

University of California  
San Francisco

UCSF Medical Center

**ADULT DIABETIC KETOACIDOSIS (DKA)  
AND HYPEROSMOLAR COMA  
MANAGEMENT ORDERS  
(For Use In Critical Care Units Only)**

UNIT NUMBER

PT. NAME

BIRTHDATE

LOCATION

DATE

Date \_\_\_\_\_ Time \_\_\_\_\_

**ALLERGIES** \_\_\_\_\_ **HT (cm)** \_\_\_\_\_ **WT (kg)** \_\_\_\_\_

“√” in box activates order

1. See Critical Care Admission Orders for additional orders/medications
2. DIET: NPO
3. INITIAL LABORATORY WORK (if not done in Emergency Department):
  - A. CBC, Na, K, Cl, CO<sub>2</sub>, Glucose, BUN, Creatinine, Ca, PO<sub>4</sub>, Mg, Serum Ketones, Serum Osmolality, urinalysis, ABG  
 Other \_\_\_\_\_
4. SUBSEQUENT LABORATORY ORDERS – RUN ALL LABS STAT.
  - A. Check blood glucose (BG) q1 hour with glucose meter. If BG >500 send to lab.  
Do not use fingertip for blood sample if patient is hypotensive or in shock.
  - B. Na, K, Cl, CO<sub>2</sub> q2h x 3, then q4 hour  
 Other \_\_\_\_\_
5. IV FLUIDS (See Fluid Management and Electrolyte Management #1 on back of sheet). Monitor I/O's q2 hour.  
Bolus: \_\_\_\_\_  
NS at \_\_\_\_\_ cc/hour  Additive: KCl \_\_\_\_\_ meq/liter  
1/2 NS at \_\_\_\_\_ cc/hour  Other: \_\_\_\_\_
6. **INITIAL INSULIN DOSE**
  - A. **IV Insulin Bolus: give 0.1 units/kg IV push** (if not done in ED)
  - B. **Insulin Infusion**  
Mix Standard Insulin Solution (Mix 25 units of regular human insulin in 250 cc NS;  
Standard Concentration is 1 unit/10 cc). Flush first 50 cc through tubing before connecting to patient.
  - C. **Begin Insulin Infusion at 5 units/hour.** (Using standard concentration, 5 units/hour = 50 cc/hour).
7. **ADJUSTMENT OF INSULIN INFUSION RATE**
  - A. **When BG >200 mg/dl, adjust Insulin Infusion rate** as follows:
    1. If BG has decreased by 50-200 mg/dl in a one hour period keep the insulin drip rate the same.
    2. **CALL HOUSE OFFICER** IF BG has decreased by <50 mg/dl or >200 mg/dl in a one hour period.  
(Aim to correct BG by 100 mg/dl per hour. See General Guidelines on back)
  - B. **When BG <200 mg/dl, call House Officer and:**
    1. Change IV solution to:  D5 1/2 NS at \_\_\_\_\_ cc/hour +  KCl \_\_\_\_\_ meq/liter
    2. Change insulin infusion to \_\_\_\_\_ units/hour (See General Guidelines on back)
    3. Check BS q1 hour.
    4. **Adjust Insulin Infusion rate as follows:**

BG <80 mg/dl	STOP insulin infusion and <b>Call House Officer; see #8 below</b> *Do not restart insulin infusion until BG ≥100 mg/dl*
BG 80-120	Decrease drip by 0.5 unit/hour
BG 121-180	No change in drip rate
BG 181-250	Increase drip by 0.5 unit/hour
BG >250	Bolus 5 units regular insulin and increase drip by 0.5 unit/hour
8. **For a BG <80 mg/dl or >400 mg/dl, call House Officer.**
  - BG <80 mg/dl but >60 mg/dl, stop insulin infusion. Check BG q15 minutes.
  - BG ≤60 mg/dl, stop insulin infusion; give 50 cc D50 IV push; check BG q15 minutes and repeat treatment until BG >100 mg/dl.
  - When BG ≥100 mg/dl, **call House Officer** for new insulin infusion rate.
  - BG >400 mg/dl, call House Officer to reassess insulin infusion rate
9. **Call House Officer** for urine output <30 cc/hour.
10. When converting to subcutaneous (SQ) insulin, give prescribed SQ dose 30 minutes prior to discontinuing insulin infusion.  
Then use SQ Insulin Order Sheet 602-562

