Retrospective evaluation of glucose management in critically ill patients in a community hospital

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BACKGROUND

- Hyperglycemia is a common problem in the inpatient setting and is seen in about 40% of critically ill patients[1]
- Hyperglycemia has been associated with poor clinical outcomes, including an increase in patient's risk of infection, poor wound healing, polyneuropathy, and death[2]
- The American Diabetes Association and Society of Critical Care Medicine support the use of insulin for the treatment of persistent hyperglycemia with an initial threshold greater than 180 mg/dL[1, 3]
- A target glucose range of below 180 mg/dL is recommended when initiating insulin for the majority of critically ill patients[3]
- While evidence demonstrating the benefit of utilizing a particular protocol is not clear in the management of glucose in critically ill patients, a protocol should be based on the ICU resources available[4]

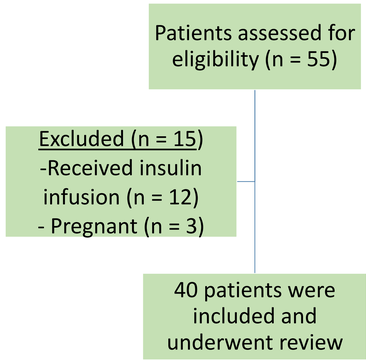
OBJECTIVES

The purpose of this study is to assess glycemic control in the Critical Care Units using the EBCC Subcutaneous Insulin (Diabetes / Hyperglycemia Management) order set and identify opportunities for optimizing care.

METHODS

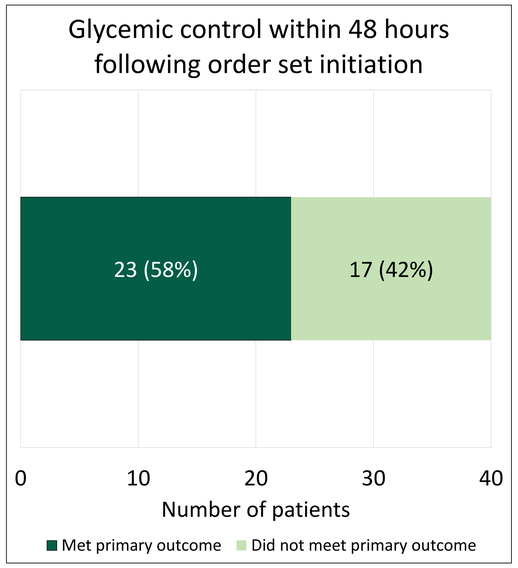
- Study design: Single-center, IRB exempt, retrospective chart review of patients admitted to the hospital's Critical Care Units (ICU/SICU/CCU) and initiated on the EBCC Subcutaneous Insulin (Diabetes / Hyperglycemia Management) order set between September 1st, 2019 and February 29th, 2020
- Inclusion criteria: Individuals ≥ 18 years old, managed with the hyperglycemia order set in the ICU/SICU/CCU, stay in Critical Care Unit for ≥ 48 hours
- Exclusion criteria: Patients with a history of diabetic ketoacidosis, hyperosmolar hyperglycemic state (HHS), postoperative cardiac surgery, known insulin secreting tumor, fulminant hepatic failure, pregnant, or receiving intravenous insulin
- Primary outcomes: Glycemic control, defined by the mean glucose value in target range (70-180 mg/dL) within forty-eight hours after initiating the Subcutaneous Insulin Orders
- Secondary outcomes: The use of basal and pre-meal insulin, sliding scale matching the patient's daily unit requirement, percent of recorded glucose values within target range (70-180 mg/dL), mean overall glucose level, and incidence of hypoglycemia

