Minnesota Patient Safety Alert: EPINEPHrine adverse health events

Oct. 2017

Adverse EPINEPHrine events on the rise

Five serious events and two deaths involving EPINEPHrine have been reported to the Minnesota patient safety registry (PSR) in the last four reporting periods. Minnesota is not alone in documenting very serious errors with EPINEPHrine. The Institute for Safe Medication Practices (ISMP) has recently issued two safety alerts for EPINEPHrine (Feb. 2015 and Aug. 2016).

Key EPINEPHrine event findings and trends:

- All reported EPINEPHrine events occurred in the emergency department or operating room.
- Three events were route errors in which the medication was given via IV route instead of IM.
- Four events were errors in which the wrong concentration was used, resulting in two deaths.

Recommended executive leadership actions

Ask an interdisciplinary team (ED staff, OR staff, surgical services, pharmacy, supply chain, risk management or a medication safety committee) to conduct a risk assessment and develop mitigation strategies focusing on these themes:

1. **Availability of different dosage forms**: EPINEPHrine is available in many concentrations, forms and vial sizes.
   a. A risk assessment should be completed in all areas where EPINEPHrine is stored and used. Assessment should include safe storage and use of “bolus dose” vasopressors (EPINEPHrine, phenylephrine) in the ED and other areas of the hospital.
   b. A limited number of products, concentrations, and sizes should be available based on the patient care that occurs within the area.
   c. A process should be in place for safe substitution of EPINEPHrine products in the event supply chain is disrupted, followed by education and awareness of the change.
2. **Look-alike/sound-alike medication:** EPINEPHrine is available in a multitude of concentrations expressed in either mg/ml or ratios as well as multiple vial sizes (single use and multi-dose vials).
   a. Risk mitigation strategies should be in place to decrease risk of mix-ups. Strategies for this medication may include:
      i. Physical separation of differing concentrations
      ii. Evaluation of need for multiple concentrations and multi-dose vials in medication storage areas
      iii. Use of barcode medication administration (BCMA) technology

3. **Safety culture:** Use of verbal orders and lack of support for “stopping the line” are associated with medication errors.
   a. Assess current culture and workflow to determine where opportunities exist to “stop the line.” Change current workflow to assure there are opportunities for all staff involved in the procedure to be informed and “speak up” when they feel there may be an error.
   b. Assess current culture of medication safety and address barriers as needed.
   c. Minimize the use of verbal orders through changing workflow and associated processes. Audit use of verbal orders to assess impact on their use.

4. **Readiness for anaphylaxis:** Two recent ISMP medication safety alerts have addressed errors rising due to the high cost of EPINEPHrine auto-injectors (2015, 2016).
   a. A risk assessment should be completed wherever EPINEPHrine is available for use in anaphylaxis and whenever considering a switch from EPI-pen to a vial formulation that requires dilution of the EPINEPHrine. The risk assessment may include:
      i. Patient type (ambulatory vs. inpatient vs. ED)
      ii. Availability of IV access site for inpatients
      iii. Staff familiarity with preparing medications from a vial
      iv. Staff familiarity with use of EPI-pens or availability of EPI-kits with detailed instructions regarding use.

**Minnesota Hospital Association and Minnesota Department of Health next steps**

MHA’s Medication Safety Committee will review the medication safety roadmap to ensure it addresses best practices to mitigate EPINEPHrine risks. Education on EPINEPHrine risks will be presented on a live webinar that will be recorded for online dissemination.

Mitigating serious medication errors requires leadership commitment and action, in addition to the diligent work of interdisciplinary teams every day. In 2018, the MHA Medication Safety Committee, MDH and its partners will continue to work on spreading these recommendations. Thank you for your continued commitment to improving quality and safety for Minnesota patients and their families.

**For information contact:**

Tania Daniels, PT, MBA  
Vice President, Quality and Patient Safety  
Minnesota Hospital Association  
tdaniels@mnrestaurants.org  
(651) 603-3517

Rachel Jokela, RRT, RCP  
Adverse Health Events Program Director  
Minnesota Department of Health  
Rachel.jokela@state.mn.us  
(651) 201-5807

---
