

ADULT ICU GLYCEMIC CONTROL INTERIM GUIDANCE DURING THE COVID-19 PANDEMIC

I. Background and Aim:

This document will serve as an interim clinical practice guideline for the use of glycemic control in the adult intensive care unit (ICU) patients. The typical ICU Glycemic Control Protocol that utilizes a continuous insulin infusion requires frequent blood glucose (BG) checks for safe titration. During the COVID-19 pandemic, a new protocol utilizing subcutaneous insulin has been created to conserve PPE and limit nursing time in the room to complete BG checks, administer insulin, and control blood glucose.

This document is intended to:

- a. provide practical recommendations to control blood glucose in COVID-19 positive or rule out patients in adult ICU patients at UMMHC
- b. provide cluster care recommendations for insulin and BG checks for nursing

This document is not intended to provide guidance for patient in Diabetic Ketoacidosis (DKA) or Hyperglycemic Hyperosmolar Syndrome (HHS).

II. New EMR Order Set titled “ICU ADULT GLYCEMIC CONTROL INSULIN FOR SQ INSULIN FOR COVID 19” has been built

- A. For adult ICU COVID-19 patients that are admitted, please utilize this order set to guide ordering POC BG checks and insulin
 1. For patients that are not well controlled using this protocol, contact COVID 19 Endocrine pager 4665 (HONK) for additional assistance
 2. For some patients, titratable insulin infusions using the ICU glycemic protocol may end up being required due to severity of critical illness. In these patients, please refer to the ICU glycemic protocol order set and cluster BG checks with other nursing care and medication due times as often as possible. This should only be used in rare, extreme circumstances.

III . Glucose Monitoring

- A. For all COVID-19 patients, blood glucose monitoring should be clustered with other nursing care as often as possible (medication due times, turns, vitals, etc).
- B. Target BG range for COVID 19 patients = 100 - 180 mg/dL

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C. Frequency of BG checks:

Standard ICU Monitoring Regimen for COVID-19 (Default Regimen)	
Measure BG as below. If two consecutive BG values are > 180 mg/dL, begin insulin injection (see next section).	
BG Value (mg/dL)	Frequency of BG Measurement:
< 100 or > 180	Every 3-4 hours* (cluster care)
100 - 180	Every 4 hours. If in goal range of 100-180 or not requiring insulin x 3 consecutive readings, see next
On Insulin: 100 - 180	Continue every 4 hours, if clinically stable consider transition to basal ± bolus (see transition table)
No Insulin: 100-180 x 3 consecutive readings, see below***	Every 8 hours. If BG out of goal range, resume BG checks as above
Any decrease or interruption in glucose source (TPN, enteral feeds or IV dextrose)	30 minutes after the glucose change, then every 1 hour x 3 BG checks
<p>***For all clinically stable patients NOT requiring SQ insulin, continue BG checks per section below: If between 70-180 mg/dL every 8 hours x 3 consecutive readings, check BG every 12 hours. If between 70-180 mg/dL every 12 hours x 2 consecutive readings, then stop BG checks. If at any point the BG > 180 mg/dL (via fingerstick or lab draw), recheck BG in 2 hours and resume the protocol as ordered above.</p>	

D. Treatment of hypoglycemia (BG <70 mg/dL) remains the same as the ICU glycemic protocol since hypoglycemia is an emergency. Once recognized, emergency dextrose treatment should be immediately given with 50% dextrose, 10% dextrose, or oral glucose source (facilitated by an out of patient room runner). A repeat BG check and repeat emergency dextrose must be given every 15 minutes until BG is >100 mg/DL)

IV. Insulin Regimen

Note: For Patients with Type I DM or DKA/HHS, please consult Endocrine. For pancreas transplant patients, the transplant team must approve insulin therapy.

A. Insulin Lispro (Humalog®) will be the subcutaneous insulin used in these patients initially and will be given no more frequently than every 4 hours. The correctional scale that will be started at will be based on the initial BG check of the patient on arrival to the ICU and will be selected by the ordering provider.

