Improved Glycemic Control with Utilization of a Computerized Subcutaneous Insulin Dosing Application

Ajay D Rao MD MMSc, Paul Chidester MD FACP

Financial Disclosures

Paul Chidester: Monarch Medical Technologies
Ajaykumar Rao: Temple University Hospital and Katz School of Medicine

Background

As academic medical centers expand to include community hospitals, variation in glycemic management practices can emerge. Temple Health, an academic health system with three hospitals relied heavily on sliding scale insulin (SSI) for inpatient diabetes care. This approach contributed to unacceptably high levels of hypoglycemia.
To reduce these adverse outcomes and meet American Diabetes Association (ADA) standards, they implemented a patient-specific subcutaneous insulin dosing platform, EndoTool SubQ (ET SQ) to improve glycemic control.

Objective

Determine whether the implementation of ET SQ improved inpatient glycemic control, particularly in reducing hypoglycemia and hyperglycemia rates.

Method

In June 2024, a 146-bed community hospital within the system deployed EndoTool SubQ. Providers could choose between:
- Continuing with pre-existing protocols or
- Using EndoTool's dosing options:
  - Basal/Bolus/Correction (BBC)
  - Basal + Correction
  - Bolus + Correction
  - Correction only

Data was collected for:
- 2,647 total patients over 8 months
- 584 patients on the BBC protocol

Outcomes assessed:
- % of patient days and stays with hypoglycemia <70 mg/dL
- % of patient days and stays with severe hypoglycemia <40 mg/dL
- % of patient days with severe hyperglycemia >300 mg/dL

Comparison was made against the 2024 Society of Hospital Medicine database for Temple University Health System.

Results

Prior to the use of ET, 0.5% of patient days had an episode of Severe Hypoglycemia (SH); with ET the incidence was 0.19% of patient days (p=0.00008).
Patient stays with SH decreased from 1.9% to 0.64% (p< 0.00001). Patients treated with BBC had slightly higher rates of SH days and stays of .36% and 0.77% respectively.
The incidence of SH was 0.044%. The incidence pre-ET was not available.

Outcomes for All Modes of Therapy		
Hypoglycemia <70 mg/dL		
Metric	**Pre ETSQ**	**Post ETSQ**
% of Patient days	**4.7%**	**2.8%**
% of Patient stays	**15.7%**	**7.9%**
Hypoglycemia <40 mg/dL		
Metric	**Pre ETSQ**	**Post ETSQ**
% of Patient days	**0.5%**	**0.19%**
% of Patient stays	**1.9%**	**0.64%**

Outcomes for Basal Bolus Correction		
Metric	**Pre ETSQ**	**Post ETSQ**
Hyperglycemia % of patient days >300 mg/dL	**5.5%**	**3.2%**
% of Patient days <70 mg/dL	**4.7%**	**3.9%**
% of Patient days <40 mg/dL	**0.5**	**0.36%**
% of Patient runs <70 mg/dL	**15.7%**	**8.1%**
% of Patient runs< 40 mg/dL	**1.9%**	**0.77%**

Conclusion and Discussion

EndoTool SubQ was associated with a significant reduction in SH across the hospital population and overall outcomes remained favorable.
Key Insights:
- Transitioning from SSI to basal insulin required focused clinical education.
- BBC mode was effective but required more familiarity with basal insulin kinetics.
- Adoption of patient-specific clinical decision support tools can support consistent, guideline-aligned care.

As systems expand, patient-specific insulin dosing tools and training will be key to reducing variability and improving outcomes.