Using a Computer-based Insulin Infusion Protocol to Improve Inpatient Glycemic Control

Ronald Fila, RPh, Clinical Pharmacist McLaren Northern Michigan

Situation Analysis

- Patients with diabetes are more likely to be hospitalized than patients without diabetes, and are more likely to have a longer duration of hospital stay.
- Insulin therapy is the preferred method for achieving glycemic control in most clinical situations. Poorly treated Hyperglycemia and Hypoglycemia can result in dangerous adverse events.
- It is imperative to understand the different glycemic control targets for noncritical and critical patients. The range recommended by the AACE and ADA should be between 140 and 180 mg/dl. More stringent goals, such as 110–140 mg/dL may be appropriate for cardiac surgery patients, as long as this can be achieved without significant hypoglycemia.

Project Aim

- Transition from a cumbersome paper based Insulin Infusion protocol to a Computer-based Insulin Infusion Protocol with a proven track record and is evidence-based.
- Ensure safety and accuracy around a complicated treatment strategy of using insulin drips for hyperglycemia and DKA.
- Improve glycemic control to help meet the recognized standards in our critical care patients, including DKA.



Methods

- •6 Units (SICU, CBED, CVU, ED, MICU, PEDS)
- •1,435 patients on EndoTool® Glucose Management System
- •37,560 Blood Glucose Readings
- Each patient visit must have a series of glucose measurements with time gaps ≤ to 4 hrs (240 minutes).
- Each visit must have ≥ 6 glucose measurements.
- •The first glucose measurement must be > 70 mg/dL.

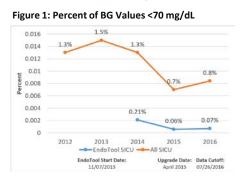
What's Next

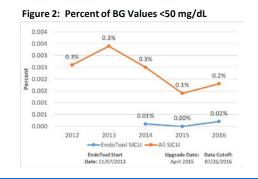
- Explore the option of deploying the EndoTool SubQ application for a more individualized and seamless transition.
- Consider upgrading EndoTool IV from the current version, to the newest version for optimized EndoTool IV performance (1.5 to 1.7 respectively).
- Integrate the EndoTool platform into the Cerner EMR to improve clinical workflow and eliminate charting duplication.

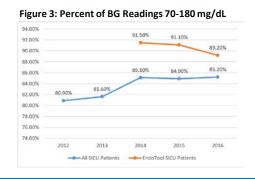
Outcomes and Lessons Learned

McLaren Northern Michigan Glucometrics has improved in many areas. Glucometrics results over 3 yrs (2013 – 2016):

- BG Readings < 70mg/dl decreased: 0.4% to 0.07%.
- BG Readings < 50mg/dl decreased: 0.13% to 0.02%.
- Days with mean BG ≥ 180mg/dL decreased: 20.3% to 17.2%.
- For DKA patients, the EndoTool insulin protocol ensures that glycemic control is achieved in a timely and safe manner.
- EndoTool has been well received.
- Despite upfront end user training and cost for IT implementation, EndoTool IV is now the method our nurses trust and highly recommend for our patients.
- More patients achieve set glucose targets and providers are more comfortable and willing to prescribe IV insulin drip to control hyperglycemia.







DKA Example

•Unit: MICU

•Total Number of BG Readings: 19

•Initial Target Range for DKA: 200 – 250 mg/dL (for 3 hrs)

•Final Target Range: 120 - 160 mg/dL

- •EndoTool Initiated: Day 1 at 18:41 with a BG 579 mg/dL
- Last BG Check: Day 2 at 13:12 with a BG 167 mg/dL
- •Time to Initial Target: about 9 hours
- •Total time on EndoTool: about 18.5 hours



