HQIC Community of Practice Call

Recognizing and Addressing Hypoglycemia in the Hospital Setting

September 15, 2022

CMS CENTERS FOR MEDICARE & MEDICAID SERVICES
HQIC
Hospital Quality Improvement Contractors
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iQUALITY IMPROVEMENT & INNOVATION GROUP

Introduction

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Center for Clinical Standards and Quality
CMS

Welcome!

Agenda

- Introduction
- Today's topic
  - Recognizing and Addressing Hypoglycemia in the Hospital Setting

    Presenters:

    - Kimberly Varney Gill, Pharm.D., BCPS, BCCCP
      Clinical Pharmacy Specialist, Endocrinology
      Virginia Commonwealth University (VCU) Health System
      Associate Professor of Pharmacy
    - Kendra Cooper, MSN-HCQ, RN, CPHQ
      Consulting Manager, Health Quality Innovators
- Open discussion
- Closing remarks

As You Listen, Ponder…

- What impactful actions can you take as a result of the information shared today?
- How are you able to increase engagement within your facilities to ensure a true change in patient safety?
- Based on what you heard today, what activities do you currently have underway that can leverage immediate action over the next 30, 60 or 90 days?

Meet Your Speakers

Kimberly Varney Gill, Pharm.D., BCPS, BCCCP
Clinical Pharmacy Specialist, Endocrinology
Virginia Commonwealth University (VCU)
Health System Associate Professor of Pharmacy

Kendra Cooper, MSN-HCQ, RN, CPHQ
Consulting Manager
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Health Quality Innovation Network

Hypoglycemia in the Hospital Setting

September 15, 2022

Agenda

1. **Background**
2. **Impact of Hypoglycemia on Patient Outcomes**
3. **Iatrogenic Hypoglycemia - Root Cause Analysis**
4. **Strategies to Decrease Incidence of Hypoglycemia**

VCU Health

VCU Health Adult Outpatient Pavilion

Definitions of Hypoglycemia in the Hospital Setting

Hypoglycemia based on blood glucose (BG) level

- **Level 1: BG 54 - 70 mg/dL** - mild symptoms may begin to occur
- **Level 2: BG < 54 mg/dL** - significant symptoms may begin to occur
- **Level 3: BG < 40 mg/dL** - "severe" hypoglycemia; increased concern for mental status changes and severe neurological symptoms

Center for Medicare and Medicaid Services (CMS) definition of Severe Hypoglycemia

- BG < 40 mg/dL + hypoglycemic med in 24 hrs + no subsequent BG > 80 in 5 mins

Iatrogenic Severe Hypoglycemia (SH) Recognized by Regulatory Agencies

Joint Commission (2016)

Recommended all hypoglycemic episodes be evaluated for a root cause; episodes should be aggregated and reviewed on a routine basis to address systemic issues

CMS (2019)

Designated Iatrogenic SH as a "**Never Event**" and a safety measure for hospital harm.

- *Never events are errors in medical care that are clearly identifiable, preventable, and serious in their consequences for patients, and that indicate a real problem in the safety and credibility of a health care facility.*

CMS Inpatient Quality Reporting (IQR) and Payment (2023 / 2025)

"***Hospital Harm -Severe Hypoglycemia***": beginning with the CY 2023 IQR reporting period / FY 2025 payment determination

Symptoms of Hypoglycemia

Patients may have <u>hypoglycemia unawareness</u>, especially with repeated episodes of hypoglycemia.

Educating patients and their caregivers on the inpatient side can assist in prevention and treatment of hypoglycemia in the hospital.

<u>Autonomic symptoms</u>

- Sweating
- Tremors
- Palpitations
- Hunger
- Tachycardia

<u>Neurological symptoms</u>

- Confusion
- Drowsiness
- Odd or agitated behavior
- Speech difficulty
- Altered coordination
- Altered mental status
- Seizure activity
- Coma

Risk Factors for Hypoglycemia

Patient characteristics

- Advanced Age; comorbidities (liver failure, decreased renal function, sepsis)
- Impaired hypoglycemic awareness
- History of hypoglycemia or antecedent hypoglycemia

Medication Factors

- High dose insulin (> 0.5 units/kg/day) or IV insulin (push or infusion)
- Use of sulfonylureas or non-hypoglycemic agents
- Sudden decrease in steroid dosing

Nutrition Factors

- Lack of synchronization b/w meal timing and prandial insulin administration
- Interruption of nutrition without carbohydrate replacement while receiving insulin
- Low caloric intake; delayed or missed meals

