

1. This protocol is **not** to be implemented for patients who
  - 1) have diabetic emergencies, such as, Diabetic Ketoacidosis (DKA) or Hyperglycemic Hyperosmolar Syndrome,
  - 2) are younger than 18 years old

This protocol may be implemented for patients who are taking an oral diet; however, the ordering physician must be contacted for prandial insulin orders.

**2. Blood Glucose Monitoring**

- a. Check Glucose every 2 hours until stable (8 consecutive values are within the target range of 80 to 139 mg/dL). In hypotensive patients, capillary blood glucose (fingersticks) may be inaccurate; obtaining the blood sample from an indwelling catheter is acceptable as long as a dextrose containing infusion is not being administered through the catheter.
- b. If Glucose levels have been stable for 8 measurements, then check Glucose levels every 4 hours if:
  - i. No significant change in clinical status
  - ii. No significant change in nutritional or carbohydrate intake( e.g, change in enteral formulation).
    1. If nutrition stopped, notify physician.
- c. Every two hours glucose measurements should continue if:
  - i. Glucose out of target range of 80 to 139 mg/dL.
  - ii. Significant changes in clinical condition (This includes clinical improvement)
  - iii. Starting or stopping of steroids, such as, Solu-Medrol (methylprednisolone), Solu-Cortef (Hydrocortisone), prednisone, or dexamethasone.
  - iv. Initiation or cessation of dialysis (any type).
  - v. Initiation, cessation, or change in nutritional support (enteral feedings, TPN, PPN, etc)

**3. Initiating an Insulin Infusion**

- a. **Discontinue:**
  - i. Discontinue all previous insulin orders, including sliding scale insulin orders.
  - ii. Discontinue all oral hypoglycemic agents, such as, Actos (pioglitazone), Avandia (Rosiglitazone), Glucophage (metformin), Glucotrol (glipizide) and others.
    1. Discontinue all insulin in Parenteral Nutrition (TPNs or PPNs)
- b. **Exogenous Glucose.** It is recommended that the patient have a parenteral or enteral source of dextrose (IV fluids with dextrose, enteral feeding, or parenteral nutrition) while on this protocol.
- c. **Initiation:** Two consecutive glucose levels greater than **140** mg/dL measured one hour apart.
- d. **Insulin Infusion:** Regular Insulin Admixture (1unit per 1ml) should be administered via a pump.
- e. **Priming:** To saturate insulin-binding sites in the tubing, flush tubing with 50 mL of Insulin Admixture.
- f. **Bolus and Initial Rate:**
  - i. **Glucose levels 140 to 170:** 1.5 units bolus and start insulin infusion at 1.5 units per hour.
  - ii. **Glucose levels 171 to 250:** 2 units bolus and start insulin infusion at 2 units per hour.
  - iii. **Glucose levels 251 to 300:** 3 units bolus and start insulin infusion at 3 units per hour.
  - iv. **Glucose levels 301 to 400:** 4 units bolus and start insulin infusion at 4 units per hour.
  - v. **Glucose levels 401 to 499:** 5 units bolus and start insulin infusion at 5 units per hour.
  - vi. **Glucose levels 500 or higher:** Consult physician for specific orders.

Protocol adapted from an article by Goldberg PA, et al. "Implementation of a Safe and Effective Insulin Infusion Protocol in a Medical Intensive Care Unit". Diabetes Care Feb 2004; 27(2): 461

( ) Verbal Order Verification

Prescriber's Signature: \_\_\_\_\_

Date/Time: \_\_\_\_\_

**Patient Identification**

4. **Changing the Insulin Infusion Rate**

The Change in Infusion Rate depends on 1) the Current rate; 2) Last Measurement; and 3) Rate of Change  
**Glucose less than 50 mg/dL:** Stop Insulin Infusion. Give 25 grams (1 amp) of D50 IV. Recheck glucose every 15 minutes. *When Glucose greater than 100 mg/dL wait one hour, restart Insulin infusion at Last Rate x 0.5.*

a. **Glucose = 50 to 74 mg/dL:** Stop Insulin Infusion.

- i. If symptomatic or unable to assess, then give 25 grams (1 amp) of D50 IV. Recheck glucose every 15 minutes. *When Glucose greater than 100 mg / dL restart Insulin infusion at Last Rate x 0.6.*
- ii. If asymptomatic, give 12.5 grams (1/2 amp) of D50 IV or 8 ounces of orange juice. Recheck Glucose every 15 minutes. *When Glucose greater than 100 mg / dL restart Insulin infusion at Last Rate x 0.6.*

b. **Glucose 75 to 499 mg/dL use chart below:**

- i. (1) Determine **the Hourly Rate of Change** of glucose levels by taking the current measurement and subtracting the previous measurement; then divide by the hours between the measurements.  
**Example Current Glucose = 130, previous Glucose was 200, 2 hours between measurements:**  
*Hourly Rate of Change = 130 – 200 = (- 70); (- 70) divided by 2 hours = (-35).* (Negative numbers are in parenthesis)
- ii. (2) Locate correct **Current Glucose** section, then use **Hourly Rate of Change** to find adjustment to rate.  
**Round to nearest 0.5 Units / hour unless rate is less than 1 unit / hour then round to nearest tenth.**

1. **Current Glucose is 75 to 99**

<b>Hourly Rate of Change in Glucose Level</b>	<b>Insulin RATE</b>
<i>greater than 0</i>	No Change
0 to (- 25)	New Rate = Current Rate x <b>0.8</b>
<i>A change of (- 26) or more</i>	Hold Infusion until Glucose greater than 100 mg / dL restart Insulin infusion at Last Rate x 0.6

2. **Current Glucose is 100 to 139**

<b>Hourly Rate of Change in Glucose Level</b>	<b>Insulin RATE</b>
<b>greater than 25</b>	New Rate = Current Rate x <b>1.2</b>
25 to (- 25)	No Change
(- 26) to (- 50)	New Rate = Current Rate x <b>0.8</b>
<i>A change of (- 51) or more</i>	Hold Infusion for 30 minutes. New Rate = Current Rate x <b>0.6</b>

3. **Current Glucose is 140 to 199**

<b>Hourly Rate of Change in Glucose Level</b>	<b>Insulin RATE</b>
<i>greater than 50</i>	New Rate = Current Rate x <b>1.4</b>
0 to 50	New Rate = Current Rate x <b>1.2</b>
(- 1) to (- 50)	No Change
(- 51) to (- 75)	New Rate = Current Rate x <b>0.8</b>
<i>A change of (- 76) or more</i>	Hold Infusion for 30 minutes. New Rate = Current Rate x <b>0.6</b>

4. **Current Glucose is 200 to 499**

<b>Hourly Rate of Change in Glucose Level</b>	<b>Insulin RATE</b>
<i>greater than 0</i>	New Rate = Current Rate x <b>1.4</b>
0 to (- 25)	New Rate = Current Rate x <b>1.2</b>
(- 26) to (- 75)	No Change
(- 76) to (- 100)	New Rate = Current Rate x <b>0.8</b>
<i>A change of (- 101) or more</i>	Hold Infusion for 30 minutes. New Rate = Current Rate x <b>0.6</b>

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