

University of Virginia Medical Center  
**Adult Critical Care Insulin Infusion Protocol**

Patient Selection Criteria

- Single result blood glucose > 120 mg/dl (recheck blood glucose immediately before starting infusion)

MD Preparation for Insulin Infusion

- Discontinue previous insulin orders
- Discontinue oral diabetes agents

Insulin Infusion Set-up

- Immediately prior to starting insulin infusion, obtain initial blood glucose (BG) using bedside meter.
- Use only Pharmacy prepared insulin infusion. Standard insulin concentration is 250ml Regular Insulin in 250ml NS (1 unit: 1ml concentration).
- Flush IV line with 25ml of insulin solution before connecting infusion to patient. Piggyback insulin infusion into a dedicated maintenance IV.

Start Insulin Infusion Rate as follows

- 0.5 units per hour for patients under 70kg; or for patients previously diet controlled, taking oral diabetes agents, or taking 30 units or less of insulin a day.
- 1 unit per hour for patients over 70 kg or taking more than 30 units of insulin a day.
- *MD Advice: Consider 3 to 5 units per hour initial dose in severe stress (e.g., sepsis, stroke), insulin resistance (e.g., use of greater than 75 units per day), high dose steroids, etc. Adequate hydration, avoiding hypoglycemia, and measures to deal with underlying stress and infection are key to minimizing unstable glucose patterns.*
- *MD Note: DKA is treated initially with 6 to 10 units per hour plus aggressive early hydration and cannot be managed alone with IV push insulin. Unlike simply poorly controlled diabetes, it is important to infuse glucose when BG < 200 mg/dl to avoid ketosis.*

Monitoring and Titrating Insulin Infusion

- **Test blood glucose by bedside meter every hour until stable (range 80 to 110 mg/dl) for two consecutive readings, and then every 2 hours.**
- **Downward Titration for Rapid Decline in Blood Glucose Values**


Current Blood Glucose Value	Amount Blood Glucose Decreased Within One Hour	Amount (%) to Decrease Insulin Infusion Rate
≥ 300 mg/dl	≥ 200 mg/dl	50%
< 300 mg/dl	≥ 100 mg/dl	50%
< 300 mg/dl	50 to 99 mg/dl	25%
80 - 110 mg/dl	25 to 49mg/dl	25%

- **Adjust Insulin Infusion Rate as follows:**

Blood Glucose Value mg/dl	Intervention
65 or less	STOP infusion and follow Hypoglycemia Treatment Guidelines*
66 - 79	STOP infusion; restart at 50 % of prior rate when BG >110 mg/dl
80 - 110	No change in infusion rate
111 - 150	Increase rate by 0.5 units per hour after 2 BG results within this range
151 - 200	Increase rate by 1 unit per hour
201 - 250	Increase rate by 1.5 units per hour
Above 250	Increase rate by 2 units per hour

- **Call physician if BG remains above 250 mg/dl for three consecutive hours.**
- If tube feeding is discontinued for any reason, reduce insulin infusion rate by 50%, and resume every 1 hour BG checks.

#### Nursing Practice Guidelines

- A second licensed health care provider will double-check to verify the medication, ordered dose and dose programmed into the pump. This verification is done at:
  - *Initiation of therapy* – for accuracy of the medication label, concentration, ordered dose, and dose programmed into the pump.
  - *All bag changes* – for label accuracy compared to the physician's order, including concentration.
  - *Change of direct nursing care provider* – for accuracy of ordered dose on the protocol compared to the dose programmed into the pump, including concentration.
- Document the rate of insulin infusion and blood glucose results in a column on the CCFS. Document the drug, concentration, dose/rate verification with 2 initials beside the column at the appropriate times.
- Safety Recommendations
  - Use of the Panel Lock  feature on the IVAC pump is recommended during any high-risk infusion to prevent unauthorized changes of pump settings. See IVAC owner's manual for further assistance.
  - If a patient receiving an insulin infusion must travel off the unit for a procedure, a registered nurse must accompany the patient. Take the Insulin Infusion Travel Kit during transport after adding a glucose meter.
  - Avoid flushing the line that would inadvertently bolus the patient with insulin. If the IV access needs to be flushed, attach the flush syringe at the most proximal point possible.

#### **\*Hypoglycemia Treatment Guidelines**

- Stop the infusion.
- If patient is conscious and able to eat or drink, give 15 Gm of carbohydrate (CHO) in the form of
  - 3 to 4 glucose tablets *or*
  - 4 oz juice or regular soda or 1 cup skim milk
 Notify MD. Recheck BG in 15 minutes, and repeat treatment every 15 minutes if needed until BG is above 100 mg/dl.
- If patient is unconscious or unable to eat or drink, give 25ml (1/2 amp) of Dextrose 50% slow IV push *or* 1mg Glucagon IM STAT if no IV access. Notify MD. Recheck BG in 15 minutes, and repeat treatment every 15 minutes if needed until BG is above 100 mg/dl.
- Restart infusion when BG > 110 mg/dl at 50% of prior rate.
- The MD should evaluate the cause of hypoglycemic episode.

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