

# Incidence of Hypoglycemia Using 5 units versus 10 units of Regular Insulin in the Treatment of Hyperkalemia Patients in the Emergency Department

Yetunde Ademoyo, PharmD, Megan Allen, PharmD, BCPS, Don Ferrill, PharmD, BCPS, Michael Guithues, PharmD, BCPS, Maithili Deshpande, PhD

## Background

- ❖ In the Emergency Department (ED), acute hyperkalemia is managed with a combination of membrane stabilizing, potassium shifting and potassium binding agents.
- ❖ The 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care recommends 10 units of IV regular insulin for the treatment of acute hyperkalemia together with 25g of dextrose.
- ❖ Previous studies have shown that reduced doses of insulin may have an equivalent or lower incidence of hypoglycemia compared to 10 units of insulin
- ❖ In 2018, the ED hyperkalemia order set for Memorial Medical Center was updated to 5 units IV regular insulin as the default dose to reduce the incidence of hypoglycemia

## Purpose

- ❖ This study will evaluate the incidence of hypoglycemia with 5 units of regular insulin compared to 10 units of regular insulin for the treatment of hyperkalemia in ED patients.

## Methods

- ❖ IRB-approved, single center, retrospective study at Memorial Medical Center, a 500-bed teaching hospital
- ❖ Study period: January 2015 to September 2020

### Inclusion Criteria

- $\geq 18$  years old
- Serum  $K^+$   $> 5$ mmol/L
- Utilization of ED hyperkalemia protocol
- 5 vs 10 units of IV regular insulin received in the ED
- Blood glucose (BG) within 12 hours post insulin administration

### Exclusion Criteria

- Pregnancy
- Absence of baseline serum  $K^+$
- Absence of baseline BG and within 12 hours after IV insulin dose
- Baseline BG  $< 70$  mg/dl
- Failure to administer concurrent dextrose with insulin therapy
- Additional insulin before rechecking BG or serum  $K^+$  concentrations

## Endpoints

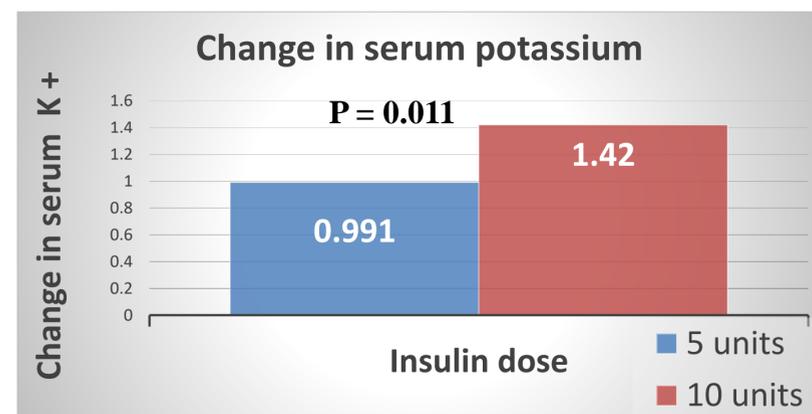
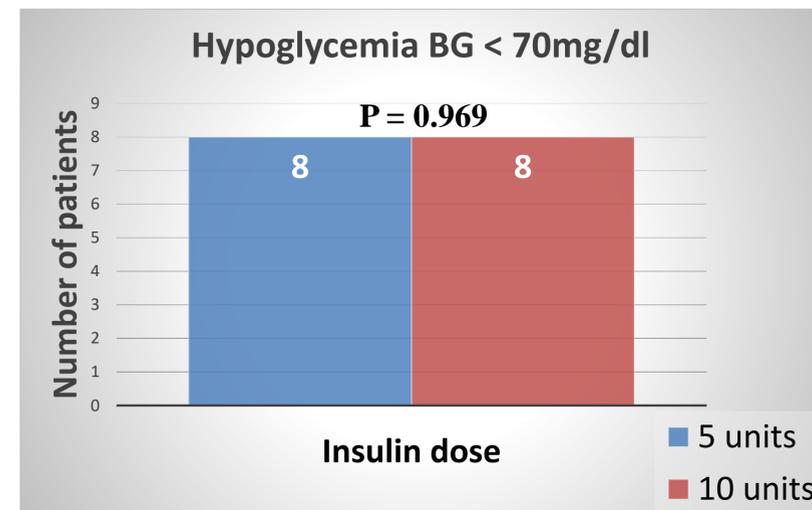
### Primary:

