

MANAGEMENT OF DIABETIC KETOACIDOSIS

Diagnosis
Hyperglycemia - Anion gap metabolic acidosis - Ketonemia

VOLUME

- Severe hypovolemia: 0.9% NaCl at ≥ 1 L/hour based on clinical assessment.
- Mild to moderate hypovolemia: 15 to 20 mL/kg per hour, in the absence of cardiac compromise, for the first few hours.

Then

- 0.9% NaCl at 250-500 mL/hour, if corrected Na^+ is Less than 135 mEq/L*.
- 0.45 NaCl at 250-500 mL/hour, if corrected Na^+ is normal or elevated.
- Add dextrose to the saline solution when the serum glucose reaches ~ 200 mg/dL.

POTASSIUM

- < 3.3 mEq/L – Hold insulin and give potassium chloride 20 to 40 mEq/hour IV until K^+ concentration is above 3.3 mEq/L.
- 3.3 to 5.3 mEq/L – Give potassium chloride 20 to 30 mEq per liter IV fluid; maintain serum K^+ between 4 to 5 mEq/L.
- > 5.3 mEq/L – Do not give potassium; check serum K^+ every 2 hours; delay administration of potassium chloride until serum K^+ has fallen to 5 to 5.2 mEq/L.

INSULIN

- $\text{K}^+ < 3.3$ mEq/L, do not give insulin; replete K^+ and fluid deficit first.
- $\text{K}^+ \geq 3.3$ mEq/L, regular insulin 0.1 units/kg IV bolus, then start a continuous IV infusion 0.1 units/kg per hour.
- If serum glucose does not fall by at least 50 to 70 mg/dL in the first hour, double the rate of insulin infusion.
- Decrease infusion rate to 0.02 - 0.05 units/kg per hour when serum glucose reaches 200 mg/dL.
- Continue insulin infusion until ketoacidosis is resolved, serum glucose is below 200 mg/dL, and subcutaneous insulin is begun (overlap for 2 hours).

BICARBONATE

- If the arterial pH is below 6.90, give 100 mEq of sodium bicarbonate plus 20 mEq of potassium chloride in 400 mL sterile water over two hours
- May be repeated if venous pH remains below 7.00.

*Corrected sodium concentration can be approximated by adding 2 mEq/L to the plasma sodium concentration for each 100 mg/100 mL (5.5 mmol/L) increase above normal in glucose concentration

Monitoring

Check glucose every one hour while on insulin infusion
Keep serum glucose 150-200 mg/dL until resolution of DKA
Check electrolytes, BUN, serum pH, and creatinine every 2-4 hours
Resolution of DKA is as evidenced by normalization of the serum anion gap (less than 12 mEq/L) and, when available, blood beta-hydroxybutyrate level.