Evaluating the Use of Dextrose 50 to Treat Hypoglycemia in the Intensive Care Unit

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Background

- The use of D50 across all Legacy Health Systems from September 1st, 2022, to September 1st, 2023, in the ICU has increased over the past year.
- Insulin and oral anti-diabetic medications require frequent monitoring as they pose a risk of inducing hypoglycemia.
- Reasons why a patient may experience hypoglycemia include inappropriate administration, dosing, improper prescribing of glucose-lowering medications, mismanagement of the initial hypoglycemic episode, interruption or change in nutrition, reduction of corticosteroids, chronic diseases, infections, delayed or missed glucose checks, and emesis.[1]
- Patients with a critical illness on insulin are prone to hypoglycemia, as glucose utilization tends to exceed glucose intake, glycogenolysis, and gluconeogenesis.[1]
- Several studies have indicated that hypoglycemia in hospitalized patients have increased length of stay, mortality, seizures, and coma.[2]
- A trial that led to the skepticism of intensive insulin therapy in critically ill patients was a multicenter follow-up study called the Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation (NICE-SUGAR) trial.[1,3]
- This trial randomized patients into two glucose target ranges: 81-108 mg/dL (intensive control) or 140-180 mg/dL (conventional control).[1,3] The results showed that 90-day mortality rates were greater with intensive insulin therapy compared to conventional therapy (27.5% vs 24.9%).[1,3]

Objectives

The purpose of this medication use evaluation is to determine parameters that have led to an increase of D50 administration due to hypoglycemia in the ICU.

Methods

- Hypoglycemia is linked to an increase in patient mortality, therefore, prevention of hypoglycemia and hyperglycemia in the ICU can reduce costs as well as patient's length of stay in the hospital.
- An analyst will be extracting data parameters pertaining to the use of D50 from September 1st, 2022, to August 31st, 2023, of all patients admitted to the ICU.
- Parameters include degree of hypoglycemia, D50 administration times, anti-diabetic medications utilized, patient characteristics, order set use, nutritional status, and diseases that can influence blood sugar levels.

Methods (cont.)

Table 1: Clinical Characteristics & Administration Details	Categories
Type of insulin prior to D50 administration	Bolus (rapid-acting, short-acting), Basal (intermediate-acting, long-acting), Pre-mixed insulin (rapid/short-acting + intermediate-acting)
Insulin naïve vs PTA insulin	Has the patient been exposed to insulin before?
Type of diabetes	T1DM, T2DM, No DM
Protocol/Order set used	DKA/HHS, ICU insulin infusion, Cardiac surgery, Pediatrics – were these medications ordered within the order set or outside?
Dietary order at the time of D50 administration	NPO, PO, Tube feed, TPN, or diet order changes
Medications impacting blood glucose	Corticosteroids – or were they discontinued prior? Oral diabetic medications and what medication?
Recent emesis	Within 8 hours of D50 administration
Did patient receive glucose tablets or glucagon prior to D50?	Within 60-90 minutes
D50 administration time and time between D50 administration and insulin given	To determine if fasting or meal-time blood sugars were affected
Two blood glucose readings before hypoglycemic event	Within 30 minutes of D50 administration – was it properly managed the first time?
Amount of D50 given	In mL/kg for pediatrics
Follow-up blood glucose after D50 administration	Was it effective, did blood glucose increase over 70/80mg/dL?
How many doses given per episode (within 3 hours) and how many hypoglycemic events	Were there repeat episodes during admission?
RxCST Score	How critical is the patient's condition?
Alterations in medications	Were there dose adjustments or discontinuations to diabetic medications after the event?
Disease states that impact blood glucose	AKI/CKD, heart failure, cirrhosis, adrenal insufficiency, sepsis – do any of these conditions increase a patient's risk for hypoglycemia?

Next Steps

Parameters will be reviewed to analyze any increasing trends that may contribute to a patient's increased risk of requiring D50 administration.

Contacts & Disclosures

The authors declare that they have no relevant or material financial interests that relate to the study described in this poster.

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