Start insulin scale based on table with insulin lispro every 4 hours

BG (mg/dL)	SQ Insulin scale	eGFR<30 BMI < 25
> 400	HDCS	MDCS
251-400	MDCS	LDCS
181-250	MDCS	LDCS
< 180	No SQ insulin required	No SQ insulin required

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- B. Correctional scale will be titrated up or down based up BG response by provider order.
- If BG <100, correctional scale should be changed next lower scale (i.e. medium to low dose)
 - If BG is unchanged or increases, provider should increase correctional scale to next higher scale (i.e. medium to high dose)

	Very low dose correction scale (VLDCS)	Low dose correction scale (LDCS)	Medium dose correction scale (MDCS)	High dose correction scale (HDCS)	Very high dose correction scale (VHDCS)
70-150	0	0	0	0	0
151-200	0	1	2	3	5
201-250	1	2	4	6	10
251-300	1	3	6	9	15
301-350	2	4	8	12	20
351-400	2	5	10	15	25
>400	3	6 and call PROVIDER	12 and call PROVIDER	18 and call PROVIDER	30 and call PROVIDER

- C. Insulin lispro order will exist in the patient's MAR as scheduled every 4 hours, however, if the patient's blood glucose is well controlled, their next BG check may not be needed for 8 or 12 hours per BG monitoring protocol. If that's the case, RN does not need to perform a BG check and will mark insulin lispro order on MAR as "not given".
- D. If BG is not in range within 24 hours or are needing up-titration of the insulin scale more than twice to correct for elevated blood sugars, start basal insulin (glargine once daily or NPH divided in two doses) as follows:
- eGFR greater than 30: 0.2 units per kg
 - eGFR less than 30: 0.1 units per kg

V. Transition to Basal Insulin

- A. Once clinically stable (BG 100-180 mg/dL for >24 hours), patients can be transitioned off of this protocol to the General Adult Subcutaneous Insulin Management Order Set
- B. For transitioning patients not on nutrition source, give half of the requirement of the total daily insulin as basal insulin (NPH every 12 hours or Lantus once daily), with correction scale of regular insulin every 6 hours
- C. For transitioning patients on oral diet, give half of the requirement of the total daily insulin as basal insulin (NPH every 12 hours or Lantus once daily), and the other half as insulin lispro divided into 3 injection before meals in addition to correction scale with insulin lispro before meals
- D. For transitioning patients on continuous tube feeds, give one third of the requirements of the total daily insulin as basal insulin and the remaining two thirds as regular insulin divided into 4 injections every 6 hours in addition to correction scale with regular insulin every 6 hours.

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Examples:

Average Insulin given over past 12h x 2	PATIENT WITHOUT NUTRITION		
	Basal Insulin Dose	Prandial Insulin Dose	Coverage Insulin
24 units	6 units HumuLIN NPH Insulin SC q12 hrs OR 12 units Lantus SC daily	No prandial insulin	Low Dose Regular insulin Q 6 hours
48 units	12 units HumuLIN NPH Insulin SC q12 hrs OR 24 units Lantus SC daily	No prandial insulin	Medium Dose Regular insulin Q 6 hours

Average Insulin given over past 12h x 2	PATIENT EATING PO DIET		
	Basal Insulin Dose	Prandial Insulin Dose	Coverage Insulin
24 units	6 units HumuLIN NPH Insulin SC q12 hrs OR 12 units Lantus SC daily	4 units lispro (HumaLOG) SC TID with Meals	Low Dose Lispro AC
48 units	12 units HumuLIN NPH Insulin SC q12 hrs OR 24 units Lantus SC daily	8 units lispro (HumaLOG) SC TID with Meals	Medium Dose Lispro AC

Average Insulin given over past 12h x 2	PATIENT RECEIVING CONTINUOUS TUBE-FEEDS		
	Basal Insulin Dose	Prandial Insulin Dose	Coverage Insulin
24 units	8 units Lantus SC every 24 hours	4 units HumuLIN Regular Insulin Q 6 hours	Low Dose Regular Q 6 hours
48 units	16 units Lantus SC daily	8 units HumuLIN Regular Insulin Q 6 hours	Medium Dose Regular Q 6 hours

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