Enhancing the Safety of Insulin Use in the Inpatient Setting

September 30, 2014
Webinar Agenda

• Welcome & Introductions
  Carolyn Konfirst, Indiana Hospital Association, Patient Safety/Quality Advisor

• Enhancing Safety of Insulin Use in the Inpatient Setting
  John Hertig, Pharm.D., Associate Director, Purdue University College of Pharmacy, Center for Medication Safety Advancement (CMSA)
  Katelyn Brown, Pharm.D., Pharmacy Resident, Purdue University College of Pharmacy, CMSA

• Wrap-up/Questions
Enhancing Safety of Insulin Use in the Inpatient Setting

Katelyn E. Brown, Pharm.D.
Medication Safety Fellow
Purdue University / Eli Lilly and Company / FDA
Disclosure

• No conflicts to disclose
Objectives

• Identify safety risks associated with insulin
• Implement evidence-based best practices and measure their progress of reducing harm associated with insulin
• Identify the benefits and risks of insulin pen utilization within the hospital setting
Diabetes in the Hospital

• Discharged diagnosis of DM increased from 2.8 million to 5.5 million from 1998-2009

• 38% of hospitalized patients experience hyperglycemia

• Hyperglycemia leads to increased morbidity and mortality


*Diabetes Care 2013;36:1033-46.*

Insulin

• Preferred treatment of hyperglycemia
• IV insulin for critically ill patients
• SC for non-critically ill patients
• Sliding scale is NOT recommended
Which medication is most commonly implicated in adverse events requiring treatment in a hospital emergency department?

A. Anticoagulants
B. Insulin
C. Aspirin
D. Amoxicillin
Insulin

- High-alert medication
- Life-saving, but life threatening
- Represents 16.2% of all harmful medication error reports
- Insulin med errors occur in all hospital settings and during each step of the medication-use process
Prescribing and Transcribing

• Abbreviations
  – "U" instead of "units"
  – "cc" instead of "mL"

• Unintended formulation
  – Humulin® N, Humulin® 70/30, Humulin® R (U-500 and U-100), etc.

• Illegible handwriting

• Missing or unplaced zeros and decimal points
Storage and Dispensing

• Look-alike/ Sound-alike
• Incorrect preparation of injectable doses
Administration

- Wrong dose
  - Lack of a double check
  - Wrong syringe
- Improper timing
- Wrong route
- Re-use of needle/pen
- Infusion rate
Monitoring

• Improper timing of BG
• Nutritional status was not evaluated
Hypoglycemia

- 70 mg/dL
  - Palpitations, tremor, arousal, sweating and hunger

- 55 mg/dL
  - Autonomic symptoms exacerbated, behavioral response

- <50 mg/dL
  - Dizziness, confusion, tiredness, seizure and/or coma

Hypoglycemia in inpatients receiving insulin or other hypoglycemic agents

Denominator:
Inpatients receiving insulin or other hypoglycemic agents

Numerator:
Hypoglycemia in inpatients receiving insulin or other hypoglycemic agents

BG $\leq$ 50 mg/dL
What is the prevalence of hypoglycemia (BG <60mg/dL) in hospitalized patients?

A. 30%
B. 12%
C. 77%
D. 26%
Enhancing Safety with Insulin

Prescribing → Transcribing → Storage → Dispensing → Administering → Monitoring
Prescribing and Transcribing

- Develop protocol-driven and evidence-based order sets
- Eliminate “free text” insulin orders
- Prohibit orders with unapproved abbreviations
- Limit oral and telephone orders for emergency situations
- Diagnosis and indication should be part of the order

Storage and Dispensing

• Store only U-100 concentration in patient areas
• All insulin infusions should be prepared in the pharmacy
• Standardize insulin infusion concentrations hospital wide
• Pharmacists should prepare and dispense pre-filled syringes for long-acting insulin
• NICU should have differentiation – i.e. “NICU only” label
• Use TALL man lettering (HumALOG vs HumULIN)
• Insulin vial should be labeled with the patient’s name and vial expiration time per institutional guidelines
Administration

• Double-check systems
• Limit types of syringes in patient care areas (tuberculin vs insulin)
• Insulin infusions should be administered via smart pump technology
• Pre-printed guides to appropriate settings of IV pumps
Monitoring

• Coordinate and standardize meals, BG testing, and insulin administration
• Alert staff when diabetic patients with insulin orders have their feedings held or discontinued
• Educate family/caregivers to request mealtime insulin

What percentage of hospitals are no longer using insulin pens due to safety concerns?

