

High Alert Medications: No Room for Errors

The Institute for Safe Medication Practices Canada (ISMP Canada) has received error reports related to insulin and narcotics that have caused patient harm. In the case of both types of drugs, incidents involving the use of “u” as abbreviation for units as well as misinterpretation of the decimal place have resulted in errors of 10-fold dosage increase. Opiate narcotic events often involve either a mix-up between an epidural infusion and a regular intravenous infusion, or the wrong concentrations input into patient controlled analgesia (PCA) pumps. Other well-known medication errors that have caused patient harm include the misuse of concentrate of potassium chloride (KCl) and the intrathecal injection of vincristine (a chemotherapy drug).

What do all these errors have in common? They all involve high alert (or high-risk) medications which have a very narrow margin of safety. High alert medications usually cause severe patient harm when implicated in an adverse drug event. Errors involving such medications have resulted in devastating consequences for patients and their families. They have also led to healthcare practitioners to suffer terrible guilt and anxiety. Furthermore, some high alert medications such as insulin, opiate narcotics and neuromuscular blocking agents have a high incidence of use, and thus have an increased likelihood of a patient suffering inadvertent harm. In the United States, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has set six patient safety goals for 2003, with a 3rd goal to: “Improve the safety of using high-alert medications.”

Below are some common examples of high-alert medications currently used in Canada:

- **Benzodiazepines- primarily midazolam** (Sedatives, often used for ‘conscious’ sedation during a procedure)
- **Chemotherapeutic agents** (for cancer treatment)
- **Intravenous digoxin** (used in the treatment of specific heart rhythm and rate abnormalities)
- **Dopamine and dobutamine** (used to treat low blood pressure and depressed heart function)
- **Heparin, intravenous and warfarin** (blood thinners - prevent blood clot formation)
- **Insulin** (regulates blood sugar levels in diabetics)
- **Lidocaine** (local anaesthetic used intravenously for specific cardiac rhythm disturbances)
- **Intravenous magnesium sulfate** (an electrolyte found in the blood: therapeutic levels are required for normal body cellular function, particularly in the heart)
- **Opiate narcotics** (used in the treatment of acute and chronic pain conditions)
- **Neuromuscular blocking agents** (paralyze muscles - including the muscles for breathing)
- **Potassium phosphate and potassium chloride** (electrolytes found in the blood - required for normal cell function especially the respiratory muscles and the heart)
- **Intravenous sodium chloride, high concentrations** (an electrolyte found in the blood - required for normal cellular function, including in the brain)

A safe medication system involves the collaboration of a wide variety of resources both directly and indirectly involved in patient care: from the processes of manufacturing and packaging, to prescribing and dispensing, to infusion pumps and other technologies used in

administering these high-alert medications. Hospitals should implement safeguards for the use of high alert medications. ISMP (US) and ISMP Canada already advocate a number of such safeguards, including:

- Removal high concentrate electrolytes (e.g. potassium chloride, potassium phosphate and sodium chloride) from all nursing units
- Stop using dangerous abbreviations such as “u”, and the trailing zero on a dosage (e.g. 5.0 mg)
- Use of a leading zero before a decimal place
- Review the hospital formulary for sound-alike and look-alike medications
- Use of “tall man” letters for sound-alike and look-alike names (e.g. DOBUTamine and DOPamine)
- Careful review of how products are arranged on shelves to avoid similar packaged or sound-alike medications being side by side
- Reduce the dosage and volume options for a medication, i.e. default dose/volume/rate for specified dose ranges
- Use of visible coloured auxiliary warning labels
- Enforce independent double checks on dosage calculation, and on the input of settings of infusion pumps being used for high alert drugs
- Use of pre-printed order forms
- Perform failure mode and effects analysis on all new protocols, procedures, as well as upon the addition of a new high alert drug or new medication device

In order to keep the high alert drug list up to date, ISMP US will be conducting a survey among many hospitals in the US, Canada and other countries, to identify new high-alert drugs. In 2003, during its first year of the Medication Safety Support Service (commissioned by the Ontario Ministry of Health and Long-term Care), ISMP Canada tackled the safe use of potassium chloride in Ontario hospitals. Following a seven-month period of aggressive support and education, preliminary results have since indicated that a large number of Ontario hospitals have removed potassium chloride concentrate from the general ward area. A second focused project on another high-alert medication is being considered and will likely be launched in September 2003. ISMP Canada has invited input from many practitioners and hospitals. ISMP Canada is also making use of the medication error reports submitted by practitioners, to assist in identifying the next targeted high alert drug. You can send your medication error reports to ISMP Canada on line to our web site: www.ismp-canada.org , by email to info@ismp-canada.org or by calling 416-480-4099. Confidentiality of all reports is guaranteed.

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