ISMP Canada is an independent Canadian non-profit agency established for the collection and analysis of medication error reports and the development of recommendations for the enhancement of patient safety.

The Healthcare Insurance Reciprocal of Canada (HIROC) is a member-owned expert provider of professional and general liability coverage and risk management support.

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Reports of Epidural Infusion Errors

Two medication error reports are shared in this bulletin. The reports both describe incorrect rates of infusion of narcotics for epidural administration.

In the first case, a post-operative patient was prescribed fentanyl 2 mcg/mL with bupivacaine 0.125% by epidural infusion, for pain management. The infusion rate ordered was 10 mL/hr. Ketorolac 30 mg intravenously was also prescribed for this patient. A student nurse 'piggybacked' a 50 mL mini-bag containing ketoralac to the main IV line which did not have an infusion pump. She then mistakenly adjusted the flow rate of the epidural infusion pump. The flow rate was set to 150mL/hour in order to deliver 50 mL in 20 minutes. After 20 minutes the student nurse returned to the patient and noticed that the minibag containing ketoralac had not been administered. She checked to ensure the line was not blocked and once again reset the epidural infusion pump rate to deliver 150 mL/hr. After another 20 minutes the patient, having by this time received 100 mL fentanyl/bupivicaine, experienced a respiratory arrest. Fortunately, the patient was successfully resuscitated.

In the second case, a patient in a Post Anesthetic Care Unit (PACU) was receiving an epidural infusion with hydromorphone 0.01 mg/mL and bupivicaine 0.125% at a rate of 10 mL/hr. At the same time, a solution of Lactated Ringers was being administered by a peripheral intravenous line using an identical volumetric pump. The patient was transferred to the obstetrical unit. Upon arrival, an RN checked the epidural pump and mistakenly set the rate to deliver 100 mL per hour. The nurse thought she was changing the rate of the IV pump, not the epidural pump. The epidural infusion ran until the pump alarmed indicating there was an empty bag. The patient had received 90 mL of the epidural infusion in less than one hour and was found to have high anaesthesia block, upper limb weakness and respiratory symptoms. Thankfully, supportive treatment provided a complete recovery.

The individuals reporting the errors indicated that the use of identical pumps for both epidural and IV infusions, as well as identical tubing, were major contributing factors. Other contributing factors identified during the review process include:

- multiple infusion lines
- poor identification of epidural pump and epidural line

Recommendations for prevention of similar errors:

1. Consider using a distinctly different pump for epidural infusions.
2. The "smart pump" that incorporates drug protocols and maximum dosing limits may safeguard against this type of overdose error. Manufacturers such as Baxter and Alaris are currently investing resources to develop "smart pumps" for epidural use.
3. Add a large visible label marked "Epidural Pump" on the pump being used to administer an epidural infusion.
4. Some hospitals have implemented the use of a coloured tubing for epidural infusions. Restricting the use of specific coloured tubing to epidural infusions can help distinguish the line from an IV line. The epidural tubing should be without injection ports. This will prevent inadvertent "piggybacking" of minibags to the epidural line.
5. Consider brightly coloured labels to identify epidural lines. ISMP (US) recommends labelling epidural lines at distal connecting sites because labelling elsewhere (i.e. close to insertion site) may not be noticed.[1]
6. Always trace the tubing from the insertion site to the pump, to ensure the correct pump is being adjusted.
7. If the peripheral IV infusion is indicated to keep vein open (TKVO) then consider a saline lock instead of an IV infusion.
8. Avoid the use of dual channel pumps for both IV and epidural infusions.
9. Some hospitals encourage placing the IV pump and epidural pump on opposite sides of the patient's bed to better distinguish the two infusions.
10. Consider limiting the size of minibag allowed, and/or the maximum total dose allowed in a minibag for epidural administration.
11. Ensure clear procedures for supervision of nursing students. Require a second check whenever a student nurse needs to manage patients with both an IV line and an epidural infusion line.
12. Although it would not have prevented the two errors described (because in each of these cases the nurses thought they were adjusting IV infusions) it is recommended that all epidural pump settings be checked by a second nurse.
13. Share this bulletin with nurses to heighten awareness of the risk for mix-ups between epidural and IV infusion pumps.

Reference:

1. ISMP Medication Safety Alert. Vol 3 Issue 11, June 3 1998.

Addendum: ISMP Canada is launching a national survey on the use of infusion pumps, for the purpose of identifying problems and issues. The project is a collaborative initiative between Health Canada, University of Toronto, Canadian Healthcare Association, Healthcare Insurance Reciprocal of Canada, and ISMP Canada. The survey questionnaire has been reviewed by ECRI (Emergency Care Research Institute), an independent non-profit organization that specializes in the review of marketed medical devices. The web-based survey will be launched on ISMP Canada's web site. Hospitals in Canada will receive a communication on this project soon, and are encouraged to participate.

Announcement

The Ontario Ministry of Health and Long Term Care has recently provided support and funding to ISMP Canada to establish the Medication Safety Support Service for Ontario hospitals. The first focused initiative is to assist hospitals in developing safer storage methods for concentrated Potassium Chloride (KCl), including strategies to remove it from patient care areas. A KCl support binder containing tools and relevant information is now available, free of charge, to hospitals in Ontario. To request the KCl support binder and for more detailed information on the support service, please visit www.ismp-canada.org.

ISMP Canada is a national voluntary medication incident and 'near miss' reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.
To report a medication error to ISMP Canada: (i) visit our website www.ismp-canada.org or (ii) email us at info@ismp-canada.org or (iii) phone us at 416-480-5899. ISMP Canada guarantees confidentiality and security of information received. ISMP Canada respects the wishes of the reporter as to the level of detail to be included in our publications.