Management of DKA in Adults

**Figure 1.** Management of diabetic ketoacidosis (DKA) in adults. (HCO₃⁻ = bicarbonate; IV = intravenous; K = potassium; Na = sodium; NaCl = sodium chloride; NaHCO₃ = sodium bicarbonate; SC = subcutaneous.)

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**Management of DKA in Adults**

- **Complete initial evaluation:**
  - Check capillary glucose and serum/urine ketone levels to confirm hyperglycemia and ketonemia/ketonuria.

- **IV Fluids**
  - Determine hydration status:
    - Severe dehydration: Administer NaCl 0.9% (1 L per hour) and/or plasma expander.
    - Cardiogenic shock: Hemodynamic monitoring.

- **Determine NaCl 0.9% level**:
  - High: 0.45% (4 to 14 mL per kg per hour) depending on hydration state.
  - Normal: 0.9% (4 to 14 mL per kg per hour) depending on hydration state.
  - Low: 0.1 units per kg per hour continuous insulin infusion.

- **When serum glucose level reaches 200 mg per dl (11.10 mmol per L), change to decrease 5% with NaCl 0.45% at 150 to 250 mL per hour**.

- **If serum glucose level does not decrease by 10% in first hour**:
  - Give 0.14 units per kg as IV bolus and continue with previous prescription.
  - No recommendations for SC or intramuscular treatment.

- **If serum glucose level reaches 200 mg per dl (11.10 mmol per L), change to decrease 5% with NaCl 0.45% at 150 to 250 mL per hour**.

- **Check electrolyte, blood urea nitrogen, creatinine, and glucose levels, and venous pH every 2 to 4 hours until stable. After resolution of DKA, and when patient is able to eat, initiate a multidose insulin regimen. To transfer from IV to SC, continue IV insulin infusion for 1 to 2 hours after SC insulin is begun to ensure adequate plasma insulin levels. In insulin-naive patients, start at 0.5 to 0.8 units per kg per day and adjust insulin as needed. Continue to look for precipitating cause(s).**

- **IV route (bolus method)**:
  - Regular insulin: 0.1 units per kg as a bolus.
  - Rapid-acting insulin (e.g., lispro [Humalog]): 0.3 units per kg, then 0.2 units as a bolus.*

- **IV route (without bolus)**:
  - Regular insulin: 0.14 units per kg per hour as continuous infusion.
  - Rapid-acting insulin (e.g., lispro [Humalog]): 0.3 units per kg, then 0.2 units per kg every 2 hours.*

- **Uncomplicated DKA: SC route**
  - 0.1 units per kg per hour continuous insulin infusion.
  - 0.1 units per kg every hour or 0.2 units per kg every 2 hours.*

- **Assess need for HCO₃⁻**
  - pH ≥ 6.9
  - No HCO₃⁻
  - pH < 6.9
  - Dilute NaHCO₃ 100 mEq in 400 mL of water with 20 mEq of potassium chloride.
  - Infuse at 200 mL per hour.
  - Repeat NaHCO₃, every two hours until pH ≥ 6.9.
  - Check serum K level every 2 hours.

- **Assess need for potassium**
  - Establish adequate renal function (urine output approximately 50 mL per hour).
  - If serum K level < 3.3 mEq per L (3.3 mmol per L), hold insulin and give 20 to 30 mEq K per hour until K level ≥ 3.3 mEq per L.
  - If serum K level ≥ 5.2 mEq per L (5.2 mmol per L), do not give K, but check serum K level every 2 hours.
  - If serum K level ≥ 3.3 but < 5.2 mEq per L, give 20 to 30 mEq K in each liter of IV fluid to keep serum K level between 4 and 5 mEq per L (4 and 5 mmol per L).

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*—A meta-analysis supports SC administration of rapid-acting insulin analogues, such as lispro, every hour (bolus of 0.3 units per kg, then 0.1 units per kg every hour) or 2 hours (bolus of 0.3 units per kg, then 0.2 units per kg every 2 hours) as a reasonable alternative to IV regular insulin for treating uncomplicated DKA.*

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