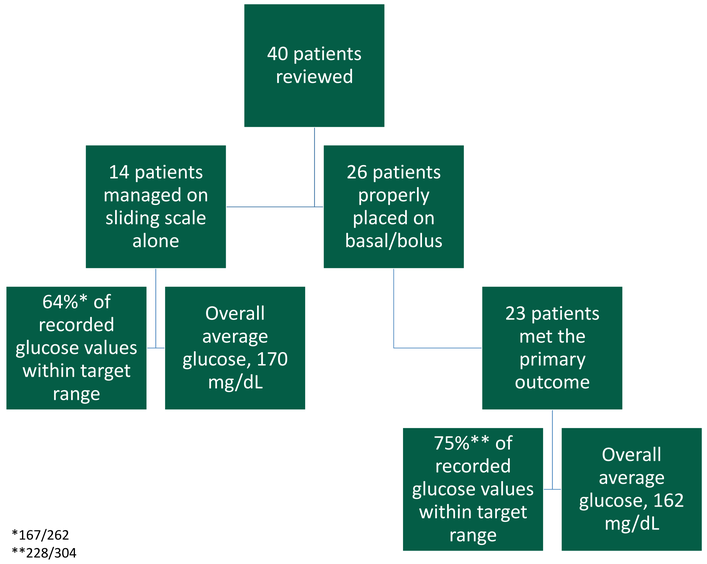
RESULTS



Baseline Characteristics	n = 40
Demographics	
Age (years), median (IQR)	66 (58-78.5)
Weight (kg), median (IQR)	83 (73-93.5)
Gender-male, n (%)	23 (58)
History of diabetes, n (%)	19 (48)
Hemoglobin A1C > 6.5, n (%)	19 (48)
Critical Care Unit length of stay (days), median (IQR)	4 (2.5-6)
Steroids/vasopressors/peripheral edema, n (%)	15 (38)

Primary Outcome





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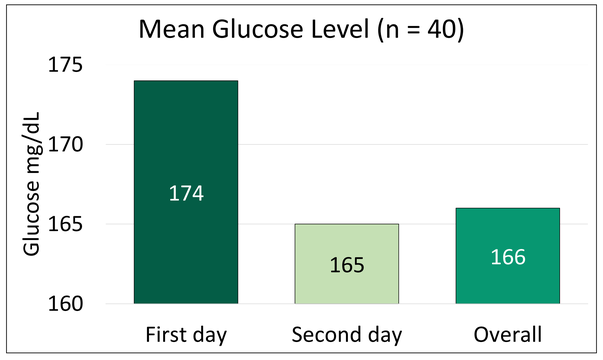
Secondary Outcomes

Endpoints	n = 40
Use of basal and pre-meal insulin, n (%)	26 (65)
Treated with sliding scale alone, n (%)	14 (35)
Appropriate sliding scale regimen, n (%)	31 (78)
Percent of recorded glucose values within target range (70-180 mg/dL)	67%
Incidence of hypoglycemia, n (%)	2 (5)



CONCLUSION

- Primary outcome was achieved in 58% of patients
- Patients placed on a basal/bolus regimen were more likely to achieve glycemic control
- Within our patient population, average glucose level was 174 mg/dL at 24 hours, and at 48 hours an improvement in glycemic control was seen
- The overall average glucose level was 166 mg/dL, below the recommended target of 180 mg/dL
- Seventy-eight percent of patients were on the appropriate sliding scale regimen
- Hypoglycemia occurred in 5% of patients

LIMITATIONS

- Small sample size
- Inpatient insulin therapy is often complicated by many variables including unpredictable food consumption, comorbidity, medications, and patient's insulin resistance

DISCUSSION

- The most commonly used sliding scale was the mild regimen
- Patients with a history of diabetes were more likely to be initially placed on a basal/bolus regimen
- It can be challenging for patients that are on a sliding scale alone to meet the required insulin units to adjust them to the next sliding scale regimen
- Opportunities to optimize the initiation of basal insulins were identified and will be reviewed
- Study results will be presented at Critical Care Committee
- Education to healthcare providers will be conducted to ensure proper utilization of the order set

REFERENCES

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4. Vizzi C, Harris K, Mohrien K, et al. Interventions for hyperglycemia in the medical and surgical intensive care unit. *Critical Care Medicine*. 2020; 48(1): 138.

DISCLOSURES

- All authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have direct or indirect interest in the subject matter of this presentation