### Hypoglycemia Treatment in Non-Pregnant Adults

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

**Key Points**
- Hypoglycemia has been linked to increased mortality, but over-treating hypoglycemia can induce glycemic 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>
</table>
| 60-79 mg/dl               | 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 < 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 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. |   |
| < 45 mg/dl                | 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. |  
|                           | • 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 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>
<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 glucose 40% oral 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  
- 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. |
| Consider calling House Officer to report BG if patient experiences recurrent hypoglycemia (≥ 2 distinct events with BG < 70 mg/dl in past 12 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 glucose 40% oral 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 glucose 40% oral 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

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


Guideline Authors

- Claire Murphy, PharmD, BCPS
- Kathleen Dungan, MD
- Kathleen Wyne, MD
- Elizabeth Buschur, MD
- Sheila Mapes, CNP
- Lindsey Karnes, CNP
- Sheila Chucta, CNS

Guideline Approved


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.