Hypoglycemia has been linked to increased mortality, but over-treating hypoglycemia can induce hyperglycemia which has equally been associated with poor outcomes.

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

Signs and symptoms of hypoglycemia include:
- Hyperadrenergic (may be absent in patients with hypoglycemia unawareness): diaphoresis, palpitations/tachycardia, hunger, nervousness, anxiety, tremor, headache.
- Neuroglycopenic: vision changes, confusion, altered behavior, seizure, other focal or generalized neurologic complaints.

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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>
</table>
| 60-79 mg/dl              | 1. Administer 15 ml D50 (7.5 g) IV**.  
  2. Consider calling House Officer.  
    - Consider calling House Officer to report BG if patient experiences recurrent BG < 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. | 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 > 4 hours from initial event and BG ≥ 80 mg/dl for two consecutive readings, may consider reducing IV dextrose. |
| 45-59 mg/dl              | 1. Administer 25 ml (½ amp) D50 (12.5 g) 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. | |
| < 45 mg/dl              | 1. Administer 50 ml (1 amp) D50 (25 g) 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. | 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 > 4 hours from initial event and BG ≥ 80 mg/dl for two consecutive readings, may consider reducing IV dextrose. |

*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>
<thead>
<tr>
<th>Blood Glucose (BG) Level</th>
<th>Action*</th>
<th>Follow Up</th>
</tr>
</thead>
</table>
| **60−69 mg/dl or 70−79 mg/dl with symptoms** | **Administer (15 g oral carbohydrate, choose one):**  
- 4 oz. juice (NOT OJ)** or regular soda/pop  
- 1 tbsp. jelly or sugar  
- 3 glucose tablets  
- 1 tube dextrose gel  
If next meal 1−2 hrs. also administer (choose one):  
- 3 graham crackers  
- 6 saltine crackers  
- 8 oz. skim milk  | **If next meal > 2 hrs. also administer (choose one):**  
- ½ sandwich  
- 3 graham crackers with one tbsp. peanut butter  
**Consider calling House Officer to report BG if patient experiences recurrent hypoglycemia (≥ 2 distinct events with BG < 70 mg/dl in past 12 hours).**  | **- 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.  |
| **45−59 mg/dl** | **Administer (20 g oral carbohydrate, choose one):**  
- 6 oz. juice (NOT OJ)** or regular soda/pop  
- 1 ½ tbsp. of jelly or sugar  
- 4 glucose tablets  
- 1 ½ tubes dextrose gel  
If next meal 1−2 hrs. also administer (choose one):  
- 3 graham crackers  
- 6 saltine crackers  
- 8 oz. skim milk  | **If next meal > 2 hrs. also administer (choose one):**  
- ½ sandwich (15 g)  
- 3 graham crackers with one tbsp. peanut butter  | **Call House Officer to report BG and action taken.**  |
| **< 45 mg/dl** | **Administer (30 g oral carbohydrate, choose one):**  
- 8 oz. juice (NOT OJ)** or regular soda/pop  
- 2 tbsp. jelly or sugar  
- 6 glucose tablets  
- 2 tubes dextrose gel  
If next meal 1−2 hrs. also administer (choose one):  
- 3 graham crackers  
- 6 saltine crackers  
- 8 oz. skim milk  | **If next meal > 2 hrs. also administer (choose one):**  
- 1 sandwich (30 g)  
- 3 graham crackers with one tbsp. peanut butter  | **- 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.  
- Call House Officer to report BG and action taken.**  |

*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

- 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
- MICU Hyperglycemia Management Guideline

References


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Guideline Approved


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