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Virtual Elimination of Severe Hypoglycemia Utilizing a Computerized Insulin Dosing Algorithm for Intravenous Insulin Infusions

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INTRODUCTION

With increasing CMS scrutiny of inpatient glycemic control, hospitals must minimize both severe hypoglycemia (SH) and hyperglycemia.

Computerized dosing algorithms represent a key strategy to improve system-wide glycemic outcomes.

AIM

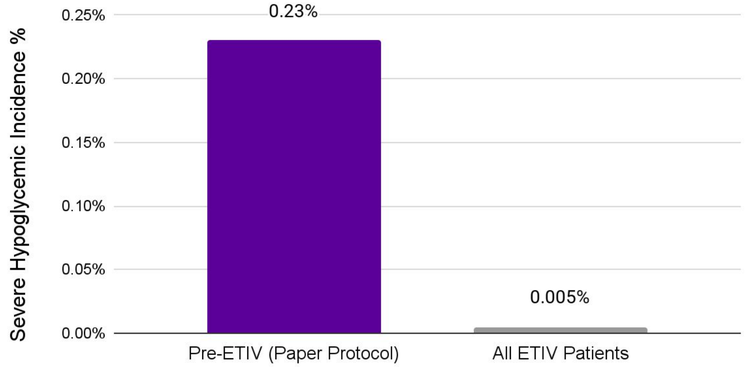
Evaluate the impact of EndoTool IV (ETIV) on reducing Severe Hypoglycemia (SH) (Blood Glucose < 40 mg/dL) across 19 hospitals at a prominent health system.

Determine if high-risk patients with renal insufficiency (eGFR < 15 cc/min) also achieved significant reductions in SH.

METHOD

- **Study Design:** A three-year retrospective analysis from January 2023 through December 2025.
- **Population:** All BG values from patients treated with intravenous insulin (IVI) were analyzed.
- **Comparison:** ETIV outcomes were compared against a historical subset treated with standard paper protocols.
- **Analysis:** SH incidence was calculated as total SH readings divided by total BG readings.
- **Subgroup Focus**: Patients with eGFR < 15 cc/min were compared directly to those with eGFR > 60 cc/min.

98% Reduction in Severe Hypoglycemia Following ETIV Implementation



Patient Group	SH Incidence (%)	Total SH Readings
Pre-ETIV (Paper Protocol)	0.23%	—
All ETIV Patients	0.005%	18
ETIV DKA Subgroup	0.007%	—
eGFR < 15 (High Risk)	0.007%	1
eGFR > 60 (Standard)	0.005%	7

RESULTS

Volume: 17,838 patients treated with ETIV; 362,901 total blood glucose values obtained.

98% SH Reduction: System-wide SH incidence dropped to **0.005%** (18 readings) compared to **0.23%** with paper protocols.

DKA Performance: 4,804 patients were managed via DKA-specific protocols with an SH incidence of only **0.007%**.

Renal Safety:

- **eGFR < 15:** 0.007% SH incidence (1 reading in 677 patients).
- **eGFR > 60:** 0.005% SH incidence (7 readings in 7,197 patients).

Hypoglycemia Prevention: 2,213 potential episodes of hypoglycemia (< 70 mg/dL) were avoided due to ETIV-recommended prophylactic carbohydrates.

Hyperglycemia: Severe hyperglycemia remained low at **0.17%**.

CONCLUSIONS

Near-Complete Elimination of SH: ETIV utilization nearly eliminated severe hypoglycemia while maintaining control over hyperglycemia.

Universal Success: Performance remained consistent across academic centers and small community hospitals.

Neutralizing Renal Risk: Patients at the highest risk for SH (eGFR < 15) achieved safety outcomes similar to those with normal renal function.

Predictive Power: The software's ability to recommend prophylactic intervention prevented over 2,200 hypoglycemic events.

Standard of Care: In an era of mandatory SH reporting, computerized algorithms should be considered essential for improving glycemic safety.

REFERENCES

JOSEPH ALOI et al; 1057-P: Improvement in Hypoglycemia Rates with EndoTool IV. Diabetes 20 June 2023; 72 (Supplement 1): 1057-P