Hypoglycemia Treatment in Non-Pregnant Adults

Goal
This guideline is designed to treat events of hypoglycemia, either spontaneous or insulin-induced, and to decrease glycemc variability associated with treatment of hypoglycemia.

Key Points
- Hypoglycemia has been linked to increased mortality, but over-treating hypoglycemia can induce glycemc variability which has been associated with poor outcomes.
- Signs and symptoms of hypoglycemia include:
  - Hyperadrenergic (may be absent in patients with hypoglycemia unawareness): diaphoresis, palpitations/tachycardia, hunger, nervousness, anxiety, tremor, and headache.
  - Neuroglycopenic: vision changes, confusion, altered behavior, seizure, other focal or generalized neurologic complaints.

Table 1. Patients Who Are Not Alert, Are NPO, or on IV Insulin Infusion

<table>
<thead>
<tr>
<th>Blood Glucose (BG) Level*</th>
<th>Action</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-79 mg/dl</td>
<td>1. Administer 7.5 g Dextrose D50% (15ml) IV**. 2. Consider calling House Officer.  • Consider calling House Officer to report BG if patient experiences recurrent BG &lt; 70 mg/dl in past 12 hours.  • Consider adding dextrose 5% to maintenance IV fluids at a rate ≥ 50 ml/hr. or increasing the rate of existing maintenance IV if dextrose source already present.</td>
<td>• Recheck BG q15 min following treatment and treat accordingly until ≥ 80 mg/dl.  • Once BG ≥ 80 mg/dl, recheck BG q1h x 2, then resume point-of-care glucose as previously ordered. Patients who are admitted with hypoglycemia should be monitored at least every 4 hours for a minimum of 24 hours.  • If &gt; 4 hours from initial event and BG ≥ 80 mg/dl for two consecutive readings, may consider reducing IV dextrose.</td>
</tr>
<tr>
<td>45-59 mg/dl</td>
<td>1. Administer 12.5 g Dextrose D50% (25ml) IV**. 2. Call House Officer.  • Report BG and action taken.  • Consider adding dextrose 5% to maintenance IV fluids at a rate ≥ 50 ml/hr. or increasing the rate of existing maintenance IV if dextrose source already present.</td>
<td></td>
</tr>
<tr>
<td>&lt; 45 mg/dl</td>
<td>1. Administer 25 g Dextrose D50% (50ml) IV**. 2. Call House Officer.  • Report BG and action taken  • Consider adding dextrose 5% to maintenance IV fluids at a rate ≥ 50 ml/hr. or increasing the rate of existing maintenance IV if dextrose source already present.</td>
<td>• Recheck BG q15 min following treatment and treat accordingly until ≥ 80 mg/dl.  • Once BG ≥ 80 mg/dl, recheck BG q1h x 4, then q4h for a minimum of 24 hours.  • If &gt; 4 hours from initial event and BG ≥ 80 mg/dl for two consecutive readings, may consider reducing IV dextrose.</td>
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*If low blood glucose value was serum blood glucose, repeat with point-of-care glucose prior to treating.

** If IV access is not available, administer 1 mg glucagon IM and contact provider to obtain IV access. Repeat blood glucose in 30 minutes.

If patient is cooperative or has available enteral access, see Table 2 on the following page.
Table 2. Patients Who Are Alert, Able to Tolerate PO Intake, and with Intact Cognitive Status

<table>
<thead>
<tr>
<th>Blood Glucose (BG) Level</th>
<th>Action*</th>
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</tr>
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<tbody>
<tr>
<td><strong>60−69 mg/dl or 70−79 mg/dl with symptoms</strong></td>
<td><strong>Administer</strong> (15 g oral carbohydrate, choose one):&lt;br&gt;- 4 oz. juice (NOT OJ)** or regular soda/pop&lt;br&gt;- 1 tbsp. jelly or sugar&lt;br&gt;- 3 glucose tablets&lt;br&gt;- 1 tube glucose 40% oral gel</td>
<td><strong>If next meal 1−2 hrs. also administer</strong> (choose one):&lt;br&gt;- 3 graham crackers&lt;br&gt;- 6 saltine crackers&lt;br&gt;- 8 oz. skim milk</td>
</tr>
<tr>
<td><strong>45−59 mg/dl</strong></td>
<td><strong>Administer</strong> (20 g oral carbohydrate, choose one):&lt;br&gt;- 6 oz. juice (NOT OJ)** or regular soda/pop&lt;br&gt;- 1 ½ tbsp. of jelly or sugar&lt;br&gt;- 4 glucose tablets&lt;br&gt;- 1 ½ tubes glucose 40% oral gel</td>
<td><strong>If next meal 1−2 hrs. also administer</strong> (choose one):&lt;br&gt;- 3 graham crackers&lt;br&gt;- 6 saltine crackers&lt;br&gt;- 8 oz. skim milk</td>
</tr>
<tr>
<td><strong>&lt; 45 mg/dl</strong></td>
<td><strong>Administer</strong> (30 g oral carbohydrate, choose one):&lt;br&gt;- 8 oz. juice (NOT OJ)** or regular soda/pop&lt;br&gt;- 2 tbsp. jelly or sugar&lt;br&gt;- 6 glucose tablets&lt;br&gt;- 2 tubes glucose 40% oral gel</td>
<td><strong>If next meal 1−2 hrs. also administer</strong> (choose one):&lt;br&gt;- 3 graham crackers&lt;br&gt;- 6 saltine crackers&lt;br&gt;- 8 oz. skim milk</td>
</tr>
</tbody>
</table>

*Choose one item from one column based on next meal time. If the next meal is 1−2 hours away, include complex carbohydrate as suggested by the examples. If the next meal is > 2 hours away include protein as suggested by the examples.

**Orange juice not appropriate for patients with renal dysfunction or patients at risk for hypoglycemia.
Clinical Considerations

- Patients with spontaneous hypoglycemia (i.e., not insulin induced, or due to liver failure) may require higher rates of D5W or a higher concentration of maintenance dextrose infusion (i.e., D10W, D20W).
- Avoidance of dextrose containing IVF is recommended in most head-injured patients at risk for ischemia or hemorrhagic expansion.
  - Exercise caution in aggressively treating hypoglycemia in these patients.
- Consider the formulation of insulin contributing to the event.
  - Longer-acting insulins like insulin glargine (Lantus©), insulin detemir (Levemir©) and NPH insulin may result in prolonged or recurrent hypoglycemic episodes.
- Patients with renal failure or acute kidney injury may have decreased clearance of insulin and require longer infusions of dextrose.

Quality Measures

- Number of episodes of hypoglycemia, blood glucose < 70 mg/dl:
  - Per patient
  - With a repeat point-of-care glucose in 30 minutes
- Time to resolution of initial hypoglycemic episode to blood glucose ≥ 70 mg/dl
- Change in blood glucose from initial value to first recheck
- Hypoglycemia recurrence within 24 hours
  - Time of recurrence
- Rebound hyperglycemia (glucose >300 mg/dl within 6 hours of event)

OSUWMC Resources

Clinical Practice Guidelines

- Type 2 Diabetes Mellitus (T2DM) and Other Non-Diabetes-Associated Hyperglycemia
- Diabetes Mellitus in Non-Pregnant Adults: Inpatient Management
- Diabetes Mellitus in Pregnancy: Inpatient Management
- Perioperative / Periprocedure Glucose Management

Additional Resources

- Nutrition Services, Carbohydrate Content
- BRAVE criteria
- Diabetes Education Handouts
- Diabetes Education Patient Resource Book

References


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Guideline Approved


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