Hospital Outcomes Associated with Hypoglycemia

In-hospital data for Iatrogenic SH	No Hypoglycemia	Hypoglycemia (BG < 70)	Severe Hypoglycemia (BG < 40)
Incidence (% hospitalizations with hypoglycemia)		3-10 %	3-7 %
Morbidity		Increase in cardiac ischemic and neurologic events	
Mortality	3.8-4.4 %	6 %	7.6-8.8% (OR 1.5-2)
Length of Stay (days)	4.5-5	8.0-9.5	
Hospital Cost		4300 $ avg increase per admission (↑ 30-40%)	

VCU 2019-2020 data: higher than acceptable rate of hypoglycemia

Root Cause Analysis:

1. **Interruption of nutrition** (incl TPN) without carbohydrate replacement while receiving SC or IV insulin
2. **Use of IV push regular insulin** (for hyperkalemia) without adequate dextrose, or *without pre- and post- insulin blood glucose monitoring*
3. **Nutrition – Insulin** administration time mismatch

- Lack of a standardized hypoglycemia treatment protocol for all pts receiving insulin
- Lack of reporting and data tracking for hypoglycemia

Prevention of Iatrogenic Hypoglycemia –
1) Understand Glycemic Targets

Glycemic Targets vary based on patient population:

- **BG 140-180 mg/dL:** recommended for the majority of critically ill and noncritically ill patients. *Grade A, Strong recommendation*
- **BG 110-140 mg/dL:** may be appropriate for select patients if this range can be achieved without significant hypoglycemia (post-surgical, cardiac surgery, cardiac ischemia, or stroke)
- **BG 180-250 mg/dL:** may be acceptable in patients with severe comorbidities and where frequent glucose monitoring is not feasible.
- **BG > 250 mg/dL:** may be acceptable in terminally ill patients with short life expectancy

AVOID HYPOGLYCEMIA BG < 70 mg/dL

Prevention of Iatrogenic Hypoglycemia –
2) Standardize Insulin Orders

Electronic Medical Ordersets	Inclusion Details
Insulin Orders	**Insulin: SC basal, prandial, correction dose; and IV** 1. Weight-based and renal dosing recommendations 2. *Blood glucose monitoring for ALL insulin orders 3. *Hypoglycemia Protocol in for ALL insulin orders
Nutrition – Insulin administration matching	1. Administration time of insulin and meals should match 2. Order comments: "wait for arrival of meal tray before administer insulin"
Avoid overnight correction dose of insulin	Order comments: "do not give at bedtime"
Restrict concentrated insulins (U-500, U-300, U-200)	Diabetes Consult Team only

*New with EPIC transition

Prevention of Iatrogenic Hypoglycemia –
3) Standardize Dextrose and Blood Glucose Monitoring Orders

Electronic Medical Ordersets	Inclusion Details
Hypoglycemia Orders	**Mandatory Hypoglycemia Protocol for ALL insulin orders**: 1. Dextrose or carbohydrate source (PO/IV) 2. *PRN Dextrose infusion – nurse to start immediately upon disruption of nutrition for patients receiving insulin 3. Blood glucose reassessment orders
Hyperkalemia Treatment Orderset	1. Automatic Dextrose 25-50 gms based on pre-treatment BG 2. Automatic BG monitoring after IV insulin is administered
Ensure adequate nutrition / CHO intake	Diet per nutrition recommendation w/in 24 hours of admission

