

Challenge: Tertiary Care Hospitals to Management of High Alert Medicine for Reduce the Medication Error

Sachin Raval^{1*} and Nipul Kapadia¹

^{1*}Deputy Manager, Pharmacy, Apollo Hospitals international limited. Ahmedabad-India.

¹AGM-Pharmacy, Apollo Hospitals international limited. Ahmedabad-India.

*Corresponding author

Sachin Raval, Deputy Manager, Pharmacy, Apollo Hospitals international limited. Ahmedabad-India, E-Mail: sachinr@apolloahd.com.

Submitted: 26 Sep 2017; Accepted: 02 Oct 2017; Published: 06 Oct 2017

Abstract

Medication errors are one of the most common causes of avoidable harm to patients in health care organizations. Medications that have the highest risk of causing injury when used wrongly are known as high-alert medications in JCI accredited hospitals. Safe practices can reduce the potential for harm. Because of the significant nature of the potential adverse effects such as bleeding or hypoglycemia. Many of these medications are also more likely to be associated with dosing errors, due to issues such as the need to frequently calculate dosing based on weight. A separate list for community and ambulatory healthcare settings is also available from ISMP. In case of LASA medication regular updating of regular LASA medication list on the basis of current incidence need to be under observation of Pharmacy and Therapeutics Committee. Prescription review by clinical pharmacist in relation with patient report, indication and instruction for the dilution was to be done before administration. This may lead to convert medication error into near miss error. All High alert medication has to be audited for every step in MMU (Medication Management and Use) like prescription, indenting, dispensing and administration. Double checking is compulsory follow in every step.

Keywords: LASA, ISMP, MMU, JCI.

Introduction

High-alert medications are defined as medications that can cause harm more commonly and serious side effects to patient suffering and additional costs associated with care of these patients.

Medication errors are one of the most common causes of avoidable harm to patients in health care organizations. A study was conducted by the Institute for Safe Medication Practices (ISMP) to determine the drugs and situations most likely to cause medication error and precipitate harm to patients. In this study, Health care organizations submitted data on serious errors this data showed that a majority of medication errors resulting in serious injury were caused by a specific list of medications. Medications that have the highest risk of causing injury when used wrongly are known as high-alert medications. The top five high-alert medications identified by the ISMP study are insulin, narcotics, concentrated electrolytes i.e. potassium chloride, magnesium sulphate (50%), sodium chloride (more than 3%) and intravenous anticoagulants heparin.

Safe practices can reduce the potential for harm. The most common types of harm associated with these medications include hypotension, bleeding, hypoglycemia, delirium, lethargy, and bradycardia. These medications are more likely to be associated with harm due to issues such as narrow therapeutic ranges (increasing the potential for a prescribing error), and also cause more significant harm when an error

does occur because of the significant nature of the potential adverse effects such as bleeding or hypoglycemia. Many of these medications are also more likely to be associated with dosing errors, due to issues such as the need to frequently calculate dosing based on weight.

There is need to develop and followed continuously improving strategy for management of high risk medications in tertiary care hospitals to reduced and monitoring of medication errors due to high alert medications misused and wrong used.

Medicines are a key component of disease management and prevention

- although most medicines have a wide margin of safety, a few medicine groups, known as high risk medicines, are recognized as having a high risk of causing significant patient harm or death if they are inadvertently misused or administered incorrectly
- Errors with high risk medicines may not occur more often than errors with other medicines but their consequences can be more devastating
- Risks associated with the storage, prescribing, dispensing, and administration of high risk medicines need to be considered at each step of the medication management pathway.

The above is not an exhaustive list, Medicines or medicine groups other than those specified above may present a high risk, e.g. neuromuscular blockers used during general anaesthesia. These should be identified and included in the organizational high risk medicines strategy where.

