



Best Practice Summary

Bedside Glycemic Management

November 2022

General

- Medical centers striving for optimal inpatient diabetes treatment should establish protocols and structured order sets, which include computerized physician order entry.
- When caring for hospitalized patients with diabetes, consult with a specialized diabetes or glucose management team when possible.
- If an onsite team is unavailable, telehealth consultation should be used.

Administration

- Insulin is thick and viscous and needs to be administered appropriately to have the intended effect.
- It works best if given with the first bite of a meal, but may be given up to 20 minutes after the first bite if 50% of the meal is eaten.
- To administer insulin correctly, the needle must remain in the skin for 10 seconds to ensure the full dose passes through the needle.
- Insulin pumps:
 - Insulin should have a dedicated line. Denatured insulin coats the interior of the IV tubing, which allows the dose of the insulin to properly flow through the tubing and be administered appropriately.
 - If you try to incorporate other fluids in the same line as the insulin, such as maintenance fluid, the velocity of the maintenance fluid may “rinse off” the denatured insulin lining the tube, which would then allow the insulin dose to stick to the IV tubing and not be fully administered.
- If self-management is to be used in the hospital, a protocol should include requiring the patient, nursing staff and physician to agree that patient self-management is appropriate.
 - Patient competency must be assessed initially and throughout the hospital stay to ensure safe use.

Basics of basal/bolus insulin therapy

- Basal/bolus is considered best practice, as opposed to sliding scale, for maintaining a stable blood glucose level.
- The target pre-meal BG level for all patients is 100-180 mg/dL.
- Basal insulin prevents ketosis and maintains steady BG levels when a patient is not eating or receiving nutrition.
- Prandial insulin is released by the body after a meal and may need to be supplemented with correction insulin.
- Rapid-acting analog insulin is used for correction when necessary to compensate for prandial consumption.

- In hospitalized patients with diabetes who are eating, bedside glucose monitoring should be performed before meals. In those not eating, glucose monitoring is advised every four to six hours.

Nutrition considerations

- Nutrition recommendations advise individualization based on treatment goals, physiological parameters and medication use. Many hospitals prefer consistent carbohydrate meal plans as they facilitate matching the prandial insulin dose to the amount of carbohydrates consumed.
- Orders should indicate that meal delivery and nutritional insulin coverage should be coordinated, as their variability often creates the possibility of hyperglycemic and hypoglycemic events.
- If possible, carbohydrate counting should be provided by the hospital kitchen for each meal.
- Patients should generally be following an insulin-to-carbohydrate ratio of 1:10.

Prescriber and RN guidance for insulin administration				
Insulin type	Insulin action	Insulin name	Times taken	Notes
Basal	Long acting	glargine (Lantus, Basaglar) OR (Semglee)	Give once or twice a day	<ul style="list-style-type: none"> • Keeps blood glucose in range between meals and overnight • Most patients take glargine once/day • Give at the same time(s) each day • Do NOT hold if patient is NPO
Prandial	Rapid acting	lispro (Admelog, Humalog) OR aspart (Novolog)	Give +/- 15 minutes of the first bite of a meal BG: AC & HS	<ul style="list-style-type: none"> • Most patients receive standard (same) dose with each meal • Give only if patient is eating • Hold if patient is skipping meal or NPO • Prandial insulin order <u>may</u> allow RN to hold insulin without contacting team if patient is not eating or is NPO
Correction	Rapid acting	lispro (Admelog, Humalog) OR aspart (Novolog)	Give to "correct" hyperglycemia	<ul style="list-style-type: none"> • Give correction insulin to "correct" hyperglycemia even if patient is NOT eating • If patient is eating, give correction according to BG <u>together</u> with standard prandial dose in a single injection • If patient is not eating, give a correction dose alone

Hypoglycemia awareness

- A hypoglycemia management protocol should be adopted and implemented by each hospital or hospital system. A plan for preventing and treating hypoglycemia should be established for each patient. Episodes of hypoglycemia in the hospital should be documented in the medical record and tracked for quality improvement/quality assessment.
- It is important to ask your patients if they ever experience symptoms of hypoglycemia (shakiness, dizziness or lightheadedness, sweat). Many patients are unaware of “hypoglycemia” but are aware that they feel unwell when their blood glucose gets below a certain number. Ask the patient if they have a general BG number they identify as the standard for symptoms.
- Hypoglycemia alert when BG <70 mg/dL.
- Clinically significant hypoglycemia when BG <54 mg/dL.

Diabetes medication adjustments for procedures and surgeries

- The target range for BG in the perioperative period should be 80-180 mg/dL.
- A preoperative risk assessment should be performed for patients with diabetes who are at high risk for ischemic heart disease and those with autonomic neuropathy or renal failure.
- Monitor BG at least every two to four hours while the patient is taking nothing by mouth and dose with rapid-acting insulin as needed.

Reducing insulin-related errors

- Avoid look-alike/sound-alike insulins.
- Use barcode scanning when dispensing and administering medications.
- Standardize dosing using electronic order sets in the EHR.
- Set maximum dose alerts when possible.
- Use medication event reports to identify root causes of errors and seek system-wide solutions.

Patient self-education/management

- Teach patients proper insulin dose measurement and self-administration, including injection and site rotation.
- Ensure patients have the ability to use a blood glucose meter or continuous glucose monitor to check glucose and understand the results.
- Teach proper use and disposal of pen needles, syringes, lancets and insulin pump supplies.
- Patients should be able to identify hypoglycemia and hyperglycemia symptoms, treatment and prevention.

- Ensure patients are aware of how to calculate carbohydrates in meals for managing doses on their own.

Discharge planning

- Educate patients and family about any changes in their home medication list prior to admission and highlight discontinued or newly prescribed medications.
- Provide patients with verbal and up-to-date written instructions on their diabetes management plan.
- Ensure patients have or will obtain the necessary diabetes medications and supplies and reconcile if needed.
- Have a follow-up plan within two weeks to adjust diabetes medications and continue self-management and education.

Resources

American Diabetes Association, "Diabetes Care in the Hospital: Standards of Medical Care in Diabetes—2022,"
https://diabetesjournals.org/care/article/45/Supplement_1/S244/138924/16-Diabetes-Care-in-the-Hospital-Standards-of

Desemone, James, *Inpatient Glycemic Management 101*, EQIC webinar, April 26, 2022

Desemone, James, *Inpatient Glycemic Management 201: Optimizing glucose management in hospitalized patients*, EQIC webinar, May 24, 2022

Mendelsohn Curanaj, Felicia A., Seley, Jane J., *Perioperative glycemic management*, EQIC webinar, June 28, 2022

Mendelsohn Curanaj, Felicia A., Seley, Jane J., *Medication Management and Discharge Planning*, EQIC webinar, July 26, 2022