

## Surgical Intensive Care Unit Glycemic Control Guideline

**Purpose:** To standardize the management of hyper and hypoglycemia in the Surgical Intensive Care Unit (SICU)

### Guidelines for Maintenance of Euglycemia

All patients admitted to the SICU should have a blood glucose (BG) level checked upon admission. Patients will be divided into high and low risk for abnormal BG values based on patient specific criteria listed below.

#### High Risk

- Sepsis
- Acute resuscitation
- Hemodynamically unstable
- Admission for a necrotizing infection
- Multiorgan dysfunction
- Baseline uncontrolled diabetes
- Post-operative liver transplant
- Impaired liver function

#### Low Risk

- Non-diabetic patients who are not critically ill

### Initial Management

#### High Risk Patients

1. Initiate the Adult Insulin Infusion Protocol
2. Select the SICU target BG range of 100-130 mg/dL
  - a. If the patient is not a surgical patient, choose the appropriate BG target range based on patient type (e.g. medical, trauma, neurology)
3. Ensure a dextrose source is being administered
  - a. Adequate dextrose sources include D10W IV at 30 mL/hr, D5W IV at 60mL/hr, tube feeds running at 60% goal rate, and total parenteral nutrition (TPN)
  - b. If enteral or parenteral nutrition is stopped while on an insulin infusion, D10W IV at 30 mL/hr should be started.

#### Low Risk Patients

1. If admission BG is  $> 180$  mg/dL, initiate subcutaneous sliding scale per the SICU order panel
2. If admission BG is  $\leq 180$  mg/dL, no insulin order is required at this time. If the patient has two or more BG values  $> 180$  mg/dL, then initiate subcutaneous sliding scale per the SICU order panel

### Transitioning from an Insulin Infusion to Sliding Scale Insulin

Consider transitioning to slide scale insulin in the following patients:

- Hemodynamically stable
- Euvolemia and/or without anasarca (edema can impair subcutaneous insulin absorption)
- Low insulin requirement (average insulin infusion rate less than 5 units/hr)

- No longer critically ill
- Patient transferring to step down/general care floor

#### Calculate Initial Insulin Dose

- If a patient is requiring less than or equal to 3 units/hr of the insulin infusion, basal insulin (insulin glargine) is not required and sliding scale insulin can be ordered per the SICU order panel.
- If a patient is requiring greater than 3 units/hr of the insulin infusion, basal insulin (insulin glargine) may be needed in addition to sliding scale insulin.
  1. Calculate the amount of insulin used in the past 24 hours from the insulin infusion.
  2. Give 30% of the 24 hour insulin requirement as the basal insulin dose
    - a. Basal insulin should be administered 2 hours prior to discontinuation of the insulin infusion
    - b. Give regardless of oral intake

#### Transitioning from Sliding Scale Insulin to an Insulin Infusion

If a patient on sliding scale insulin has 2 or more blood glucoses greater than 250 mg/dL, the provider may consider starting an insulin infusion and following the protocol for high risk patients listed above.

#### Discontinuing Sliding Scale Insulin

Consider discontinuing sliding scale insulin for the following patients:

- Has a consistent dextrose/nutrition source and requires minimal insulin (<10 units/day)
- Blood glucoses consistently less than 180 mg/dL without insulin administration

#### Prevention of Hypoglycemia

Patients at a high risk of hypoglycemia should have a continuous dextrose source. Examples of appropriate dextrose sources include D10W IV at 30 mL/hr, D5W IV at 60mL/hr, tube feeds running at 60% goal rate, and total parenteral nutrition (TPN). When a dextrose source is stopped or changed, blood glucoses should be closely monitored and hypoglycemia should be treated per the hypoglycemia order panel.

#### Endocrine Consults

Endocrine consults should be considered for the following circumstances:

- Patient is on U-500 (concentrated) insulin at home
- Patient uses an insulin pump at home
- Patient is a Type 1 Diabetic
- Difficulty transitioning off the insulin infusion
- Difficult to control patients on complex nutrition regimens (e.g bolus tube feedings, night time tube feedings)

#### References:

1. Bode BW, Braithwaite SS, Steed RD, Davidson PC. Intravenous insulin infusion therapy: indications, methods, and transition to subcutaneous insulin therapy. *Endocrine Practice* 2004;10(2):71-80.
2. Jacobi J, Bircher N, Krinsley J, et al. Guidelines for the use of an insulin infusion for the management of hyperglycemia in critically ill patients. *Critical Care Medicine* 2012; 40:3251–3276.
3. Kauffmann RM, Hayes RM, Jenkins JM, et al.: Provision of Balanced Nutrition Protects Against Hypoglycemia in the Critically Ill Surgical Patient. *Journal of Parenteral and Enteral Nutrition* 2011; 35:686–694.

4. Mowery NT, Gunter OL, Kauffmann RM, et al.: Duration of time on intensive insulin therapy predicts severe hypoglycemia in the surgically critically ill population. [Internet]. World Journal of Surgery 2011; 36:270–277.

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