The Institute for Safe Medication Practices (ISMP) has created, and periodically updates, a list of High-Alert Medications 4 identified in the USA which has formed the basis of similar high risk medicines lists worldwide and within Australia. The list, consisting of medicine groups and individual medicines, is based on error reports submitted to the ISMP National Medication Errors Reporting Program, reports of harmful errors in the literature, and input from practitioners and safety experts. This list reflects the collective thinking of all who provided input. A separate list for community and ambulatory healthcare settings is also available from ISMP.

Whilst the types of medicines used and patients treated may vary between and within health care settings, the ISMP believes that the evidence suggests there is a core group of medicines that should be considered high risk and that every hospital's list should include (when used):

- concentrated electrolytes
- neuromuscular blocking agents
- opioids
- anticoagulants
- insulin
- epidural or intrathecal medications
- Chemotherapy.

Insulin

Common Risk Factors

Lack of dose check systems. Insulin and heparin vials kept in close proximity to each other on a nursing unit, leading to mix-ups. Use of "U" as an abbreviation for "units" in orders (which can be confused with "O," resulting in a 10-fold overdose). Incorrect rates being programmed into an infusion pump.

Suggested Strategies

Establish a check system whereby one nurse prepares the dose and another nurse reviews it. Do not store insulin and heparin near each other. Spell out the word "units" instead of "U." "Build in an independent check system for infusion pump rates and concentration settings.

Opiates and Narcotics

Common Risk Factors

Parenteral narcotics stored in nursing areas as floor stock Confusion between hydromorphone and morphine. Patient-controlled analgesia (PCA) errors regarding concentration and rate.

Suggested Strategies

Limit the opiates and narcotics available in floor stock. Educate staff about hydromorphone and morphine mix-ups. Implement PCA protocols that include double-checks of the drug, pump setting and dosage Injectable Potassium Chloride or Phosphate Concentrate.

Concentrated Electrolyte

Common Risk Factors

Storing concentrated potassium chloride/phosphate outside of the pharmacy. Mixing potassium chloride/phosphate extemporaneously Requests for unusual concentrations.

Suggested Strategies

Remove potassium chloride/phosphate from floor stock. Move drug preparation off units and use commercially available premixed IV solutions. Standardize and limit drug concentrations.

Sodium Chloride Solutions above 0.9 percent.

Common Risk Factors

Storing sodium chloride solutions (above 0.9 percent) on nursing units Large number of concentrations/formulations available. No double check system in place.

Suggested Strategies

Limit access of sodium chloride solutions (above 0.9 percent) and remove from nursing units. Standardize and limit drug concentrations. Double check pump rate, drug, concentration and line attachments.

Intravenous Anticoagulants (Heparin)

Common Risk Factors

Unclear labeling regarding concentration and total volume. Multi-dose containers. Confusion between heparin and insulin due to similar measurement units and proximity.

Suggested Strategies

Standardize concentrations and use premixed solutions. Use only single-dose containers. Separate heparin and insulin and remove heparin from the top of medication carts.

Discussion

In tertiary care hospital it is necessary to reduce medication error and monitor continuously. Medication error related to high risk medication need to monitor on high priority, with strong management system.

From literature review it was observed that implementation of some new strategy and precaution may reduce the medication error significantly. Awareness with staff for high risk medication list and continuous training for administration and management of high risk medication help to keep medication error in reduced. For Insulin patient education is very useful and leaflet developed as per organization need, local language was seen to be very efficient. Self administration of Insulin in diabetic patient need to be educated and need continuous observation. In case of LASA medication regular updating of regular LASA medication list on the basis of current incidence need to be under observation of Pharmacy and Therapeutics Committee. LASA list have to be publish in ward and work place in pharmacy observed effective in minimization of error. Concentrated electrolyte leads to the most serious high alert medication error. Hence it is necessary to develop a strong strategy against storage and administration of concentrated electrolyte. Prescription review by clinical pharmacist in relation with patient report, indication and instruction for the dilution was to be done before administration. This may lead to convert medication error into near miss error.

All High alert medication have to be audited for every step in MMU like prescription, indenting, dispensing and administration. Double checking is compulsory follow in every step [1-26].

