

Retrospective Study Evaluating Blood Glucose Endpoints in Patients with Type 2 Diabetes on Acute Care Medical Units (R-SwEET)



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Background

- Sliding scale insulin (SSI) has historically been used as the sole method for managing hyperglycemia for patients on acute care medical units (ACMUs)
- Current practice guidelines recommend a proactive approach to managing hyperglycemia, such as Basal-Bolus-Correctional (BBC) insulin instead of a reactive approach such as SSI
- A study at Vancouver General Hospital (VGH) by Harbin et. al. showed that use of a BBC-based PPO was associated with improved glycemic control in the vascular surgery diabetic population¹
- At Surrey Memorial Hospital (SMH), SSI has been the most commonly used insulin regimen for patients on ACMUs
- The effectiveness of blood glucose (BG) control methods on ACMUs is currently unknown

Objectives

- To characterize the effectiveness of BG control in patients with type 2 diabetes mellitus (T2DM) admitted to an institution-specific ACMU
- To describe the most common insulin regimens used for BG control in patients with T2DM admitted to ACMUs

Methods

- Design:** Retrospective single-centre chart review at SMH
- Sample Size:** n=151
- Inclusion Criteria:** Adult patients with T2DM admitted to institution specific ACMUs
- Exclusion Criteria:** No prior diagnosis of T2DM, any acute critical or surgical illness, eGFR < 30mL/min, diabetic ketoacidosis on admission, endocrinologist consult, length of stay ≤ 3 days, ICU admission during stay and use of insulin pump
- Primary Outcome:**
 - Percent of total measurements within target range (BG = 4 – 10 mmol/L)
- Secondary Outcomes:**
 - Percent of hypoglycemic episodes during hospital stay (BG < 4 mmol/L)
 - Percent of hyperglycemic episodes during hospital stay (BG > 10 mmol/L)
 - Percent of prandial measurements (breakfast + lunch + dinner) within target range (BG = 4 – 10 mmol/L)
 - Percent of evening measurements within target range (BG = 4 – 10 mmol/L)

Results

Table 1: Baseline Characteristics

Characteristics	Sliding Scale Insulin (n = 50)	Basal-Plus Insulin (n = 50)	Basal-Bolus-Correctional (n = 51)
Age – mean (± SD)	73.7 (13.2)	70.4 (15)	65.1 (13.6)**
Male – no. (%)	21 (42)	23 (46)	28 (55)
Mean BMI (kg/m ²)*	26.5	26.2	31.9
Comorbidities – no. (%)			
Hypertension	38 (76)	44 (88)	44 (86.3)
Dyslipidemia	30 (60)	27 (54)	33 (64.7)
Coronary artery disease	17 (34)	28 (56)	22 (43.1)
Peripheral vascular disease	3 (6)	7 (14)	5 (9.8)
Chronic kidney disease	8 (16)	13 (26)	20 (39.2)**
Length of stay – mean (± SD)	9.8 (7.1)	16.1 (16.4)	33.2 (54)**

*Data available for n=1 Sliding Scale, n=2 Basal-Plus, n=4 Basal-Bolus-Correctional

** Statistically Significant (p<0.05)

Table 2: Primary and Secondary Outcomes

Outcome	SSI (n = 50)	BP (n = 50)	BBC (n = 51)	P-value
Primary Outcome				
% Blood Glucose Measurements within Target Range (4 – 10 mmol/L) (mean±SD)	53±24%	45± 23%	52±25%	0.16*
Secondary Outcomes				
% Hypoglycemic Blood Glucose Measurements (<4 mmol/L) (mean±SD)	1±3%	2±4%	3±4%	0.08**
% Hyperglycemic Blood Glucose Measurements (>10 mmol/L) (mean±SD)	47±26%	53±23%	46±25%	0.28*
% Prandial Blood Glucose Measurements within Target Range (4 – 10 mmol/L) (mean±SD)	54±24%	45±22%	51±25%	0.18*
% Evening Blood Glucose Measurements within Target Range (4 – 10 mmol/L) (mean±SD)	52±34%	42±30%	54±32%	0.14*

