## Change in Glucose from Prior Measure*

<table>
<thead>
<tr>
<th>Current Glucose</th>
<th>Decreased 50-100 mg/dl</th>
<th>Changed less than 50 mg/dl (increase or decrease)</th>
<th>Increased by ≥ 50 mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 400 mg/dl</td>
<td>Contact the prescriber and <strong>Increase</strong> infusion rate by 2 units/hr</td>
<td>Contact the prescriber and <strong>Increase</strong> infusion rate by 2-4 units/hr</td>
<td>Contact the prescriber and <strong>Increase</strong> infusion rate to 2x current rate</td>
</tr>
<tr>
<td>301-400 mg/dl</td>
<td><strong>Increase</strong> infusion rate by 2 units/hr</td>
<td><strong>Increase</strong> infusion rate by 2-4 units/hr</td>
<td><strong>Increase</strong> infusion rate to 2x current rate</td>
</tr>
<tr>
<td>201-400 mg/dl</td>
<td>No change</td>
<td><strong>Increase</strong> infusion rate by 1 unit/hr</td>
<td><strong>Increase</strong> infusion rate by 2-3 units/hr</td>
</tr>
<tr>
<td>201-300 mg/dl</td>
<td><strong>Increase</strong> infusion rate by 1 unit/hr</td>
<td><strong>Increase</strong> infusion rate by 1-2 units/hr</td>
<td><strong>Increase</strong> infusion rate by 1 unit/hr</td>
</tr>
<tr>
<td>151-200 mg/dl</td>
<td>No change</td>
<td><strong>Increase</strong> infusion rate by 0-1 unit/hr</td>
<td><strong>Increase</strong> infusion rate by 1-2 units/hr</td>
</tr>
<tr>
<td>110-150 mg/dl</td>
<td><strong>Decrease</strong> infusion rate by 2 units/hr (minimum rate = 0.5-1 unit/hr)</td>
<td>If blood glucose increasing, then <strong>increase</strong> infusion rate by 0-1 u/hr. If blood glucose decreasing, then <strong>decrease</strong> infusion rate by 0-2 unit/hr (min. rate = 0.5 unit/hr)</td>
<td>No change</td>
</tr>
<tr>
<td><strong>OPTIMAL</strong></td>
<td><strong>Stop infusion of insulin and contact the prescriber</strong></td>
<td>If rate less than 3 u/hr, <strong>decrease</strong> by 1-2 u/hr. If infusion stopped, <strong>contact the prescriber</strong>. If rate 3-7 u/hr, then <strong>decrease</strong> by 1-3 units/hr. If rate greater than 7 units/hr, then <strong>decrease</strong> by 50% (min. rate = 0.5-1 unit/hr)</td>
<td>No change</td>
</tr>
<tr>
<td>80-109 mg/dl</td>
<td><strong>Stop infusion of insulin and contact the prescriber</strong></td>
<td>Double current infusion rate of dextrose solution, if running. If not receiving dextrose IV infusion, start D5W at 50 ml/hr <strong>Consider giving D50%</strong> according to the “Diabetes Mellitus in Non-Pregnant Adults” Guideline <strong>Recheck glucose in 15 minutes</strong> When glucose greater than 150 mg/dl, reduce dextrose infusion back to previous rate, if running, and resume drip at 0.5-1 unit/hr <strong>Resume drip guideline</strong></td>
<td>No change</td>
</tr>
<tr>
<td>&lt; 80 mg/dl</td>
<td><strong>Stop infusion of insulin and contact the prescriber</strong></td>
<td><strong>Double current infusion rate of dextrose solution, if running.</strong> If not receiving dextrose IV infusion, start D5W at 50 ml/hr <strong>Consider giving D50%</strong> according to the “Diabetes Mellitus in Non-Pregnant Adults” Guideline <strong>Recheck glucose in 15 minutes</strong> When glucose greater than 150 mg/dl, reduce dextrose infusion back to previous rate, if running, and resume drip at 0.5-1 unit/hr <strong>Resume drip guideline</strong></td>
<td><strong>Stop infusion of insulin and contact the prescriber</strong></td>
</tr>
</tbody>
</table>

*Contact prescriber if rate of decline in glucose exceeds 100 mg/dl/hr. Patient may need a more rapid taper of the drip than is indicated in the above table.
Steps for IV Insulin Infusion

1. Measure patient’s glucose q1hr.
2. Initiate insulin infusion at 2 units/hr if glucose > 150 mg/dl.
3. Monitor patient’s glucose q1hr and adjust the insulin infusion rate as directed in the table.

Consultation

- To call for a Diabetes Consult, call 292-3800, or use CPOE.
- To speak to a Diabetes Specialist, call:
  - Pager # 7592, 5234 or 3165 for OSUMC: 8 a.m. - 5 p.m.
  - Pager # 1821 or 2516, for OSU East: 8 a.m. - 5 p.m.
  - WebXchange for MD on diabetes consults: 5 p.m. - 8 a.m.

General Considerations for Dose Ranges

When unsure of dose within the range, use the lower infusion rate.

