

Management of Type II Diabetes in Hospitalized Patients

Key points:

- Stress associated with acute illness tends to raise blood glucose (BG) levels.
- Decreased oral intake or changes in enteral/parenteral nutrition may result in lower than usual BG levels.
- Predicting BG levels in hospitalized patients is challenging.
- This guideline is not intended for use in patients with DKA/HHS

Goals of management:

- Avoid hypoglycemia (BG <70 mg/dL)
- Avoid severe hyperglycemia (see glycemic targets below)
- Ensure adequate nutrition
- Provide education as needed
- Ensure appropriate discharge management/follow-up

University Hospital Glycemic Protocols

- The ICU Glycemic control PowerPlan is a nurse driven protocol to manage hyperglycemia in critically ill patients. An insulin drip is included and should be automatically ordered when indicated. The ICU Glycemic control PowerPlan is intended for use only in critical care settings.
- The Non-Critical Glycemic Control PowerPlan includes options for basal, bolus, and SSI for patients who are clinically stable and can be used in any hospital setting.

Glycemic targets:

1. Critically ill: 140-180 mg/dL
2. Noncritically ill: pre-prandial target is <140 mg/dL and all random BGs are <180 mg/dL
3. Minimal levels: 90-100 mg/dL to allow room for decreases due to unexpected changes

Insulin Regimens (see below for specific dosing recommendations):

1. Sliding scale: less reliable method of correction in which rapid acting insulin is given every 4 hours based on BG levels independent of mealtime. (This is the typical management at USA)
2. Basal/long-acting insulin: given daily or BID to provide baseline level of control
3. Bolus/mealtime insulin: rapid acting insulin given prior to eating a meal, often combined with basal dosing
4. Correction insulin: rapid acting insulin that is ADDED to the pre-meal bolus dose when hyperglycemia is present prior to eating. (Not included in USA PowerPlans)
5. Continuous regular insulin infusion: regular insulin that infuses continuously and is initiated & titrated per a nursing protocol.

Insulin dosing recommendations:

1. Patients on home basal/bolus insulin: continue home regimen but consider reducing the dose by 25-50% due to more controlled oral intake while hospitalized, adjust dose as needed every 1-2 days.
2. Patients NOT on home basal/bolus insulin who have an A1c >9 or use >20 units of SSI who are also getting oral, enteral, or parenteral nutrition:
 - a. Basal insulin: start with Lantus 0.3 units/kg/day. Titrate by 10-20% every 1-2 days to achieve target BG levels. Dose should be given daily until >80 units is needed per dose.
 - b. Bolus insulin: start with Lispro 0.05-0.1 units/kg/meal. Titrate by 1-2 units/dose every 1-2 days to achieve target BG levels.
 - c. Lispro sliding scale: given as a bolus dose q4h PRN for patients who are not eating consistent meals or as corrective insulin for pre-meal hyperglycemia
3. Critically ill patients should transition to an insulin infusion if any one BG is >300 mg/dL or two consecutive BGs are >200 mg/dL. When placed on the ICU Glycemic PowerPlan, the nurse should automatically transition to the drip when criteria are met. Always verify that the drip was started.

Special considerations:

1. ICU patients requiring an insulin drip should be transitioned to basal insulin with either mealtime or SSI once they reach a steady infusion rate.
 - a. Calculate the total insulin used in 24 hours.
 - b. Give 50% as basal/long-acting insulin.
 - c. Give the remainder as bolus/mealtime dosing (if eating) or SSI (if on continuous nutrition).
 - d. Titrate the doses as above.
2. Patients on continuous nutrition should have BGs monitored q4h and receive basal/SSI regimens as above
3. Patients with acute infection may have increased blood glucose levels that return to baseline once treated. Use caution when increasing basal insulin in septic patients.
4. If patients transition to NPO, reduce basal insulin by 50% or discontinue completely based on their clinical condition.

Home Medications:

- Hold oral medications in most patients
- Stable patients with well controlled BGs and consistent oral intake may take oral medications, use caution with Metformin
- Metformin is contraindicated with impaired renal function and hemodynamic instability due to the risk of lactic acidosis including AKI, dehydration, sepsis, urinary obstruction, and impending surgery or radiocontrast studies.