References

1. McCannon CJ, Hackbarth AD, Giffin FA (2007) Miles to go: An introduction to the 5 Million Lives Campaign. Jt Comm J Qual Patient Saf 33: 477-484.
2. Classen D (2003) Improving medication safety: The measurement conundrum and where to start. Int J Qual Health Care 15: i41-i47.

3. Leape LL et al. (1991) The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *N Engl J Med* 324: 377-384.
4. Institute of Medicine. Preventing Medication Errors. National Academies Press, Washington, DC; 2006.
5. Nebeker JR, Barach P, Samore MH (2004) Clarifying adverse drug events: A clinician's guide to terminology, documentation, and reporting. *Ann Intern Med* 140: 795-801.
6. Bates D et al. (1995) Relationship between medication errors and adverse drug events. *J Gen Intern Med* 10: 199-205.
7. The Joint Commission: High-Alert Medications and Patient Safety, *Sentinel Event Alert*, Issue 11, Nov. 19, 1999.
8. Institute for Safe Medication Practices (ISMP): *ISMP's List of High-Alert Medications*. At Medication Safety Tools and Resources.
9. Winterstein AG et al. (2002) Identifying clinically significant preventable adverse drug events through a hospital's database of adverse drug reaction reports. *Am J Health Syst Pharm* 59: 1742-1749.
10. Kanjanarat P et al. (2003) Nature of preventable adverse drug events in hospitals: A literature review. *Am J Health Syst Pharm* 60: 1750-1759.
11. Budnitz DS et al. (2006) National surveillance of emergency department visits for outpatient adverse drug events. *JAMA* 296: 1858-1866.
12. Griffin FA, Resar RK IHI Global Trigger Tool for Measuring Adverse Events. IHI Innovation Series white paper. Institute for Healthcare Improvement, Cambridge, MA; 2007 (available at the IHI Web site at).
13. Nolan T (2000) System changes to improve patient safety. *BMJ* 320: 771-773.
14. Institute for Safe Medication Practices (ISMP): Part II-How to prevent errors-Safety issues with patient-controlled analgesia. ISMP Medication Safety Alert: Acute Care, Jul. 24, 2003 (last accessed Jul. 17, 2007).
15. Nolan T.: Executing for System-Level Results: Part 1. (Last accessed Jul. 17, 2007).
16. Langley GL et al (1996) *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. Jossey-Bass, San Francisco.
17. Rozich JD et al (2004) Standardization as a mechanism to improve safety in health care. *Jt Comm J Qual Patient Saf* 30: 5-14.
18. Institute for Safe Medication Practices (ISMP): *ISMP Self-Assessments*. (last accessed Jul. 17, 2007)..
19. National Quality Forum: *Safe Practices for Better Healthcare*. (last accessed Jul. 17, 2007..
20. The Joint Commission: *Sentinel Event Alert*. (last accessed Jul. 17, 2007).
21. Rickrode GA, Williams-Lowe ME, Rippe JL, et al. (2007) Internal reporting system to improve a pharmacy's medication distribution process. *Am J Health Syst Pharm* 64: 1197-1202.
22. Sakowski J, Newman JM, Dozier K (2008) Severity of medication administration errors detected by bar-code medication administration system. *Am J Health Syst Pharm* 65: 1661-1666.
23. Monroe PS, Heck WD, Lavsa SM (2012) Changes to medication use processes after overdose of U-500 regular insulin. *Am J Health Syst Pharm* 69: 2089-2093.
24. Institute for Safe Medication Practices ISMP list of high-alert medications in acute care settings. 2014. Accessed August 24, 2016.
25. National Alert Network Potential for wrong route errors with Exparel. Mar 20, 2012. Accessed August 24, 2016.
26. Cohen MR, Smetzer JL, Tuohy NR, et al. (2007) High-alert medications: safeguarding against errors. In: Cohen MR, editor. *Medication Errors*. Washington, D.C.: The American Pharmacist Association pp. 317-412.

Copyright: ©2017 Sachin Raval. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.