

Reports of epidural infusion errors

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This article includes, with permission, material from an ISMP Canada Safety Bulletin (ISMP Canada, 2003). Two medication error reports are shared. The reports both describe incorrect rates of infusions 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/hour. Ketorolac 30 mg intravenously was also prescribed for this patient. A student nurse ‘piggybacked’ a 50 mL minibag containing ketorolac 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 infuse 150 mL/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 ketorolac 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/bupivacaine, experienced a respiratory arrest. Fortunately, the patient was resuscitated successfully.

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 bupivacaine 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. On 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 anesthesia block, upper limb weakness and respiratory symptoms. Supportive treatment resulted in 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 included:

- multiple infusion lines
- inaccurate 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.
4. Some hospitals have implemented the use of coloured tubing for epidural infusions. Restricting the use of specific coloured tubing to epidural infusions can help distinguish the line from an IV line.
5. The epidural tubing should be without injection ports. This will prevent inadvertent “piggybacking” of minibags or IV “push” medications injected into the epidural line.
6. 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 (ISMP, 1998).
7. Always trace the tubing from the insertion site to the pump to ensure the correct pump is being adjusted.
8. If the peripheral IV infusion is indicated to keep vein open (TKVO), then consider a saline lock instead of an IV infusion.
9. Avoid the use of dual or multi-channel pumps for epidural infusions.
10. Some hospitals encourage placing the IV pump and epidural pump on opposite sides of the patient’s bed to better distinguish the two infusions.
11. Consider limiting the size of minibags allowed and/or the maximum total dose allowed in a minibag for epidural administration.
12. Ensure clear procedures for supervision of nursing students. Require a second “independent” check whenever a student nurse needs to manage patients with both an IV line and an epidural infusion line.
13. It is also recommended that all epidural pump settings be checked “independently” by a second nurse (ISMP, 2003).
14. Share this bulletin with nurses to heighten awareness of the risk for mix-ups between epidural and IV infusions. 

About the author

Christine Koczmar is a staff member at ISMP Canada. She also holds a part-time position as a bedside nurse in the ICU at St. Joseph’s Health Centre, Toronto where, prior to joining ISMP Canada, she was the Clinical Care Leader involved with ICU staff education.

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