*For parametric data, the one-way ANOVA test was used

**For non-parametric data, the Kruskal-Wallis Test was used

Figure 2: Secondary Outcome: Percentage of Prandial and Evening Blood Glucose Measurements within Target Range (4 – 10 mmol/L) (±SD)

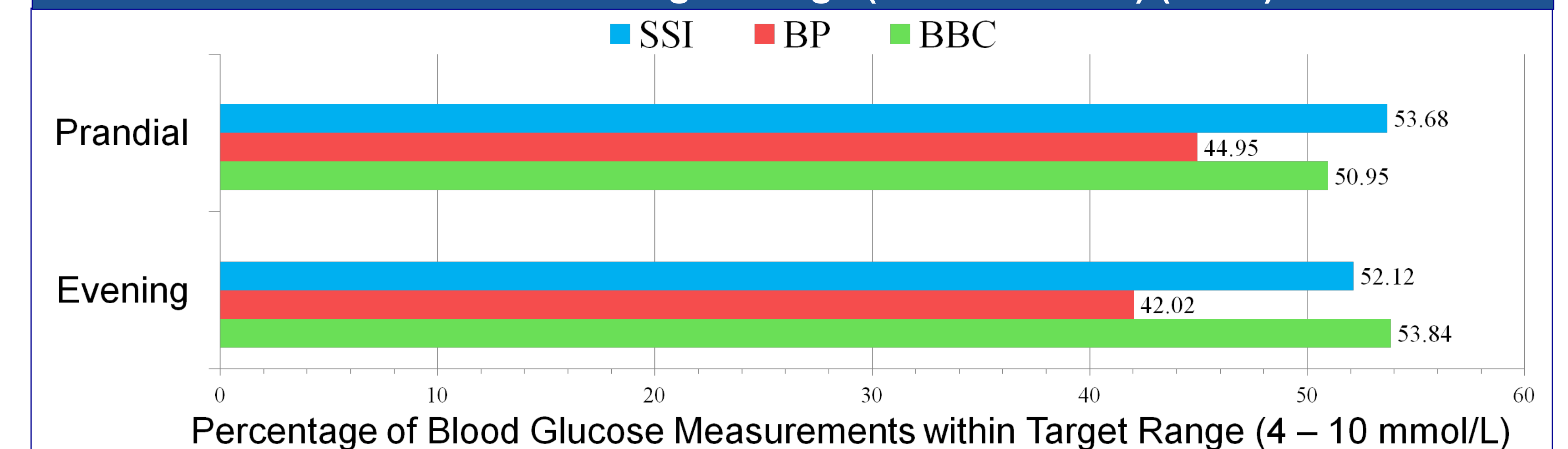
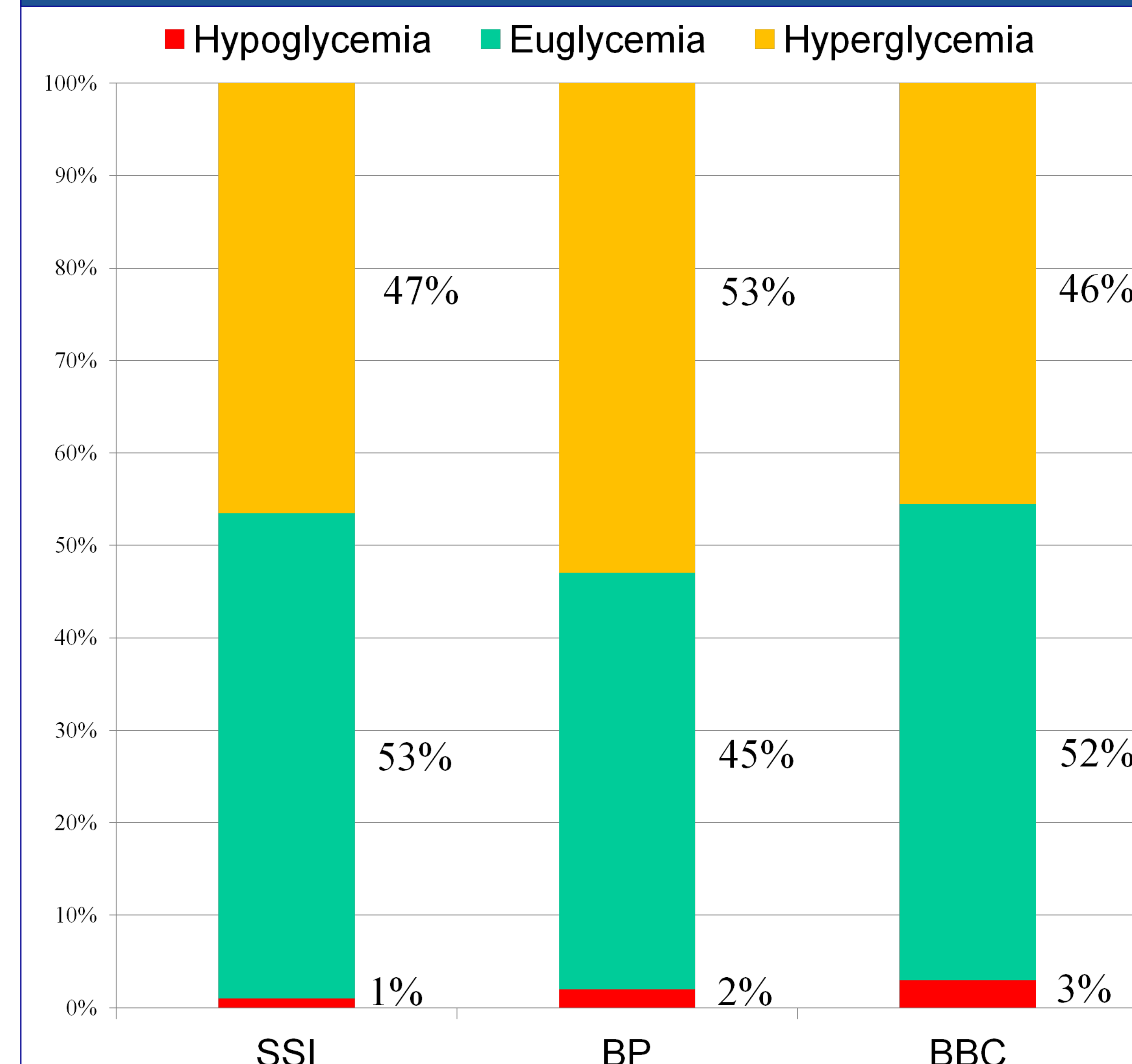


Figure 1: Mean Percentage of Total Blood Glucose Measurements by Group



Discussion

- No difference between SSI, BP, and BBC insulin regimens may be due to lack of standardized protocol for BBC insulin orders
- A future trial which assesses blood glucose post implementation of a BBC pre-printed order may elucidate whether BBC leads to improved glucose outcomes with less hypoglycemia
- Limitations
 - Study underpowered to detect statistically significant differences between SSI, BP, and BBC with respect to BG management
 - Reliance upon accurate documentation for blood glucose measurements
 - Retrospective chart review – unable to assess symptomatic hypoglycemia

Conclusions

- At SMH, BBC insulin dose not appear to result in statistically significant differences with respect to euglycemia, hypoglycemia, or hyperglycemia compared to SSI or BP insulin regimens

Reference:

1. Harbin M, Dossa A, de Lemos J, Drummond I, Paty B, Taylor B. Evaluation of Protocol-Guided Scheduled Basal-Nutritional-Correction Insulin Over Standard Care for Vascular Surgery Patients. *Can J Diabetes*. 2015; (39): 210-215