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Acute Hyperkalemia: A Novel Strategy To Prevent Insulin Induced Hypoglycemia

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Background

- Insulin is the preferred method of treatment for acute hyperkalemia
- Nationally about 20% of patients will experience at least 1 hypoglycemic episode
- Hyperkalemic patients admitted with hypoglycemia have a 2.5-fold increased risk of in-hospital mortality ranging from 13-27%
- Methods to prevent hypoglycemia have been inconclusive
- Pre-Insulin glucose monitoring is essential

Research Question

To determine if increasing the frequency of blood glucose monitoring can decrease hypoglycemia rates

Methodology

- Method: Retrospective Chart Review
- January 1, 2017 – March 31, 2018
- Inclusion Criteria: All inpatient and emergency department patients from the Swedish region who received regular insulin for a K+ of ≥ 6.0 mmol/L
- Primary Endpoint: Serum blood glucose of ≤ 70 mg/dl within 360 minutes following regular insulin administration

Results

1. Hypoglycemic Numbers

| | 2017 | 2018 |
|--|----------|----------|
| Patients studied (n) | 212 | 173 |
| Patients with at least one hypoglycemic event (n, %) | 24 (11%) | 30 (17%) |
| Time to first hypoglycemic event (mean, min) | 146 | 127 |

2. Order Set Usage

| | Pre-Intervention (n=212) | Post-Intervention (n=173) |
|------------------------------------|--------------------------|---------------------------|
| Order set used (n, %) | 69 (33%) | 54 (31%) |
| Hypoglycemia with order set (n, %) | 10 (42%) | 17 (57%) |

3. Location of Hypoglycemic Events

| | 2017 (24) | 2018 (30) |
|-----------------|-----------|-----------|
| ED (n, %) | 9 (38%) | 11 (37%) |
| ICU (n, %) | 2 (8%) | 2 (7%) |
| Med-Surg (n, %) | 9 (38%) | 9 (30%) |

4. Safest Starting Blood Glucose Levels

| | Pre-Intervention | Post-Intervention |
|--|------------------|-------------------|
| Total baseline blood glucose <120 mg/dl (n) | 56 | 55 |
| Hypoglycemia with baseline blood glucose <120 mg/dl (n, %) | 41 (73%) | 37 (67%) |
| Baseline blood glucose >120 mg/dl (n) | 112 | 96 |
| Hypoglycemia with baseline blood glucose >120 mg/dl (n, %) | 6 (5%) | 8 (8%) |

Conclusions & Implications

- Hypoglycemia rates increased in the post-intervention group due to improved surveillance
- Increasing blood glucose monitoring does not alone prevent hypoglycemia but can proactively detect dropping levels
- Starting blood glucose levels at 120 mg/dl or below carry a 4-5 time increased risk ($P < 0.001$) of hypoglycemia
- For ESRD or high risk patients consider a D10 infusion and reducing the insulin dose to 5 units
- Research findings were presented to 5 Clinical Decision Teams to collaboratively create a new Providence order set

New PSJH 2020 Hyperkalemia – Acute Management

Hyperkalemia - Acute Management [⌵]

Change Information

Notification

This order set was modified 01/21/2020
 For more information on this development, review the [Executive Summary](#)

General

Nursing

Hyperkalemia management
 Details

New Features & Tools For Nurses

- Nursing Management Order
- Serial POCT Blood Glucose Panel
- Streamlined Best Practice Medications

Anticipated Outcomes & Future Direction

1. Decrease in hypoglycemia rates after insulin for acute hyperkalemia management (Goal 5-10%)
2. Increased usage of the hyperkalemia order set in all care areas and an increase in compliance for nurses in completing all required POCT blood glucose checks (Goal 60%)
3. Increased usage of evidence-based medications and a reduction in medications that are not first line agents
4. Follow-up study in Fall of 2020

NAME AND CREDENTIALS: Brandon Wu MN, BSN, PCCN

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- **SHORT BIO (MAX 150 WORDS):** Brandon Wu is a Clinical Educator with Swedish Medical Center and has been with the organization since 2017. Brandon has been a nurse for 5 years, is certified in progressive care nursing, and is a member of Swedish's Evidence-Based Practice Council. He received his Masters of Nursing in Education at UW Bothell and also has a Bachelor's Degree in Nursing and Public Health. Clinical Interests include: Medication Safety, Nursing Education, Infection Prevention, Nursing Research, and Holistic Medicine. Brandon started this Project in 2017 and has been working closely with Pharmacy, Physicians, Informatics, Senior Leaders, and Nurses.
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