Here are some steps to take to reduce the risk of patient harm.

1. **Access to hydromorphone should be limited.** Stock amounts of hydromorphone should be reduced, whenever possible, and should be eliminated from floor stock entirely if usage is low. The health facility where the error occurred has now removed hydromorphone from every ED in the health care region. If the drug is needed for patient-care units, only the 2-mg/mL strength is available except in palliative-care units. The distribution of other high-potency narcotics is also being revised. The pharmacy continues to stock hydromorphone for compounding patient-controlled analgesia or continuous infusions.

2. **Availability of the products should be reduced.**
   a. If both morphine and hydromorphone are available in patient-care units, they should not be stocked in the same strength. Because both drugs are available in 2-mg and 4-mg prefilled syringes in the U.S., hydromorphone 2 mg and morphine 4 mg can be stocked—but not vice versa, because hydromorphone 4 mg could be an excessive dose.
   b. If both drugs are stored in an automated dispensing cabinet, access to morphine can be allowed in emergencies via an override function, but pharmacy order review should be required before the first dose of hydromorphone is given.
   c. Each medication should be stored in a separate, individual bin or drawer in the cabinet to help prevent errors in drug selection.
   d. In the pharmacy, prefilled syringes and vials of hydromorphone and morphine should be segregated, especially if they contain the same concentration.

3. **The “look-alike” potential of the products should be minimized.**
   a. When possible, “tall man” lettering should be used to emphasize HYDRO and PHONE (i.e., HYDROMorPHONE) on pharmacy and auxiliary labels, medication administration records, and drug listings on computer screens or automated dispensing cabinets.
   b. In order to prevent confusion, label reminders should be added to indicate the brand-name equivalent for hydromorphone (Dilaudid).
   c. When nurses retrieve hydromorphone, some automated dispensing cabinets may have the capability of asking a question such as, “This is Dilaudid. Is that correct?”

4. **Extra (“redundant”) safeguards, such as double-checks, should be enforced and encouraged.**
   a. Independent double-checks should be instituted before intravenous narcotic doses are administered. Because nurses routinely obtain narcotics from floor stock, the typical pharmacist–nurse double-check is not in place as it is when specific patient doses are dispensed from the pharmacy.
   b. Some automated dispensing cabinets can be programmed to require a “witness” when certain narcotics are removed or when the override feature is used to access them. Reminders can also appear on the computer screen.
   c. When nurses retrieve hydromorphone, the pharmacy should be informed about the differences between hydromorphone and morphine. Some of the reported mix-ups have stemmed from the mistaken belief that hydromorphone is the generic name for morphine.

5. **Staff members should receive safety information on narcotics.** Instruction on the use of potent narcotics should be provided via newsletters and services. The staff should be informed about the differences between hydromorphone and morphine. Some of the reported mix-ups have stemmed from the mistaken belief that hydromorphone is the generic name for morphine.

6. **Technology should be used when possible.** Bar coding and automated dispensing technology that requires pharmacy order screening prior to dose retrieval can help reduce, although it does not completely eliminate, the risk of drug mix-ups.

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7. Patients also need information. Before a narcotic is administered, the staff member should repeat the name of the medication out loud to the patient as another way of confirming the drug name.

8. Patients should be carefully monitored. Facilities should implement policies specifying the scope, frequency, and duration of monitoring that should take place before discharging patients who have just received a parenteral narcotic agent.

REFERENCE


The reports described in this column were received through the USP–ISMP Medication Errors Reporting Program (MERP). Errors, close calls, or hazardous conditions may be reported on the ISMP (www.ismp.org) or the USP (www.usp.org) Web site or communicated directly to ISMP by calling 1-800-FAILSAFE or via e-mail at ismp-info@ismp.org.