

Evaluation of Glucose Management Software in Critically Ill Patients with Hyperglycemic Crises

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BACKGROUND

- The American Diabetes Association recommends the use of a continuous intravenous (IV) infusion of regular insulin as one of the main components in the treatment of hyperglycemic crises, including diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic states (HHS).
- These recommendations also advocate achievement of a blood glucose (BG) reduction of 50-75 mg/dL/hr.
- Our institution utilizes EndoTool® software for management of insulin infusions in ICU patients.
- Studies exist addressing the safety and efficacy of glucose management software programs, however there are limited data using these programs in DKA and/or HHS patient populations.

PURPOSE

- Determine the safety and effectiveness of a computerized glucose management system (EndoTool®) for lowering blood glucose (BG) in DKA/HHS patients.

METHODS

Design

- Single center, retrospective chart review
- Adult patients with a diagnosis of DKA or HHS

Outcome Measures

- Incidence of hypoglycemia (BG less than 60 mg/dL)
- Incidence of severe hypoglycemia (BG less than 40 mg/dL)
- Rate of decrease of BG levels in mg/dL/hr

OBJECTIVES

Inclusion Criteria

- Critically ill adults age 18 years and older
- Diagnosis of DKA or HHS
- Insulin infusion managed with EndoTool® software

Exclusion Criteria:

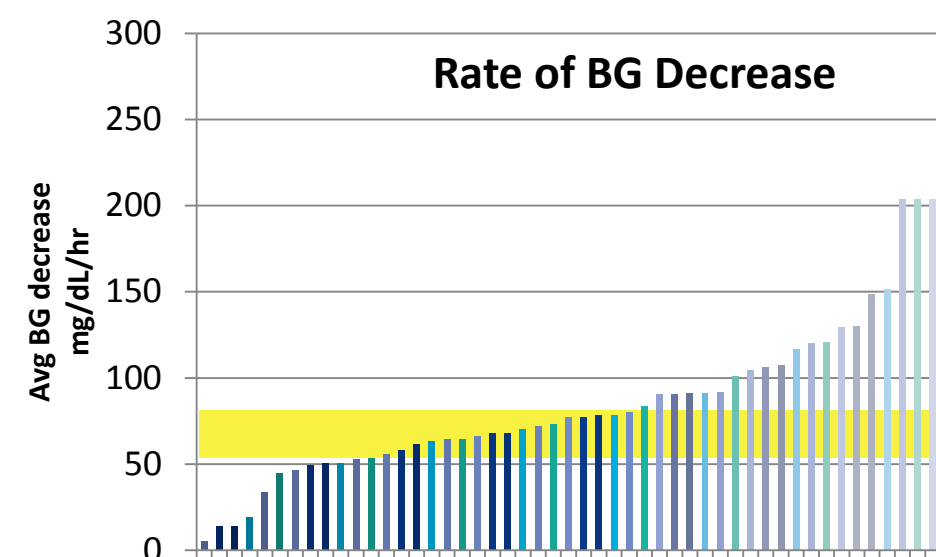
- Pt with initial BG in EndoTool system less than 300 mg/dL

DISCUSSION

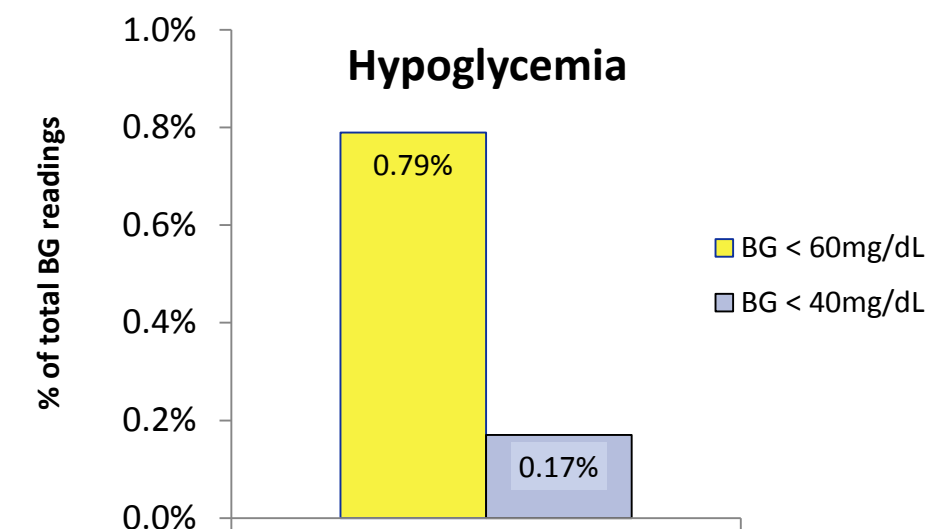
- Majority of patients achieved the minimal recommended rate of BG decrease while on EndoTool® software.
- Rate of hypoglycemia was acceptably low.
- Limitations of the review:
 - Several patients initiated on insulin in emergency department, where software is not used.
 - Criteria for resolution of hyperglycemic crisis were not evaluated.
- Management of patients with HHS could be improved with disease state specific triggers within software.
 - Fluid changes based on BG level.
 - Insulin changes based on ion gap closure.

RESULTS

- A total of 50 patients evaluated
 - 44 patients with a diagnosis of DKA
- Mean rate of BG reduction was 87 mg/dL/hr. A BG reduction of at least 50 mg/dL/hr was achieved in 84% (42) of patients



- Of the 2912 recorded BG measurements, 0.79% (23) were categorized as hypoglycemia and 0.17% (5) categorized as severe hypoglycemia



CONCLUSION

- The management of a continuous intravenous infusion of regular insulin utilizing a computerized glucose management system (EndoTool®) is both safe and effective at lowering BG in DKA and HHS patients.