A. 45%
B. 75%
C. 15%
D. 20%
Insulin Pen Medication Errors

• Risks
  – Hemoglobin was detected in 6 out of 146 cartridges (4.1%) used by diabetic patients
  – In 120 patients, non-inert material, including squamous cells and other epithelial cells, was found in 58% of the cartridges
• Community hospital, NY 2014
  – 4,000 patients were sent a letter about possible exposure
• VA hospital, NY 2010-2012
  – 700 patients exposed to HIV, hepatitis B or hepatitis C due to reused insulin pens


Diabetes Care. 2001; 24(3):603-4
Insulin Pens

• NovoPen® first insulin pen introduced in 1985 to:
  – Increase adherence
  – Improve ease of use for patients

• Advantages
  – Medication Safety
  – Patient
  – Hospital

Diabetes Educ. 2002; 28(1):52-6,59-60
Current Recommendations

Institute for Safe Medication Practices (ISMP)

• Insulin pens should **not** be used in acute care setting **unless** used in specific situations and procedures should be in place to make sure each patient has his/her own pen

American Society of Health-Systems Pharmacists (ASHP)

• Store only U-100 concentration insulin and U-100 administration devices (e.g. syringe, pens)
• Develop policies and procedures that ensure insulin pens are used for individual patients only
• Establish policies and educational programs to ensure the safe use of insulin pens and disposable needle tips

The purpose

The goal of this study is to assess current inpatient utilization trends of insulin pens and share best practices to improve the safety of insulin pens.
Insulin Pen Prevalence

- Insulin Pen on Formulary in Past 10 Years: 73% Yes, 27% No
- Insulin Pen on Formulary Currently: 81% Yes, 19% No
- Patients Allowed to Bring in Own Pen: 32% Yes, 68% No
Insulin Pen Risk Mitigation Strategies

- Store insulin pens in pharmacy until used on a patient: 73% Agree, 15% Neither, 12% Disagree
- Limit the variety of pens on formulary: 88% Agree, 6% Neither, 4% Disagree
- Require insulin pen training and education for all new hires administering medication: 96% Agree, 6% Neither, 2% Disagree
- Label each pen with a patient barcode: 83% Agree, 10% Neither, 7% Disagree
- Label each pen with at least 2 identifiers: 90% Agree, 6% Neither, 4% Disagree
Insulin Pen Errors

- Insulin Pens Can Be Safely Used in an Inpatient Setting: 61% Agree, 15% Neither, 24% Disagree
- Insulin Pens are Clinically Useful in an Inpatient Setting: 63% Agree, 15% Neither, 23% Disagree
- My Institution Safely Uses Insulin Pens: 67% Agree, 27% Neither, 7% Disagree
- Insulin Pen Errors are Properly Reported: 62% Agree, 26% Neither, 12% Disagree

Legend:
- Agree
- Neither
- Disagree
Discussion

• **20%** drop in institutions using insulin pens mostly due to ISMP recommendation

• **60%** of participants report an insulin pen has **not** been used on more than one patient
  – **53%** are concerned errors are not being reported
  – Only **27%** of participants strongly agree that their institution uses insulin pens safely

• Less than **50%** are implementing risk mitigation strategies such as a prescribing protocol

• Lack of knowledge on the education and training of insulin pen administration
Discussion

• Over 75% of participants are using insulin pens in the inpatient setting
• Over 50% agree insulin pens can be safely used in the inpatient setting and are clinically useful in an inpatient setting
• 35% of participants report an insulin pen has been used on more than one patient
• 53% are concerned insulin pen errors are not being reported
Insulin Pen Recommendations

• Limit types of pens available
• Label pen with 2 patient identifiers (not on the removable cap)
• Place tamper-evident seal vertically on the pen
• Policies and procedures for storage of pens
• Education of staff on proper administration
• Patient and caregiver education
• Constant monitoring via a risk-management function
Questions
Take Home Points

• Education of staff

• Chose one practice to improve upon
  – PharmD: Check indication and diagnosis
  – RN: Take the time for double-check
  – Risk Manager: Update policy/procedure
  – MD, PA, NP: Reduce oral/telephone orders

• Measure, Analyze, Report
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Evaluation & Follow-up

• Webinar funded by CMS through the *Partnership for Patients*

• CMS reviews results and wants 80% of participants to evaluate educational sessions

• Please complete the simple three question evaluation by Oct. 9, 2014:
  

• Link to evaluation and webinar recording will be distributed to participants within one week

THANK YOU FOR YOUR PARTICIPATION!
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