- Patients with type 1 diabetes will generally require less insulin than those with type 2 diabetes.
- More severely ill patients will generally require more insulin.
- Insulin naïve patients will generally require less insulin.
- Patients whose blood glucose has been chronically poorly controlled will generally require more insulin.
- Use the patient’s response to previous changes in insulin infusion rate to help guide subsequent changes.
- Recommend continuing insulin drip at least 48-72 hours, once started.
- If patient is on vasopressors that are being titrated down, consider decreasing infusion by half.

Additional Considerations for Dose Ranges

- OSUWMC’s Pharmacy Department for guidelines

If Patient Is Eating While on Insulin Drip

Order meal coverage with l:CHO ratio before meals SQ, but DO NOT give the correction (sliding scale) component. The dose should be commensurate with the estimated total daily insulin requirements from all sources (see table below). Increase for patients who have a substantial increase in insulin infusion rate following meals.

<table>
<thead>
<tr>
<th>Total Daily Dose (units)</th>
<th>Insulin: Carb (units: grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>1:20 (low dose)</td>
</tr>
<tr>
<td>20-40</td>
<td>1:15</td>
</tr>
<tr>
<td>41-50</td>
<td>1:10 (standard dose)</td>
</tr>
<tr>
<td>51-80</td>
<td>1:8</td>
</tr>
<tr>
<td>81-120</td>
<td>1:5 (high dose)</td>
</tr>
</tbody>
</table>

Indications for Discontinuing IV Insulin

- If previous DKA, acidosis has resolved, patient is stable.
- In hyperglycemic, non-DKA patient, patient stable on continuous insulin infusion with minimal rate changes for at least 6 hrs and not intubated.
- Ideally, patient should be off pressors and ready to begin oral intake.

Transitioning off Intravenous Insulin Drip

If patient requires less than 1 unit/hr:

- **Patients with type 1 diabetes** should still receive basal insulin of some form (IV, NPH, glargine, detemir, SQ insulin pump) at all times. Transitioning from IV to SQ requires overlap, approximately 4 hrs after the dose of basal insulin.

If patient requires more than 1 unit/hr (whether he/she has known diabetes):

- Patient should receive basal insulin in the hospital.
- Evaluate and compare home dose with hospital dose.
- To calculate the basal insulin for type 1 diabetes, use current insulin rate / hr (i.e., 1 unit / hr) and multiply times 10, give as basal insulin glargine / detemir insulin now (1 x 10 = 10 units) and then q24hr / compare to home dose.
- To calculate the basal insulin for type 2 diabetes, use current insulin rate / hr (i.e., 1 unit / hr) and multiply times 15, give as basal insulin glargine / detemir insulin now (1 x 15 = 15 units) and then q24hr / compare to home dose.

If patient requires more than 3 units/hr or control is labile, consider DM consult for transition guidance.

For all patients transitioning off insulin drip:

- Continue insulin infusion and fluids for 6 hrs after first dose of insulin glargine given.
- Glucose monitoring should be done q1hr X 4 when insulin infusion is stopped and then scheduled qachs. Discontinue dextrose, if running, when insulin infusion is stopped.

If Patient Requires Tube Feeds

- Continue the IV infusion until patient reaches goal tube feed rate for at least 12-24 hours.
- If the tube feeds are stopped for any reason, contact prescriber for additional dextrose order. Recommend increasing dextrose containing fluids to same rate as tube feeds were running if no contraindications.
- If tube feeds are interrupted, the infusion should be stopped and restarted at no more than half the previous rate if the glucose exceeds 150 mg/dl.
- When transiting to SQ insulin, the total daily scheduled dose should be calculated from 80% of the IV insulin requirements, and then administered as one-fourth long-acting basal insulin once daily and three-quarters regular insulin divided q5hr.
Resources

- OSUWMC’s Nutrition Services/Clinical Nutrition, Carbohydrate Content for Common Foods
- OSUWMC’s Pharmacy Department/Clinical/Critical Care/Guidelines for Insulin Glargine Prescribing in the Medical Intensive Care Unit (MICU)
- OSUWMC’s Diabetes Guidelines

Guideline Authors

- Kathleen Dungan, MD
- Marcia Belcher, MSN, RN, CNS

Guideline Approved

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References

- American Diabetes Association Position Statement: Standards of Medical Care in Diabetes Care January 2012. 35:(Suppl 1) S11-S63.
- AACE Diabetes Care Plan Guidelines, Endocrine Practice 2011:17 (Suppl 2).

Quality Measures

- Average time to first glucose test after insulin infusion initiated (hrs)
- Blood glucose lab monitoring occurring hourly while on insulin drip
- Number of episodes > 150 mg/dl while on drip
- Number of episodes < 80 mg/dl while on drip
- Average time to 150 mg/dl (hrs)
- Effective insulin therapy after drip cessation
- Potentially ineffective insulin therapy
- Initiation of insulin if drip rate > 1 unit per hour at time of drip discontinuation

Disclaimer

Clinical practice guidelines and algorithms at The Ohio State University Wexner Medical Center (OSUWMC) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUWMC’s guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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