CHO: carbohydrate

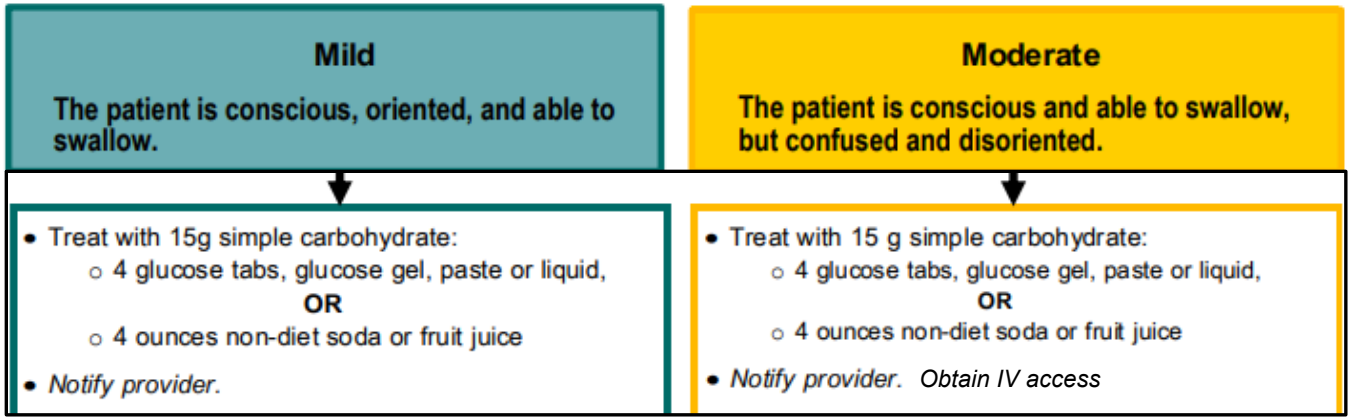
*New with EPIC transition

Prevention of Iatrogenic Hypoglycemia – Other

Education and Consultation	Details
Education regarding Hyperglycemia and Hypoglycemia	Provided by VCU Diabetes Team (MD, PharmD, APP) to providers, learners, and nurses on a yearly basis
VCU Diabetes Consult Team (main campus only; 24/7)	Adult Inpatient Consult Team: MDs, Fellows, APPs
VCU Diabetes Committee	Develops and updates protocols, practice management, and conducts data analysis for patients with hyperglycemia and hypoglycemia at VCU Health

VCU Treatment of Hypoglycemia – Mild to Moderate category

**investigate and correct causative factors in every situation*



- **Repeat BG every 15 mins until BG >/= 70 mg/dL for 3 consecutive readings after any intervention**
- **If BG remains < 70 mg/dL, initiate Dextrose 10% infusion at 100 mls/hr and titrate to maintain BG 140-180 mg/dL. If no IV access, administer Glucagon IM 1 mg and reassess BG as above.**

VCU Treatment of Hypoglycemia – Severe category

**investigate and correct causative factors in every situation*

Severe
The patient is unconscious, unable to swallow, intubated, or NPO status; has seizures, tachycardia, slurred speech, aggressive behavior.

- **Assess Airway/Breathing/Circulation**
- **Stop insulin drip**
- **Activate Rapid Response (dial *500) for patients on General or Progressive levels of care**
- **Notify provider**

- **If central IV access, give D50% over 5 mins. If peripheral IV access, give D10% 100 mls, then start Dextrose 10% infusion at 100 ml/hr.**
- **If no IV access, administer Glucagon IM 1 mg and reassess BG.**
- **Repeat BG every 15 mins until BG >/= 70 mg/dL for 3 consecutive readings after any intervention**
- **Maintain BG 140-180 mg/dL, or appropriate BG goal**

Tracking Data

Joint Commission (March 2021):

Recommends all hypoglycemic episodes be evaluated for a root cause; episodes be aggregated and reviewed to address systemic issues

- Data Tracking
- Report to engaged individuals
- Requires a dedicated team to assess results and implement changes

Summary

Iatrogenic Severe Hypoglycemia is now considered a Never-Event

Incidence *can* be decreased:

- Ensure Blood Glucose goals in ADA recommended range (140-180 most pts)
- Standardize Insulin orders: include dextrose and glucose monitoring
- Standardize Hypoglycemia orders: include dextrose and glucose monitoring
- Ongoing tracking and data analysis to engaged individuals

American Diabetes Association.

Resources

1. Brodovicz, K et al. Curr Med Res Opin Feb 2013:101-107
2. Cruz P. J of Diab Sci and Technology 2020:560-66
3. ADA Standards of Medical Care in Diabetes Jan 2022
4. Shelton, C et al. J of Diab Sci and Technology 2021:1-8
5. Hulkower R et al. Diabetes Management 2014;4(2):165–176
6. Griffing KL. Clinical Diabetes 2016;Vol 34(4):193-199

HQI's Hospital Network Perspective

Getting Back to Basics: Small and Rural Facilities

Challenges	What's Working
Change Management	• Launch an Interdisciplinary Team • Establish a sense of urgency • Create a common goal
Limited Pharmacist support and/or Turnover	• Peer to peer connection • Expert SME consultation • Established protocol sharing

Getting Back to Basics: Small and Rural Facilities (continued)

Challenges	What's Working
Tracking Events & Data Support	• Incident/Event reporting system • Root cause analysis with multidisciplinary team • ADEs discussed in daily safety huddles • Pharmacy clinical surveillance technology • Health Information Management – Coders communicate with quality for review • IHI Global Trigger tool
Standardize Order Sets & Protocols	• Integration into EMR • Hypoglycemic Protocols from pharmacist • Rescue agents readily available • Long-acting insulins with daily chart review • Individualize sliding scale insulin therapy

Discussion

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Final Thoughts

Join Us for the Next Community of Practice Call!

Join us for the next
Community of Practice Call on October 13, 2022
from 1:00 – 2:00 p.m. ET

We invite you to register at the following link:
https://zoom.us/webinar/register/WN_ASl_l3p_TEyx_VY_YYFFeA

You will receive a confirmation email with login details.

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We will use the information you provide to improve future events.