

# Evaluating the Effect of EndoTool Utilization for Glycemic Control in Critically Ill Patients

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## Introduction

- EndoTool IV (ETIV) is an algorithm that dictates insulin-dosing regimen based on blood glucose values
- It was initiated to reduce and even eliminate redundancies and human errors, this algorithm has improved hypoglycemia rates and avoided errors in insulin dosing
- This study analyzes patient outcomes for a comparable three-month period pre- and post-implementation of ETIV in two critical care units at UPMC Central PA

## Methods

- A retrospective study done to compare patients who were managed on an insulin drip pre- and post-ETIV implementation at the UPMC Central PA hospitals. Data was obtained from Epic EMR over 2 months
- Pre-ETIV implementation group included 125 patients and post-ETIV implementation group included a total of 162 patients
- Inclusion criteria consisted of adult patients hospitalized who required an insulin drip
- The primary outcome was the time (days) on insulin drip
- Secondary outcomes included hypoglycemic events, length of hospital stay, readmission rate, electrolyte management

## Results

- Post-ETIV implementation showed statistically significant reduction in time on insulin infusion, average time to reach goal blood glucose of 140 , and rate of hypoglycemic events with blood glucose < 70
- Also demonstrated a reduction in ICU length of stay , hospital length of stay, cost of ICU charges per patient, although not statistically significant

|                                     | MAY - JULY 2022         |   | SEPTEMBER - DECEMBER 2022     |   |
|-------------------------------------|-------------------------|---|-------------------------------|---|
| Metrics                             | Pre- Implementation     | Pre- Implementation on Standard Deviation | 3 months Post- Implementation | Post- Implementation Standard Deviation |
| Total Patients                      | 125 total               |   | 162 total                     |   |
| Average Age                         | 65.6 years              | 11.8                                      | 64.5                          | 11.3                                    |
| Average ICU LOS (Days)              | 5.3                     | 5.6                                       | 4.76                          | 4.85                                    |
| Average Hospital LOS (Days)         | 11                      | 9.9                                       | 8.6                           | 4.49                                    |
| Average Time on Infusion (Hours)    | 58.16 hours             | 57:00                                     | 41.4                          | 24.5                                    |
| Average ICU Charges                 | \$42,032 av per patient | \$50,681                                  | \$32,162                      | \$37,223                                |
| Average #BG checks while on drip    | 67 on average           | 49  | 31.2                          | 26.6                                    |
| Average Time to Goal of 140 (Hours) | 18:15                   | 13:02                                     | 4.7                           | 4.76                                    |
| % of values < 70                    | 2.11%                   | 168/7957                                  | 0.530%                        | 27/5058                                 |
| % of values < 40                    | 0.14%                   | 11/7957                                   | 0.000%                        | 0/5058                                  |

## Discussion

- There was a fourfold reduction in hypoglycemia less than 70mg/dl and the complete elimination of severe hypoglycemia (blood glucose less than 40 mg/dl).
- Reduction in the average time required to achieve blood glucose targets, reducing the progression of DKA and hastening patient's recovery
- ETIV offers advantages such as simplifying insulin dosing, reducing the cognitive load on clinicians and possibly reducing errors
- By offering an individualized dosing regimen based on a patient's specific conditions, it also has the potential to improve patient care
- Given the increasing prevalence of diabetes and its complications, innovative solutions like ETIV are critical in managing these patients and improving their prognosis

## References

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