- Incidence of hypoglycemia (BG  $< 70$  mg/dl) within 6 hours of insulin administration)

### Secondary:

- Change in serum  $K^+$  after insulin therapy within 6 hours
- Incidence of severe hypoglycemia (BG  $< 40$  mg/dl) within 12 hours
- Length of hospital stay (LOS)
- In-patient mortality

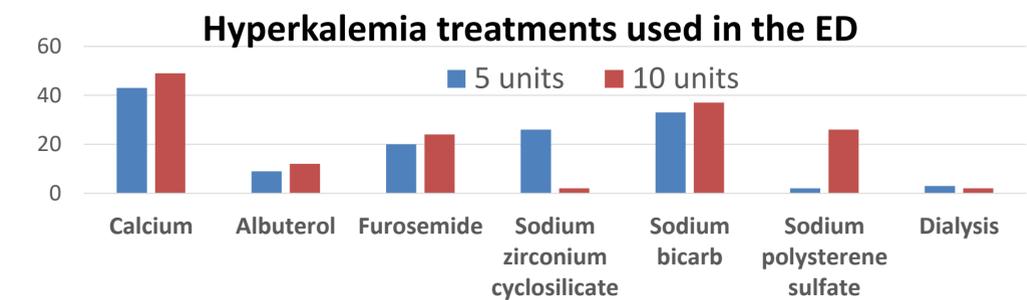
## Results



## Disclosures

- ❖ Authors have no conflicts of interests regarding personal or financial relationships with commercial entities that may have influenced the content or subject matter of this presentation. (Ademoyo.yetunde@mhsil.com)

## Results



## Discussion/ Limitation

- ❖ Baseline characteristics did not differ statistically between groups
- ❖ Hypoglycemia within 6 hours was not significantly different
- ❖ As expected, there was a greater  $K^+$  reduction in the 10 units group compared to the 5 units group, which was statistically significant
- ❖ There was no statistically significant difference in severe hypoglycemia BG $<40$  mg/dl (p=0.491), LOS (p=0.223) or in-hospital mortality (p=0.113) between groups. There was 1 incidence of BG $<40$ mg/dl in the 10 unit compared to none in the 5 unit group
- ❖  $Ca^{2+}$  and sodium bicarb were mostly used in both groups while sodium zirconium cyclosilicate was higher in the 5 unit group due to a formulary change, but it is uncertain this had any effect on the change in serum  $K^+$
- ❖ Limitations include retrospective study, small sample size, single study center, and a formulary change. Hence, further studies are needed to fully assess the impact of both dosing strategies

## Conclusion

- ❖ There was no statistically significant difference in the incidence of hypoglycemia between the 2 groups, possibly because the study was underpowered
- ❖ There was a statistically significant difference in potassium reduction in the 10 units compared to the 5 unit group

## References

- ❖ Moussavi K, Nguyen LT, Hua H, Fitter S. Comparison of IV Insulin Dosing Strategies for Hyperkalemia in the Emergency Department. Crit Care Explor. 2020;2(4):e0092. Published 2020 Apr 29. doi:10.1097/CCE.0000000000000092
- ❖ Schafers S, Naunheim R, Vijayan A, Tobin G. Incidence of hypoglycemia following insulin-based acute stabilization of hyperkalemia treatment. J Hosp Med. 2012;7(3): 239-242. doi:10.1002/jhm.977