# ADULT DIABETIC KETOACIDOSIS (DKA) AND HYPEROSMOLAR COMA MANAGEMENT ORDERS (For Use In Critical Care Units Only)

## DIAGNOSTIC CRITERIA

	DKA	HYPEROSMOLAR COMA
<b>Serum HCO<sub>3</sub></b>	low ( < 15 meq/l)	Normal or slightly low
<b>pH</b>	< 7.3	> 7.3
<b>BG</b>	< 800 mg/dl & can be normal	Often > 800 mg/dl
<b>Serum Ketones</b>	> 5 mmol/l	< 5 mmol/l
<b>Urine Ketones</b>	large	small

**Na correction:**  $2.4 \times (\text{plasma glucose} - 100)/100$  (Am. J. Med. 1999;106:399)

**Anion Gap:**  $\text{Na} - \text{Cl} - \text{CO}_2$  (nl 8-20)  
(Use measured Na)

**Calculated Osmolality:**  $2(\text{Na} + \text{K}) + \text{glucose}/20$  (coma: calculated osmolality exceeds ~ 340)

## FLUID MANAGEMENT

Assume about 10% dehydration (100 ml/kg). Give 1 liter/hour for 4 hours and then 250-500 cc/hour for the next 2-4 hours; then 100-250 cc/hour. Correct fluid deficit over 36-48 hours. Give NS initially; give 1/2 NS if corrected Na is >150 meq/l. Change to D5 NS or D5 1/2 NS when BG <200 mg/dl.

## ELECTROLYTE MANAGEMENT

### 1. Potassium:

Serum K <sup>+</sup>	KCl	Maximum KCl administration rate:
<3.5 meq/l	give 40 meq	Central line: 20 meq/hour
3.5-5.5 meq/l	give 20 meq	Peripheral line: 10 meq/hour
>5.5 meq/l	no replacement necessary	

### 2. Bicarbonate:

Generally replacement not recommended. May administer ONLY if pH <7.0; give 50 meq Na bicarbonate in 1/2 NS with KCl 20 meq/l over 1 hour. The non-gap acidosis that occurs in the recovery phase generally does not require management.

### 3. Phosphate:

Generally replacement not recommended despite anticipated fall during Days 1 and 2.

May administer ONLY if serum PO<sub>4</sub> <1 mg/dl.

Use sodium phosphate (3 mmol P/cc; 4 meq Na/cc)

Give 0.3-0.6 mmol P/kg/day. Give phosphate ordered in millimoles over 6 hours. Do not use if patient has hypercalcemia or renal failure. Monitor Ca, PO<sub>4</sub>, and Na.

### 4. Magnesium:

Administer ONLY if serum Mg <1.8 mg/dl or if patient has tetany; give 5 g Mg sulfate in 500 cc 1/2 NS over 5 hours (100 cc/hour).

## GENERAL GUIDELINES FOR ADJUSTING INSULIN INFUSION RATE:

### 1. When BG >200 mg/dl:

If BG has decreased by <50 mg/dl in the one hour period, increase the insulin drip rate 50-100%, depending on the degree of insulin resistance.

If BG has decreased by >200 mg/dl in the one hour period, decrease the insulin drip rate by 50%.

### 2. When BG <200 mg/dl:

Usually, starting the insulin infusion rate at approximately 2-4 units/hour is adequate. Generally, the insulin infusion rate should be 1 unit/hour for every 100 cc/hour of D5 1/2 NS (e.g., if D5 1/2 NS is set at 200 cc/hour, then the insulin infusion rate should be 2 units/hour).